As part of the Silicone Process Technology division in Waterford, NY, my assignment consisted of several core projects and numerous smaller, support tasks. The silicone family is the foundation of numerous products such as sealants and adhesives, rubber, and foam products for use in numerous applications such as construction, electronics, and personal care. The Waterford, NY site is the largest Momentive location in the United States and is home to over 1000 employees.

My projects were extremely immersive and collaborative in nature, and by the end of the term, I had worked to some degree with almost half of the entire Technology department in Waterford, as well as another dozen or so mechanics, technicians, contractors, and manufacturing engineers out in the plant. My supervisor was the NPI (New Product Introduction) Leader for the Waterford site, and my office-mate, who acted as a mentor, was an NPI engineer. However, most of my projects did not involve introduction of new processes but rather modification and continuous improvement of existing ones. Over the course of the term, I was able to develop an excellent relationship with my supervisor. Not only did I report to him, but I was also able to work directly with him on several projects, and this level of collaboration made my work experience much more enjoyable.

Most of my projects focused primarily in an area within the plant that, in which liquids and solids are fed continuously to process equipment and mixed to form a product. My focus was improving the capacity and capability of the mixing equipment by making modifications to core components of the machines. These projects included building and installing a modified funnel that would improve solids feed intake by eliminating several design flaws in the existing model; working with the equipment vendor to develop a new design that would better suit the properties of current grades.

Another project required me to use torque deltas and corresponding heat transfer calculations to gauge the effectiveness of using wider outlet piping so as to reduce backpressure and subsequently the temperature of a product that was bordering on the threshold temperature value for product degradation. After wider – and consequently, much heavier – pipe was determined to be a plausible solution, I had to work with the building maintenance leader to create an efficient method for the operators and mechanics to easily transport, install, and dismantle the significantly heavier pipe whenever this product was run. I also worked on several other projects that were designed to improve capacity and rates such as the installation of a new filler feeder and a feeder controller upgrade.

One of the biggest problems facing several of the products is variable product stability. Unfortunately, product stability experiments need to occur over months, if not years, depending on the product. In the past, variation in product stability seemed to be somewhat of a random occurrence. For example, one batch of product would have product stability two or three times greater than another. My goal was to develop an accelerated aging test based on first principles of fluid mechanics that would allow us to develop a correlation between the accelerated aging and real-time aging. This project was extremely collaborative and I worked with chemists, engineers, and an engineering consultant who was also a Six Sigma statistical analysis expert to develop a “Design of Experiment (DOE)” that would allow us to use the accelerated aging test as a tool to determine which factors of the product formation in the plant would lead to changes in product stability.
The final major project that I worked on was a lab-scale process design for a solvent-less continuous process to produce a product. This project was designed to assess the initial feasibility of converting a process that was currently run in batch cycles to a continuous process. My task was to apply principles of heat transfer and fluid mechanics to size static mixers, heat exchangers, chillers, determine required temperatures for the cooling/heating fluids, and to make recommendations regarding which vendors to choose in order to produce ~1000g/hr of product a specified temperature.

One of my learning objectives was to improve my verbal communication and presentation skills and I was given ample opportunity to do so throughout the term. I gave several presentations including a large presentation at the end of the term detailing my endeavors throughout the co-op session in front of twenty of my peers. On a smaller level, I also served a support function by pushing smaller projects to completion by obtaining the required approvals and signatures needed for the project to continue. This involved obtaining an intimate understanding of the processes in question so that I would be able to answer all questions posed by the various specialists who needed to sign off on the project. These smaller support tasks helped build my knowledge of silicone chemistry, which proved to be very helpful when I worked on larger-scale projects.

On the first day of work I attended a safety training seminar and afterwards I had to pass a quiz to ensure that I was aware of plant safety. These training sessions were quite useful as I often spent a lot of time out in the plant. The hallways of my office building were reminiscent of the halls in Baker Lab, with laboratories flanking the corridors. I was immediately outfitted with steel-toe boots, a lab coat, and a hard hat. I was also given prescription safety goggles. Lab coats, safety shoes, and the goggles were mandatory when working in the lab, and going out into the plant required wearing a hardhat. I shared a comfortably large – and newly renovated – office with a PhD chemical engineer who had begun working at Momentive in July. Immediately, she served as an excellent mentor and we would have regular, informative discussions on our current projects. Additionally, there was never any hesitation on my part to call one of the chemists or engineers whenever I needed assistance because they were all willing to offer help whenever I requested it.

Working in a chemical plant where numerous hazardous chemicals are used led to a number of unique situations that gave me an interesting picture of the dangers of working in a facility of this nature. In early November, an unexpected Hydrogen chloride (HCl) release resulted from a line rupture inside a production building, forming a massive HCl cloud – the largest in 20 years – that caused the adjacent highway to be temporarily shut down and for us to be placed under lockdown in our building for an hour while the cloud dissipated and the wind took it in the opposite direction. Though nobody was injured, and while our building was never in any serious danger, it was quite an interesting experience to see how such an event is handled in the real world – and it’s certainly an event I probably will never forget.

Other unique experiences involved having to deal with the company’s transition from being GE Advanced Materials to Momentive Performance Materials. Although it had been almost a year since the company became Momentive, the transitional period was still ongoing and this led to numerous minor annoyances such as a problematic e-mail and server migration. However, this gave me a more in-depth
view of the inner workings of a company. I also received all of the company-wide emails and attended the quarterly financial meetings, so I got a firsthand look at how a large business operates financially.

Momentive did not provide any assistance for my housing search, but rent is fairly inexpensive in the area and I was able to sublet a large, fully-furnished luxury apartment for $500/month via Craigslist. Momentive did, however, cover moving costs at an excellent rate, and this helped to cover all of the money spent on gasoline throughout the entire term. Clifton Park, the town of my residence, is a suburb about 15 minutes north of Albany, and my apartment complex was within one mile of a Price Chopper, a Super Walmart, Target, Office Max and a host of other department stores and restaurants. The town of Clifton Park is quite nice and my commute to work only took about 15 minutes each way. I was also about 15 minutes away from the Crossgates Mall in Albany, which is one of the largest malls in New York. Many weekends I either drove back home to central Massachusetts or drove to Cornell, as my location was equidistant and relatively close to both.

There wasn’t really all that much to do outside of work, and I spent most of my time on the computer, at the gym, or watching TV. I went to several movies throughout the term with a fellow chemical engineering co-op at GE Energy as well. While the writers strike hindered my ability to watch new episodes of my favorite shows, I was able to watch sports to my heart’s content.

Overall, my experience was excellent. While the silicone industry isn’t exactly glamorous in nature, I was put to work on useful projects and I was able to see the results of many of my projects by the end of my term. I was constantly challenged and at any given time I had several different projects to work on. Although I occasionally had to work overtime to complete all of my work, my projects were fulfilling enough that I had no reservations about doing that. The employees are all extremely friendly and helpful, and the atmosphere made it an easy decision for me to come back to the same function for the summer term.
As I wrote in my first job summary, one of the biggest problems facing several of the products made in a particular area of the plant is the issue of product stability variations. Because product stability experiments need to occur over months, if not years, depending on the product, an accelerated aging test was required in order to develop a correlation between the accelerated aging and real-time results. Through the use of Six Sigma tools such as “Design of Experiment (DOE)” we could determine which factors of the product formation would lead to changes in product stability.

Due to the study necessitating a correlation between accelerated aging and real-time aging, the samples had to sit for 6+ months before the data could be analyzed and correlated. This coincided perfectly with me returning for the summer, and I was able to pick up right where I left off. This project involved me learning and using advanced statistical tools to design and analyze models. I received formal and informal training in the use of two statistical programs, Minitab and Design Expert, that helped me analyze the data generated from the experiments that were conducted. I learned to read and understand ANOVA analyses, infer data from diagnostic charts, and apply model transforms as necessary. I also learned to read process data for the production machine.

One of the best things about my projects was that several of my projects informed the main product stability study, and I was able to see resolution in my main project because of the work that I had done on the smaller ones. During my first term, I also worked on process capability improvements and was able to implement physical changes to realize such improvements. Because of the work that I had done during my first term on improving the capability of the production equipment, many of the concerns that were previously present were no longer there. As such, the tradeoffs that once existed between different product quality attributes became obsolete. This was proven when a DOE was conducted out in the plant and the product quality remained relatively constant as different factors were changed.

In the end, I was able to offer recommendations on how to improve product stability based on strong evidence. I was able to develop a correlation between accelerated-aging and real-world data and I identified critical production variables to improve product stability and quality.

Unlike my previous term in the fall where I was the only co-op/intern, there were nearly thirty interns working at Momentive this summer – although almost all of them were either in manufacturing or finance. While I rarely interacted with the other interns on projects, Momentive did an excellent job organizing events and training exercises for all of the interns. The formal training included the introductory courses on Lean Manufacturing and Six Sigma that are taught to employees seeking their Six Sigma Green Belt. Outside of work, the interns scheduled a weekly dinner at local restaurants, and there was a large intern event that took place in the middle of July.

One of the major negatives about working during the summer is that many of the full-time employees use their vacation time during these months. Out of my 10+ work weeks this summer, my supervisor was away on business or vacation for three of them, while several members of the team also were on vacation for week-long stretches. In contrast, I do not recall anyone that I worked with using their vacation time until the end of December during my first term.
Momentive offered some short-term housing suggestions for the summer, but instead I subletted a room in a house that I found through Craigslist. Momentive provided a housing subsidy of $125/week that covered almost the entirety of the rent I had to pay. Momentive also covered moving costs once again, and the money that I received for mileage covered most of my gasoline expenditure for the entire term. I found that living in a house was much nicer than living in an apartment, and the two roommates that I had were really enjoyable to live with, even though they were in their thirties. I once again lived in the town of Clifton Park and the commute was about 15 minutes to work via back roads. Note that a car is required to work here – there is no way you can get around this area without one.

There was a large Planet Fitness two minutes from where I lived, as well as public basketball and tennis courts nearby. There was also a large swimming pool at the house that I stayed in, which was a luxury in the summer heat. I didn’t really take advantage of the location as much as I probably should have, and I spent most of my free time either at the gym or sitting around the house. However, there are plenty of things to do in the area: many coworkers would go to AAA baseball or arena football games; some frequently went waterskiing on Lake George; others would go to the racetrack in Saratoga. It is also very easy to go to New York City from Albany by train. Because I worked a large number of weeks during the first term, I was able to go on a family vacation to Italy for two weeks at the end of July, which was an excellent experience.

Because my focus during this summer was on the product study, I did not do much chemical engineering work during this term. I was familiar with the chemistry of the applications that I was studying because of my experience from the first term, and I was able to make informed decisions regarding the planning of experiments because I understood the chemistry. I found that knowing how to do statistical analysis is critical as an engineer – and I found I enjoyed doing it as well. Weekly courses taught by a Six Sigma consultant were offered to the technology department this summer, and I plan to further my knowledge by taking some statistics classes when I return to Cornell.

My overall experience with Momentive was excellent. Throughout the course of both terms, I was able to absorb tons of information through stories of past experiences that my coworkers would tell me about. These stories were invaluable because they were a true representation of the working world and would never be taught in any college class. It was after hearing some of these stories and experiences that I was able to make or augment decisions regarding my own academic- and career-path.

My experience with my supervisor was extremely collaborative during both terms. Many of the job summaries that I have read for other companies indicated that many supervisors were people that the co-op student saw once or twice a week for a brief meeting. In my case, I worked directly with my supervisor on many projects, and it was this collaboration that allowed me to learn more – especially when I took the opportunity to lead projects like the product stability study.

It was an interesting experience working in a chemical plant, and because I was in the technology department, I got significant experience working in a lab setting, an office setting, and even a plant setting – needless to say, all three are quite different. One of the most critical components of the co-op experience was learning to manage relationships, especially out in the plant. I learned to exhibit leadership qualities because I was able to manage relationships effectively. Further, by showing that I
was capable and interested, I was able to garner the respect of my coworkers. My coworkers treated me as a professional engineer and not just a co-op student, and, as a result, I was able to take meaningful projects with critical business implications and see them to completion.
Coop 1st Term Summary

I worked in the Waterford Process Technology group for Momentive Performance Materials. This was the same group and position as the previous coop Pawan K. Process Technology works on process improvements, new processes, and introducing new products in the plant. Originally, I was going to carry on with the projects Pawan left, however after about a month I switched emphasis to NPI (New Product Introduction) support. In the end, I had two main projects. One was continuing, and then concluding, Pawan’s project to improve product shelf-stability. The other was the introduction of a new product from lab-scale equipment to the production equipment in the plant.

The work on the product shelf-stability had a large focus on statistics and data analysis. I would check when a group of products was being run in the plant; then go out to the plant and collect samples. I would take the samples back to the lab, process/test them, take measurements of the samples, and then analyze the data. I also did a DOE (Design of Experiment) to determine important factors in machine set-up/conditions. A DOE is a term used for a general structure of an experiment, emphasized in Six Sigma teaching.

My mentor gave me some informal training in statistics, and statistical analysis software. Using that, I would then analyze the measurements I had taken of the samples. The statistics computer program would indicate which factors produced a statistically significant response; revealing what we could change about the process to best improve the product characteristics.

In this project, I was also able to design some of my own test/experiments for the samples to help provide more insight into the fundamental driving forces of the phenomenon. Some of those tests I did do, though the results weren’t as clear as I would have hoped; partly because I identified a previously unknown experimental pit-fall. I enjoyed this project because it allowed me to see a project from beginning to end. I collected and measured samples myself, and then analyzed the data. Then I could consider the next steps, with my mentor. However, some of the experiments we had to cancel due to the arrival of my next project, the new product introduction.

For a new product introduction, there are a variety of tasks that need to be done. Many of them are paperwork and information management. Some of them are closer to “school-like” engineering. I worked on the project very closely with my mentor. He did the large part of the coordinating and directing information with many different people for much of the information management work. We worked together on many of the remaining tasks; and I did some of the tasks myself.

One of the items which I did a large part of the work was the MOC (management of change) form. The form is intended to require those working on the project to inform all affected persons or areas, by getting their signature. The list includes EHS (Environmental, Health and Safety), waste management, quality, regulatory, and production. Through communicating and collecting sign-offs, I got an exposure to the different areas. Each person would have questions or concerns that gave me an idea of their area.
Another item was preparing a feed tank for a flammable input to the product. OSHA and the Waterford Momentive plant have a set of standards that govern how chemicals must be handled. For flammable chemicals, those standards are stricter. At the beginning of the project, we had to figure out exactly what the requirements were; which mainly involved meeting and doing walkthroughs with EHS and other people. Once we had identified our plan, to use the particular feed tank, we had a hazards review to identify potential problems or dangers as a result of using the tank to feed that particular material.

To prepare the tank, one of tasks was to ensure that the new material could be handled by the system. This is where I did some school-like engineering calculations. I was responsible for doing the pressure drop calculation to determine if the installed pump could deliver the necessary flow rate of the new material. I also did some pressure drop/flow-rate calculations on some of the safety devices on the tank. This was one of the only times were I directly applied a formula/lesson from school. Much more common was the need to think like an engineer, rather than using specific formulas or calculations.

The NPI also involved an aggressive timeline and was considered an important project. Therefore, I learned a lot about project management. The lead product chemist involved, my mentor, and I had weekly status meetings on the project to identify the most important items. The chemist and my mentor coordinated with the Global team on the project. I was also introduced to Gantt charts as a way of planning out a project. As part of project management, I learned how to deal with stress. Because the project was important and had an aggressive timeline, I initially felt stressed when delays and new obstacles presented themselves. However, after a few weeks, I managed to reduce/eliminate the stress involved with the project.

In addition to my two main projects, I also had a few side projects. The two largest of those both started by a co-worker walking into my mentor’s office with a question, while I was there (my office was next to his). These mini-projects were things that I wasn’t necessarily assigned to work on; but did so because they were fun or interesting.

I could set my start and end dates for my assignment. I worked from the end of August until the week before school resumed in January. I did go home for a full two weeks over Christmas and New Years. I returned because my project was near completion, my apartment lease didn’t expire until the end of January, and I wanted more flexibility in the summer. In retrospect, it would have been more economical for me to lease my apartment until the end of December (save a full months rent); and then not work for the two weeks in January. I worked 19 weeks in this term and have 14 available in the summer. Depending on how things turn out, I may work more than my required 28 weeks.

I lived in a single bedroom apartment in a nearby apartment complex, Strawberry Ridge. The other coop lived in an apartment with other college students, in Troy. My apartment was considerably more expensive; largely because I lived in a single bedroom instead of sharing an apartment. Brought furniture from home in a trailer. When looking at apartments, those that were furnished seemed to be much more expensive. A pro of my apartment was that it was close to Momentive. My drive to work was only ten minutes; and I also biked to work a few days in the fall.
Coop 2\textsuperscript{nd} Term Summary

In my second term I worked in the Global ChemOps Technology group for Momentive Performance Materials; I was still in Technology. The previous term, my project were focused on end products, but this term I was in a group that focuses on the chemical building blocks and intermediates for the products. This involved dealing with a lot more “classic” chemical engineering units, such as tanks, distillation columns, and reactors. I still sat in the same building and office, but I worked with different people and different areas of the plant.

My main project was looking at options for processing a waste stream. The project considered both the recovered value and the environmental impact of any new process. This differed from projects in my previous work term in that it was more long-term. I was only working on the conceptual stage of the project, where as last term I was more focused on the implementation step of new product introductions.

In addition to my main project, I also wrote a technical report on a project from my previous term. In the fall term, I did some support work on residence time distributions for a coworker’s project. My (previous) mentor and I thought that my work could be expanded into its own report. The TIS was partly theoretical focused; and I did calculations in Mathematica and Excel. Writing the report was a good secondary project for me to work on during lulls on my primary project.

For my main project, the first part was mainly learning about the process and the waste stream. My mentor gave me tours and reading material on the processes and equipment. I also read reports on previous projects dealing with the waste stream of interest. In addition, I worked on collecting data about the amount/volume of material that was passing through the processes per year. The volume information was stored in a database, but it wasn’t always in a usable form. I worked with Excel to retrieve, analyze, and store information from the database. I also looked up physical properties on some of the components in the waste streams.

After gathering information, my mentor and I came up with a few concepts for how we could process the waste stream. Part of this involved looking up information on different pieces of equipment, and trying to evaluate if they would be a good fit for the process. This involved looking at both the equipment manufacturer information, reading up on the general principles, and looking for academic analysis of the equipment in literature. We also looked up design information on processes Momentive already operated that were similar to the conceptual processes we were developing. Our concepts became more defined as we obtained new information.

Once the few major concepts were relatively well defined, I did some preliminary equipment sizing based on simple mass and energy balances. I did this in Excel, such that it was easy to vary the parameters; so as we obtained more information, we could update the size estimations. From this analysis, I was able to provide a reasonable guess at the sizes for the various vessels, heaters, coolers, and other equipment. We could compare the predicted sizing for the different process schemes we had developed, so that we could identify which schemes were most reasonable. In addition, the sizing allowed us to more clearly see the important parameters, and what things would need to be investigated
on a lab or pilot scale. A lab effort was being started co-currently with my work (at another site) that would be able to answer some of the questions.

The work this term differed greatly from that of my previous term. Because it was focused on a different area of the plant, I had to learn about that area. I also needed to have a more complete understanding of the area and the overall process; I needed to understand how the conceptual processes I was developing would integrate and fit into the overall process. In the fall term, I only focused on and really understood a small part of the area I worked in. There were fewer people that I worked with this term (compared to the previous). My group (those that have the same manager) itself was smaller than the previous term; and some were located globally (so group meetings always included a teleconference). I also spent very little time out in the plant. The fall work term was more task orientated, with a list of tasks that needed to be done before the next part of my project could proceed. This term, it wasn’t always as clear what should be the next task; I needed to decide the general direction in which to head. It was a different style of working than I was used to. The summer term was also shorter than the fall term; so it seemed that it was time to leave once I had gotten up to speed and actually moving with my project.

I was still working in the Technology department, so I imagine it was very different than if I had been a coop in production/manufacturing. One similarity between the two terms is that I worked very closely with my mentor (different person this term). It was my mentor’s project as well as mine, so we worked collaboratively. Also, I was always able to get help or guidance on my individual parts of the project when I needed it. Like the previous term, I did give a final presentation to my group and others; unlike the previous term, the presentation was given over teleconference as well as with a local audience.

For housing this term, I did a short-term lease (they called it a sublet) with a student housing apartment complex (Campus Habitat) in Troy. I put off looking for housing quite a bit longer than I should have; so I paid more than I could have had I sublet directly from students. One advantage was that the apartment was furnished with a bed, a couch, a desk and chair, and two coffee tables; so I didn’t have to bring my own furniture. The drive to work was about 20 minutes with traffic (the traffic wasn’t bad and only added a little time).

Same as my last term, I wasn’t very efficient when at home with a television. I would have not gotten cable tv, except that I wanted internet and they were a packaged at the apartment. I did go camping or hiking with my parents two or three weekends. I also went hiking by myself; but I don’t necessarily recommend that because of the greater safety risk (nothing happened to me, but don’t go alone particularly if your not familiar with the area). I also visited with family in the area a few times. I did take a week off in the middle of the summer to go home for a family reunion (and to take a break). The summer coop term did go by much faster than the previous term. Because of the number of weeks I worked in the fall, the summer work term was only about half as long.
On the first day, as soon as I came to work, I was trained and had to pass a test on safety procedures in the plant. It was very important to pay attention to the safety training, as unexpected situations tend to occur in chemical plants. Then they equipped me with steel-toed shoes, prescribed safety glasses, fire retardant lab coat, and a hard hat. As I was introduced to my supervisor, mentor, and other employees, I tried to keep in mind a few key things I learned from previous co-ops and in Cornell co-op workshops: be outgoing, introduce yourself to other employees, take initiative on projects, etc.

The Process Technology team in Momentive Performance Materials works on growth, productivity, capacity, and quality of new and existing silicone products and processes. As part of chemical-operations and process technology group, I was given two major projects that would improve productivity in existing programs. One focused on adjusting the process of an existing reactor so that the company can supply itself with an important intermediate instead of buying that material from a competitor. The second project was on a solvent recovery effort from wastes produced within the plant. Both of these projects required me to speak to many people including managers and leaders of different programs, production engineers, process engineers, chemists, and operators. By the end of my first week of work, I had already spoken to over 50 people at the Waterford Momentive site.

For my first project, the objective was to evaluate the quality of product after changing the feed ratio to a continuous reactor. There are three main feed streams to this reactor. Of those, one is a by-product returned to Waterford. The expected benefit of supplying internally is approximately $0.5MM to $1.2MM with a minimum cost avoidance of $50K from reducing railcar rental for storing the by-product material on site. However, a change in ratio of the feeds increases the likelihood of impurities in the intermediate material; this impurity may be an effect of corrosion or other unaddressed problems. The quality of the intermediate material was tested during the trial run to ascertain that they were in specification. The tests included basic lab analysis and some non-routine tests. The intermediate material is further treated in the plant to be used as reinforcing material for many silicone products. Some products produced in Waterford are sealants, rubbers, adhesives, etc. Once the trial material was treated, several representative rubber and sealant grades were made to see the effect of changing feed rate on the quality of final products.

In addition to the project on a continuous reactor, the second project is a long-term effort on solvent recovery. In order to reduce contamination after producing a certain product, solvents are used to clean out the reactor. Then solvents are transferred to the Waste Water Treatment Plant in Waterford to be incinerated. In order to avoid the cost of buying new solvents, my project was to evaluate the potential solvent recovery sites and characterize the streams at that location. The data collected will provide some information for upcoming projects on solvent recovery. When the samples were collected throughout the plant, I got to perform lab procedures that I learned in Organic Chemistry Lab. I also learned how to use Gas Chromatography-Mass Spectrometer to analyze all the components in the solvent samples.
Youngji Kim
yk335@cornell.edu
Cornell Chemical Engineering – Fall 2008
Process Technology

For both of my projects, time was spent in plant, lab, and office settings. In my office, I researched on the processes of reactors and kettles involved in my project. Going out to the plant and getting a tour from either the production engineer or an operator helped me further understand the process. There were plenty of documents and previous experiments I could have read up on, but it was easier for me to discuss the matter with other engineers. Not only did they give me answers to my questions but also recommended different approaches I can take to solve a problem.

Although this was my first time working in an industry like this, I was given full responsibility on my projects and I got to experience the high and low of working life. I have always heard from previous co-ops and interns that one of the problems they’ve experienced was bureaucracy within the company. I never knew exactly what that meant until this co-op term. Due to how the company is structured, I had to go through a fairly complex process of approvals at different levels to complete each step of project procedure. Although I was not able to execute my trial plan until the second half of my work term, I was given more time to attend company meetings and training sessions offered by Momentive. I found the decision making process and the hierarchical system in a bigger company very interesting.

For housing, the HR at Momentive provided a list of near-by apartments. However, most of these were unfurnished or too expensive. I found my housing on Craigslist. I subletted a room in a house near Rensselaer Polytechnic Institute with other RPI students. There are many colleges near Momentive such as RPI, SUNY Albany, Russell Sage, and Siena—so looking for a housing near campuses would be the most affordable way to go. With the generous housing stipend, I was able to pay for my all my rents and utilities.

For transportation, although there is a regional bus system called CDTA, it is not very convenient. I bought a used car in Albany before the beginning of my work term. This seemed to be more practical since there wasn’t a bus stop near Momentive and most of the grocery shops were 5-10 minutes away by car.

Outside of work, I went shopping at several shopping malls that were within 20 minutes of where I lived—Crossgates, Colonic Center, Stuyvesant Plaza. When the weather was nice, it was also interesting to walk around in Troy downtown, Saratoga, or Albany. Momentive provided membership at a company gym for $15 a month, so I also spent my time at the gym. It was especially nice to live with other college students, because I got to attend some RPI events like concerts and exhibitions with them.

Overall, this was a very positive experience for me. I enjoyed working on a project where the result will benefit the company significantly. Everyone here was willing to help with everything and my supervisors were very supportive of my decisions on my projects and always gave me advice on how I can improve. One thing I hope to do differently for my next work term is to find smaller projects on my own and keep myself busy all the time.
The idea of internal and external collaboration raised interest in using technologies like blog’s and wiki’s within many companies. Momentive is also exploring such methods of communication to expand its capabilities. Unlike the first term, I worked with the Enabling Technology & Innovation (ET&I) team for my summer ’09 Co-op. This is a newly formed team that promotes cross-strategic business unit (SBU) and cross-functional collaboration. The team’s goal is to develop an IT infrastructure to effectively share knowledge within the Momentive community.

Using the concepts of Six Sigma that I became familiar with in my first term of co-op, I started by defining the basis/problem/customer. Working in an IT-related field, I realized that my customer was Momentive. I interpreted one aspect of the IT infrastructure as an environment where all employees have access to relevant information regarding other employees of Momentive. In order to do this, I developed an organizational chart and personal profile for each individual on the company intranet. This way, there was a searchable set of skills that the employees have.

This co-op term, I was given an opportunity to experience the real working life. My work was not a “co-op assignment”, but the type of work that a full-time employee would be doing. I had to identify the problems and come up with the best solution. My main project and a couple minor projects were all defined in this way. Speaking with other employees was the key in many cases. Others had differing viewpoints and ideas that helped me identify areas where I can focus. It was also enlightening in a sense to hear the different approaches that IT, HR, and Technology groups would take. Although my job was not strictly chemical engineering-related, my work required me to use skills that all engineers possess—problem solving and optimizing the solution.

I expected to see more interns this summer, but given the current economic situation, not many interns were hired. Also, working experience in the summer, when everyone takes his or her vacation, was very different from the fall. Often, it was difficult for me to get in contact with some people.

For housing in this area, I contacted the students of RPI that I stayed with last co-op term. I sublet the same apartment from them. Momentive’s housing stipend helped in paying the monthly rent. Having a car here was very useful. Sometimes my work required me to travel between Waterford and the corporate headquarter in Albany. Although there is a public transportation available called CDTA, I find it inconvenient. In the summer, there are many events in Albany and surrounding areas that one can attend. My housemates and I enjoyed free live concerts on some weekends. When the weather was nice, I also liked going to the parks and lakes nearby.

Overall, my experience was positive and I enjoyed working in a more technology driven position. Figuring out my project from start to finish was a real rewarding experience and a great opportunity that not everyone will get before graduating college.
During the second term of my co-op assignment, I returned to the Momentive Process Technology group in Waterford, NY. The Waterford site is a large silicones production plant, manufacturing numerous consumer and industrial materials including sealants, adhesives, and rubbers. Process Technology specializes in improving production processes, new process development, plant support, and new product introduction (NPI). I had two main projects during the summer of 2011, both of which however differed in scope from the normal Process Technology functions.

Rather than working on new product development or laboratory to manufacturing scale-up, as would a chemist or chemical engineer in the group, my first assignment was a continuation of my project from last fall, studying and characterizing the material properties of a specific silicone elastomer (a viscoelastic polymer). Working under the same mentor from my first co-op term, I extended the investigation to probe for new material behaviors initially left out of the study due to time constraints. Additionally, I spent a majority of the summer continuing to document the work into an internal report for the company, as well as a paper and PowerPoint for presentation at the American Chemical Society Rubber Division meeting in October 2011.

My second project was also a fundamental study of material properties in one of the Momentive products, using similar testing methods to those utilized during my first assignment in the fall. Because I was already trained on the equipment, I was able to work autonomously on the investigation with little guidance from my mentor once I had acquired my samples for testing. I had to make the material first, however, and worked closely with my mentor and a lab technician in the group to learn the chemistry necessary to formulate my samples.

My co-op assignment at Momentive was an excellent learning and personal development experience for me. I gained so much more than I had ever expected from assignment, obtaining exposure to both industry and research. As one of my co-op goals prior to starting at Momentive last fall, I had wanted to apply classroom knowledge to real-life engineering scenarios. While much of what I had to know in order to complete my projects was learned on site, my fundamental understanding of material properties and a solid understanding of basic engineering math were everyday tools that I used to accomplish my study. I also had hoped to sharpen my written and verbal communication skills, both of which I had the opportunity to improve through my final reports and presentations.

I worked a total of 30 weeks during my assignment at Momentive. I lived in a three-bedroom house in Albany during the summer term, about 25 minutes from the plant. Momentive did not provide the housing, however they suggested several websites to aid in the search. I found my housing through a personal connection at school who knew the landlord of the house I lived in. I traveled most weekends, either back to Cornell to visit friends (as it was only a 3 hour drive), back to our homes in the Boston area (only 2½ hours away), or to visit friends elsewhere.

Overall, I had a very positive experience during my time at Momentive and I learned a great deal more than I ever would have imagined. The group I worked in was extremely welcoming and went out of their way to be invaluable resources to me throughout my assignment. Thanks to the excellent support and mentoring from my personal mentor, as well as the rest of Process Technology, I have decided to apply to graduate school, an idea that had previously intimidated me, however I now approach with a newfound confidence gained during my time on the co-op.