Final Reflection on
My 2016 Summer Research Experience
at St. Louis University

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This summer, I had the opportunity to take part in the six-week Students and Teachers as Research Scientists (STARS) program in St. Louis, MO. The program pairs high school students with scientific research investigators to work on a project and complete a research paper. I was paired with Dr. Scott Sell of the St. Louis University Biomedical Engineering Department and worked on creating a type of “band aid” that would help heal skin wounds that don’t repair themselves.

Research Talks

A couple of days a week, STARS students would gather in an auditorium in the morning and listen to lectures. These lectures were almost always presented by a scientist or physician who was sharing his or her research and development goals. We learned about many interesting topics—from the importance of bees to the particulars of reconstructive surgery. (Occasionally, we would also hear talks from local admissions counselors, discussing ways to optimize college experiences or excel in the application process.) The research presentations provided useful insights into how the scientific process works and eased some of my concerns about lab work during the STARS program and the school year.

Work in the Lab

Five days a week, I would go to the lab and work on my research project. Although the lectures were interesting, the lab was what I really looked forward. My project was headed by Emily Growney Kalaf, a Ph.D. candidate who was working under Dr. Sell. The full project title was: “Characterization of Nebulized Slow-Gelling Alginate in Electrospun Polycaprolactone Scaffolds as a Composite for Dermal Wound Regeneration.” That still makes me blink my eyes every time I read it. I worked on investigating how to create a material made up of bio-compatible plastic woven into thin fibers with sprayed-on gel beads, which were made from seaweed. The idea was that the gel beads would stimulate the healing process when used in conjunction with live skin cells or growth hormones to heal the wound. Working on a technology that would be capable of helping millions of people inspired me to work hard every day.
The first week in the lab was “Research 101.” I learned the ins and outs, from mixing chemicals properly to wearing the right protective equipment. In addition, I was taught many of the basic skills that I would need to start working on my own, including how to spray the gel using a process called nebulization. As each day passed in the lab, though, I was given more and more freedom with the project. My knowledge gained in the lab was supplemented by work at back at the dorm. I remember my Ph.D. student handing me more than 100 pages of dense reading materials and science papers on the first day of lab. I couldn’t even pronounce half of the terms in those papers! By the third week, though, I had absorbed much of it and was able to work almost on my own. It was a totally new experience to be in charge of conducting experiments and collecting so much different data. Additionally, it felt strange to be working on something that no one else had done before. Working in the lab was a tremendous departure from high school science labs. If an experiment wasn’t working properly, you couldn’t just ask the teacher what needed to be changed with regard to what you were doing. Instead, you had to break down the whole process and figure out exactly how, why, and where you should modify the experiment to get the results.

One of my favorite moments in the lab was when my Ph.D. student and I decided that we needed a better way to hold up an aluminum disk used for making the plastic-fiber scaffolds, so she had me design and build an apparatus. The way that I had been doing it up until that point involved suspending the disk with electrical tape, which was inaccurate and often took a very long time. That day, I considered using materials ranging from Styrofoam to ceramic tiles, which we had in the lab or had foraged. I cut, sawed, taped, glued, and tested different options to best serve our needs. When the device was finally complete, I was very proud of my work. It made setting up to spin the fibers much easier. In fact, they’re still using that creation in Dr. Sell’s lab!

Final Product

In addition to collecting data, STARS students also must write a scientific paper on their research project. Each week, we turned in the progress we’d made on our papers to our advisors so that they could make suggestions on how to improve. At the end of the program, we were given the opportunity to present our research to an audience that included parents and other professors. I really enjoyed showcasing all of the hard work that I had done and also watching other students present their research. Discussing the particulars of each project and asking questions about scientific procedure or application was a true highlight of the program. There were more than 100 student presentations that one could watch that day! Over the course of six weeks, I couldn’t believe how much I had learned about research—both in and out of the lab.
Residential Life

The residential portion of STARS was just as scary as it was extremely fun. I had been to other residential summer camps away from home, but I was not prepared for staying at the University of Missouri-St. Louis (UMSL) dorms. During previous camps, there were always RAs and a lot of kids taking the same classes. At the UMSL dorms, there were no RAs and just a few STARS kids, none of whom had the same professor as I did. It was really weird to think that I could leave my room at 2 a.m. and go for a walk or take the Metra to the city center and go see monuments. Getting adjusted to this freedom and figuring out how to do simple things, like buying groceries and living off of them, was very difficult. It was easy to spend too long at the lab trying to finish an experiment so that, by the time I actually got back to the dorm and needed to have dinner, it was 9 p.m. Balancing my passion for research at the lab with writing a paper, spending time at the dorm, and continuing to live in a healthy way was undoubtedly the most challenging thing that I have ever done in my life.

Luckily, I had amazing friends to help me through the process. In total, there were about 10 STARS kids living at the dorms together for six weeks, so we grew really close. We watched movies late at night, visited museums and malls, went to parades, and even grocery shopped together. Within our group, we had students who loved as close as an hour away from St. Louis and those who lived as far as Greece and Korea! One of my favorite memories of dorm life was cooking and enjoying a meal together. There were noodles, pita bread, a Greek yogurt dip, Indian foods, Mexican soda, and waffles. The kids I met were very intelligent, extremely talented in their own ways, and very hard working. There were more than a couple of nights when we all stayed up into the morning hours, working on our papers or painting our faces. I definitely plan on staying in contact with all of them and visiting them whenever I have the chance.

Looking Forward

After going through the STARS program, I feel much more prepared for college and beyond. Interacting with so many undergraduate and graduate students has given me a really good understanding of what it takes to succeed in the world of research and what the life of a biomedical engineer is like. My six-week experience with conducting experiments aimed at discovering methods to heal dermal tissue has really instilled in me a love for research. I know that I’ll apply the skills that I learned at SLU in college and very likely throughout my career.

I can’t stress enough how much I learned at STARS. My most important take away from the entire experience was something that my Ph.D. student told me when I was struggling to finish experiments: “In science, it doesn’t have to be perfect, it just has to be consistent.” I’ve taken that quote to heart and applied it to both academic and personal aspects of my life. I feel very
lucky to have participated in this program and would highly recommend it to students with an interest in scientific research.

I’m very thankful to the STARS program, Dr. Sell, and everyone in his lab—especially Emily Growney Kalaf. Of course, none of this experience would have been possible without the generosity and support of the Garwin Family Foundation (GFF). Their advice and fantastic program have guided me to being a better individual and given me the confidence to explore my passions. Thank you so much, GFF!