GRO Summer Internship Final Report

Green Chemistry
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During the summer of 2010, I had the opportunity to intern with EPA's Office of Pollution Prevention and Toxics' Green Chemistry program in Washington, DC, as part of the Greater Research Opportunities Undergraduate Fellowship, working with Richard Engler and Carol Farris, two longtime EPA employees. Along with all of the other EPA employees I met this summer, Richard and Carol were extremely friendly and made my experience this summer an enjoyable one.

The first month of my internship, our office was occupied with frantically putting the finishing touches on the Presidential Green Chemistry Awards Ceremony. This annual event recognizes large corporations, academic researchers, and small businesses that are incorporating sustainable chemistry practices. Most of my duties related to the ceremony involved corresponding with invitees through an online RSVP management system. I also read through the eight-page nominations of 2010's five winners, which included several multi-billion-dollar pharmaceutical companies (Dow and Merck) and a pesticide company (Clarke). A smaller corporation, Solazyme, which did not win an award, but whose work I found fascinating, is making biofuels from a biological pathway in algae. It uses the lipids (mainly in triglyceride oil form) that algae produce to store energy to produce the precursors of useful products (car and jet fuel, soap, etc.) traditionally manufactured from petrochemicals. It is fascinating to be able to directly explore the chemistry that makes our modern lifestyles possible, and especially exciting that so many leading corporations are finding ways to incorporate environmentally sustainable chemistry into manufacturing and production processes.

I also assisted in drafting congratulatory letters to the award recipients that were eventually signed by EPA Administrator Lisa Jackson. Helping to create a letter that was signed by one of the Federal government's most important individuals, appointed by President Obama, was a task that I assured I completed with care and precision. It was also one that induced feelings of nervousness! The certificates were also signed by Nancy Sutley, who heads the White House Commission on Environmental Quality for President Obama. Several times, I had to run a stack of several hundred certificates back and forth from the EPA building to the White House to be signed. I even narrowly avoided a potentially devastating rain storm by sprinting across downtown DC with the certificates in hand.

Our efforts to prepare for the ceremony concluded about halfway through my summer internship. The day of the Awards was a relatively frantic one. It was filled with last minute preparations, such as ensuring all of the catering, location, and certificate details had been taken care of. Additionally, we had to move approximately 120 framed certificates from the EPA Northwest building to the banquet hall in the Ronald Reagan International Trade Center. Although the locations are located adjacent to one another near the Federal Triangle Metro stop, this did not simplify the matter of transporting these items from point A (the EPA) to point B (the awards venue in the Reagan Building). Getting them there showed me, on a small scale, some of the complexities government workers can face when attempting to get something done. We trucked them around to various entrances before we actually found the correct one. Eventually, however, we did get into the building and set up the hall for the event, at which I was able to see EPA Administrator Lisa Jackson deliver the keynote speech.

The rest of that week was filled with the American Chemical Society's Green Chemistry and Engineering Conference held at the Capital Hilton. I attended two days of presentations and speeches by such notable presenters as Dr. Robert Grubbs, who won the Nobel Prize in Chemistry in 2005. Steven Webster, Senior Vice President for Research and Technology Commercialization for 3M (the company behind many consumer products, most notably Post-it™ notes and Scotch™ tape) also gave an interesting speech on the industrial sector's incentives for using greener manufacturing processes for economic and environmental benefits.

After two days of events like this, the week ended with a student workshop hosted by Beyond Benign, a company aimed at educating students about Green Chemistry. This workshop took some of the lessons learned throughout the conference and helped us put them into action on a practical level. Along with postdoctoral, graduate, and other undergraduate students, I interacted with elementary-aged students from the DC area and helped demonstrate green chemistry techniques. We performed this event at the National Education Association's headquarters, and my booth with the students specifically focused on creating "greener polymers." To do this, we helped the students use vinyl benzyl thymine to create artwork on transparent sheets of plastic when the compound was exposed to ultraviolet light. Overall, I had fun interacting with the local students and it seemed like they learned a lot and had a good experience learning chemistry from us! With all of the events, this was definitely the most fun and engaging week of my internship experience at the EPA.

The second half of the summer, I worked on an independent research project exploring the Toxic Substances Control Act (TSCA) and current efforts in Congress to reform its weaknesses. I definitely learned some new things about this important piece of Federal legislation. I primarily used computer-based research tools and databases. This project was especially insightful since the branch of the EPA I worked with this summer relies on TSCA for its regulatory authority and legislative mandate. More than any other environmentally-focused law before it, TSCA attempted to arm the United States government with the regulatory tools it needed to ensure the chemicals that companies were using in their industrial production processes were not excessively harming the nation's environment or human health. EPA was given the task of implementing TSCA, and the wording of the law particularly singled out harmful poly-chlorinated biphenyls (PCBs). By targeting them from the onset, Congress was able to immediately address PCB pollution, an issue of national significance.

From its inception, however, TSCA's regulatory abilities have been relatively limited in scope and effectiveness. For one, TSCA does not explicitly classify chemicals as toxic or nontoxic. Instead, it uses a constantly expanding, at least in theory, chemical inventory to regulate what chemicals can and cannot be used in industry within the United States and by companies importing products into the country. Chemicals that are listed on the inventory are classified as existing chemicals while those that are not yet listed on it are considered new chemicals. A "new chemical substance" is defined as "any chemical substance which is not included in the chemical substance list compiled and published under TSCA section 8(b)." This list, called the TSCA Inventory, is a compilation of all chemical substances in commerce prior to December, 1979. All chemicals on the market prior to this date, approximately 99% by volume of what is on the market today, are classified as existing chemical substances. These chemicals are considered safe unless the EPA can demonstrate that they present an unreasonable risk to human health or the environment. Needless to say, this places the burden of proof on the EPA and often renders regulatory attempts ineffective.

Working at the EPA this summer has reinforced my commitment to a career with the Federal government. This fall, I plan on applying to several student career introduction programs that would facilitate employment with the EPA. I am currently exploring the Student Career Experience Program, the Federal Career Intern Program, and the Environmental Careers Program and have talked with several employees in my office about these opportunities. This summer, I also applied and interviewed to join the Peace Corps next fall, hopefully working in some sort of environmental education program. I am exploring both options, and should I get accepted to both programs, I will have to evaluate which one I want to pursue. Both, I believe, would be beneficial to my long-term plans to pursue a career with the EPA.

Overall, my experience with the GRO Program has been highly beneficial, and I would encourage next year's interns to plug into their offices as much as possible and to also explore the cities they're living in. I have been able to experience DC beyond the tourist sites, and it has made me realize I would like to live and pursue a career in the Nation's Capital.