THE BIRTH OF A RENAISSANCE PERSON

GRAND CHALLENGE SCHOLARS PROGRAM PORTFOLIO

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Much like the drastic transformations touted on late night infomercials, Olin has toned, sculpted and transformed me these past four years with amazing results. My time here has helped me to cultivate my passion for the environment and sustainability, encouraging me to constantly reevaluate my worldview and question my perspective on everything. When I sit down and reflect on my four years, I have certainly become a better engineer, but what is even more important is that I have become a better person overall. The story of my time at Olin is, therefore, not just about me becoming a well rounded engineer, but rather a Renaissance person.

Olin does not offer a typical undergraduate experience, and for that reason I feel even better prepared to handle the problems that wait for me after I graduate. From my interdisciplnary and service oriented experiences, as well as my SCOPE project, I have become an engineer ready to tackle the grand challenges of our modern times.

YEAR ZERO

Two weeks before I was to start Olin, I broke my ankle quite severely, and was forced to take a gap year. I was bedridden for 6 weeks and it was 6 months before I was ambulatory again. Despite this setback, I still mark this as the beginning of my college career. During that gap year I took classes in philosophy, toured the collegiate debate circuit, and would take machine shop classes at night, and worked during the day. I learned so much about being an everyday adult, from managing my finances and choosing how to do spend my time. This gap year also set the tone for my collegiate career. While bedridden, I spent my days thinking about electric vehicles, and all the things I wanted to do at Olin. While many of those activities never came to fruition, it did set me apart from my peers as it allowed me the time to reflect, and prepare myself for what I wanted to achieve from my college experience. It grew my thirst for knowledge, my passion for electric vehicles, and my desire to start something big.

Additionally, this break from school gave me the opportunity to reflect on my educational career up until that point, and how I wanted my next four years to be different. I wanted to focus on gaining knowledge, not cultivating a perfect GPA. I wanted to prepare myself to make a difference, and to make a lasting impact on the world.

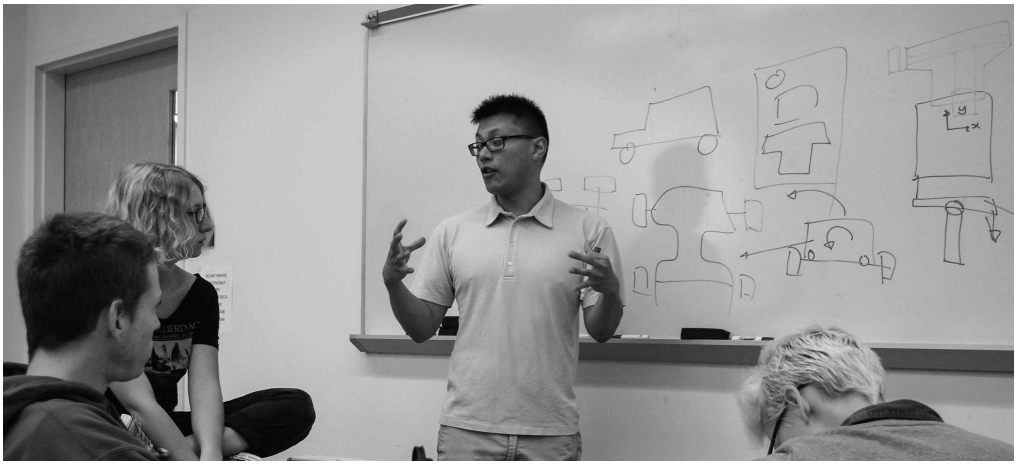
INTERDISCIPLINARY AND ENTREPRENEURIAL EXPERIENCE

Any retelling of my Olin story would be incomplete without mentioning REVO, Research of Electric Vehicles at Olin. My first year at Olin I co-founded this student team, with the hope of gaining knowledge and teaching others how to build electric vehicles, perhaps even making the product of our research open source and allowing anyone who wanted a simple and easy way of making awesome electric vehicles. In pursuing this goal I learned so much about teaching, entrepreneurship, and broadening the scope of my knowledge base.

In the beginning, we were a ragtag team of first years and sophomores trying to build high powered motor controllers, not even knowing the difference between transistor types or what even a microcontroller was. Fast forward four years and we have several incredibly technical and complicated projects ranging from smart battery chargers to CAN bus implementations, as well as advanced fabrication techniques and research into new and creative ways to make better frames and suspension elements. This was no accident, but rather the product of four years of dedicated team members driven by a singular, overarching goal: to make pure electric awesomeness.

Gaining knowledge in college is easy, the difficulty, however, lies in actually putting that theory into practice. Batteries, electric motors, raw stock are all expensive and it is difficult to do anything without funding. REVO's growth as a club mirrors the amount of funding we have had available. Our first year was a tale of waiting and waiting on grants, not being able to even afford $20 for an Arduino Uno to play with. Our next project was an electric go-kart that had all the parts donated at a huge discount. Then when our budget began looking a little healthier we built a reverse trike completely in house, flexing our design skills. Now, as I prepare to leave REVO, we have the good fortune of being able to compete and build a Formula SAE vehicle, a project with a $20,000 projected budget.

None of what REVO has accomplished is the work of any one person, and the value of a committed, and cohesive team has been a huge lesson to me, and it has encouraged me to give back and pay forward the wisdom of others. Knowledge transfer is a big factor in REVO's success, making sure that the new members are ready to continue the technically challenging projects when the older members graduate or move on. This was not easy to achieve, as it is incredibly frustrating at times knowing that you or someone more experienced could do a project in a matter of days that would take a novice weeks or months. When a semester is only 16 weeks long, that difference really matters. Yet it is much more important, both from a learning and member retention perspective, to spend those weeks and months to train and grow new members, rather than to build amazing products that no one knows how to fix or rebuild.



GLOBAL AWARENESS

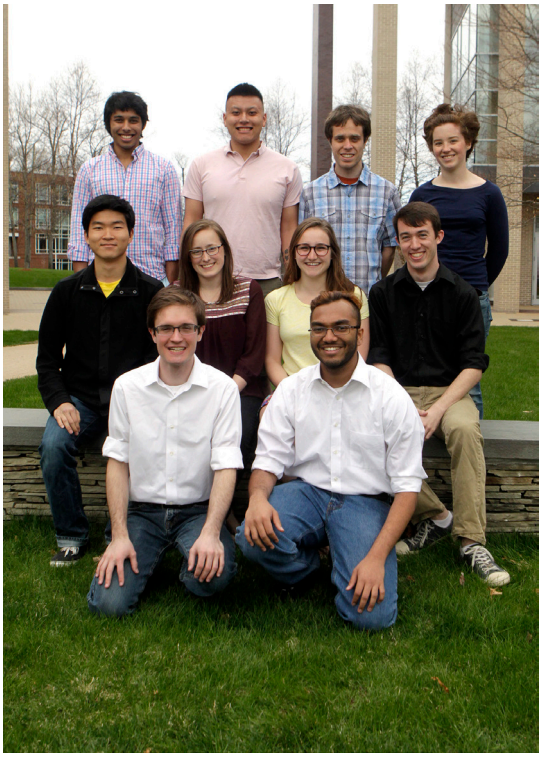
The summer after my first year, I had the good fortune of being employed as a summer intern for IMEC in Belgium. Each day I would work with a team of 16 other Belgian graduate students, and a foreign exchange student from China, building the first 3D printed Formula Student race car. Through this experience I not only became intimately familiar in designing parts using the metric system, I also gained a deep understanding of the Belgian culture and lifestyle. Whenever I went to work my colleagues would speak Flemish-Dutch, and only speak English when they were talking to me. I embraced this environment wholeheartedly, and by the end of the summer I was able to understand a good deal of the conversations. From this complete immersion came a lot of cultural learnings as well, ranging from attitudes towards leisure time, education, and life goals.

Not only were my team mates more traditionally eduated, their attitudes towards design and engineering were completely different than what I had been exposed to at Olin, and helped me to understand and reframe my view of engineering. There were some ideas that were lost in translation, such as differences in vocabulary, or switching over to designing solely in metric.

Finally, I also realized the importance of manufacturing abilities, and how much the project hinged on sourcing the right parts and contacting the right vendors from the world over. Even with a small student project parts for the vehicle came from China, the UK, the US, and all over Europe. From this experience I gained a new appreciation with what it meant to be globally minded, especially as an engineer.

SERVICE LEARNING

CORe, Council of Olin Representatives, our student government, has been one of the most important activities during my time at Olin. My experience with student government began my first year as a class representative. I took a hiatus my sophomore, but still felt drawn to read the meeting minutes and keep up to date on the goings on. Junior year I returned to the table as a class representative again, and was elected president my senior year. Throughout my time at Olin, I constantly questioned why I continued to be part of the organization and if I was actually making any impact.



It was not until that I sat down to write this reflection that I saw and understood the impact CORe had was not necessarily on others, or Olin as a whole, but rather myself as an individual. Through my time I gained great insights on maintaining and managing large organizations, the power of delegating and the necessity of trusting members of your team, and to adapt to change. I have had the privilege of sitting in on meetings of the Board of Trustees, calling senior officials of the college my colleagues, and share my vision of Olin to a whole generation of prospective students.

RESTORE AND IMPROVE URBAN INFARSTRUCTURE

During the summer before my senior year, I had the exciting opportunity to do exploratory research for a new SCOPE team that was forming in the 2014-2015 academic year. SCOPE stands for Senior Olin Project Experience, and is analogous to many of the Senior Design projects that exist at other institutions. At Olin, however, the difference lies in that SCOPE is sponsored by an outside entity, usually a corporation, and the students receive a specific project topic to tackle.

My SCOPE project was to improve traffic safety. My sponsor, the Santos Family Foundation, is a non-profit charity that focuses solely on reducing traffic related fatalities. For nearly a full year, from late May of 2014 through to early May of 2015, I was engaged by the foundation to help develop a project that has the potential to revolutionize traffic safety. This project was one of the most rewarding and challenging projects I have ever undertaken. The prompt was to improve road safety, by whatever means necessary. The only real metric was that it needed to have a wide impact and the foundation really wanted to spark a grassroots change.

SANTOS FAMILY FOUNDATION

Billions of individuals use roadways every day, the world over, each with their own agenda, style and attitudes. How could my team and I possibly capture all those attitudes and craft some product or program that would encourage safer driving?

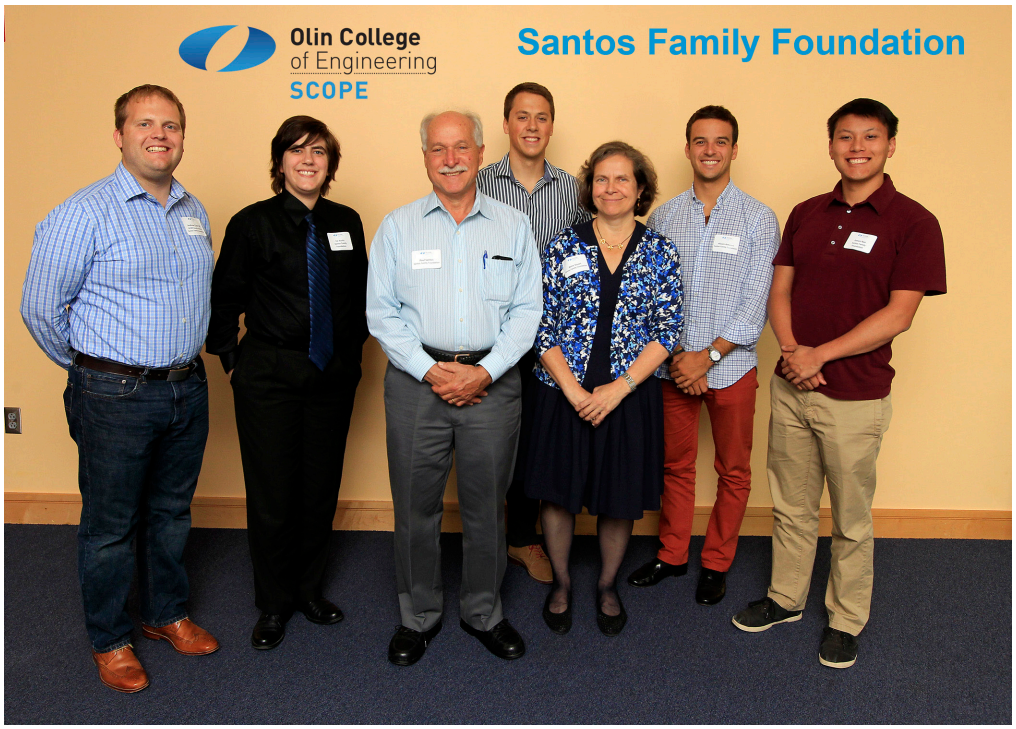
The summer team and I focused heavily on interviewing a wide range of users, especially experts in the automotive industry, from transportation lawyers to crash reconstructionists. We also spent a significant amount of time interviewing everyday drivers, to dive deep and understand the various user groups that travel American roads. We narrowed down the field of ideas through our user interviews and deep dives and provided the SCOPE team with 4 topic areas to further explore.

During my senior year, I continued work on the project. Based off of the exploratory research done in the summer, we had originally planned to dive right into building a technical product. As we began construction of the product, we realized that the research the summer team had donw was incomplete, and that our product would not be as effectual as we would have liked. Instead of pursuing the project further, we decided to pivot and head back to the drawing board. This was a crucial decision, and a scary one. Pivoting meant dropping all the work and effort we had invested, and starting anew. Looking back it was clear that our eventual success would not have been possible without this pivot, but at the time it was incredibly nerve wracking.

For the remainder of the Fall 2014 term we studied the state of affairs in traffic safety and came to two major understandings. First, safety is not cool and no user, from drivers to pedestrians, are that invested in their personal well being. Second, better infrastructure is the key to safer roads, and traffic engineers are the ones making the changes. Our goal then was to help traffic engineers make better, more well-informed decisions.

From this goal our product was born. We wanted to offer a low cost, easy to use platform that would gather traffic data from all over, process the data and return trends and figures that would help inform the actions that traffic engineers should take. This would include building the hardware platform, communicating with a web server, and then designing a seamless user experience that would bring traffic engineering tools into the modern age.

This idea came from what we saw as a huge need in what traffic engineers have available now. Currently, traffic engineers have a limited range of tools available to them, and while there are modern tools on the market they are often priced beyond the reach of small to mid-sized towns, places where these tools could have the most impact. This is even before the technical difficulties of installing these sensors, and training the town engineers, often older individuals, to use the software. It was our goal then to develop a low cost, intuitive platform that would allow engineers in small towns to make more informed decisions as to what course of action to take when considering infrastructure changes or improvements.



LOOKING AHEAD

Going forward I do not know what future challenges are in my path, engineering or otherwise. Regardless, I feel well equipped to tackle them head on, and to grow and learn from them. In choosing a title for this portfolio, I made it clear that my Olin experience was the creation a Renaissance Person, a well-rounded, solidly educated individual. While the phrase is usually Renaissance Man, a major piece of my time here was the exploration of equality in the engineering context, as well as our society as a whole. Through all my activities, from my gap year through to my SCOPE project, this conversation existed as an undercurrent in all that I did. Through Olin I have truly become a Renaissance person. Not only have I gained a deep understanding and knowledge of the sciences, I have really grown my soft skills; working with a diverse set of people on many different projects, communicating ideas and finding solutions when we cannot agree.

I have come to develop a passion for team building and creating structures to grow and improve my community, and hopefully the world. Olin has helped me refine those skills and see where my strengths and weaknesses lie, and prepared me for the great big world outside the bubble.