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My Beckman Experience

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Beckman Scholar 2004-05



My Beckman Experience

As a recent graduate of the University of Kentucky, I am often asked for advice by my younger sister and her friends concerning their upcoming freshman year. I had a busy four years as an undergraduate student, and I always tell them that becoming involved in something you are passionate about is the most important thing. Then comes the next inevitable question: what did you do?

This question always causes me to look back and take stock of my experiences. What was the most important thing? Becoming a leader through my

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sorority or Alpha Epsilon Delta? Volunteering in a children's hospital? Filling my semesters with difficult classes and keeping my 4.0 intact? All of these things are important in my life and have helped me become the person I am now; but one special area of my education made a bigger impact on me than any other. I spent two years learning from and working with Dr. Robin Cooper in his neurophysiology lab. If this sounds like an intimidating place, you would be partially correct. When I tell people that I work on a neurobiology research project, they get a wary look on their faces. That look only worsens when I explain that I use crayfish as my model organism.

I have always loved science and English in school. In high school, instead of choosing electives like year-book and advanced gym, I elected to take anatomy and second year chemistry. I also enjoyed my variety of English and humanities classes, in which we studied literature, classical music, and art. I believed, and still do, that these seemingly separate disciplines of science and art are in fact beautifully intertwined. Is a science experiment really that removed from an artistic composition? Both follow specific rules, and yet search for something new and different.

When it came time for me to choose a college and major, UK appealed to me because of its Honors Program (in which I could participate with other students in in-depth study of art and literature) and because of the thriving undergraduate research programs in the sciences. I knew I wanted to be involved with research in my college years, and it seemed that I had many options open to me.

At the end of my sophomore year I mustered up the courage to go speak with Dr. Cooper about joining his lab as an undergraduate. I had no idea what I was getting into, but I was intrigued by the work he was doing with the complexities of the nervous system. His students all had projects that you will find in scientific journals, and he cared (and still does care) more about his students than anything else. My biology classes taught me a few basics about nerves and science in general, but I wanted something more. Believe me, I got what I asked for.

I am studying the dynamics of vesicle populations in motor nerve terminals. This basically means that I am trying to figure out the inner workings of the communication between nerves and muscles. I examined whether the vesicle pools are equally recruited during electrical activity and in the presence of neuromodulators such as serotonin. Serotonin is important in humans as well as crayfish. Many nervous system disorders stem from an imbalance or improper use of neuromodulators, and from problems in communication between nerves and muscles.

To study the vesicle pools, a specific neurotoxin

is added to the nerve, and a computer records the results. These vesicles are like beach balls within the nerve that carry a chemical messenger called glutamate. When stimulated, the vesicles release their chemical to a muscle, and the message is passed from nerve to muscle. I have found, through my research, that two pools of vesicles are preferentially regulated differently. One is regulated by electrical stimulation while the other is regulated by the neuromodulator serotonin. The goal of my work is to provide insight into how the nervous system works on a vesicular level, so that a little more light can shine into the uncertainty that is neuroscience. Hopefully this work can lead to more questions and answers that can help scientists and pharmacologists design better therapies for patients suffering from all varieties of nervous system disorders.

I now have a published research paper on which I am first author, and have a variety of presentations under my belt. I was given the opportunity to speak with the Kentucky legislature about the importance of higher education. I discussed my project *Theatrical Discourse in Early Modern England* with students, teachers, faculty, and state government officials from all over the state. These experiences are important, because scientific research involves more than bench work. I count myself lucky that I was able to see and participate in all areas of research, from data analysis and poster presentations to writing and publishing a scientific paper. I am excited to know that the data I have found will fuel future projects in Dr. Cooper's lab. My work will be the foundation for further study, and may open up new questions that demand answers. I know that only a small percentage of college students are fortunate enough to have a scientific background that is this complete.

The Beckman scholarship was an asset in my role as an undergraduate researcher and in expanding my scientific education. I was able to travel to international neuroscience conferences to present my research and speak with some of the most knowledgeable people in the field. At the annual Beckman Symposium in California, I was able to speak with other students from top universities across the nation and see the astounding variety of research that is going on in undergraduate labs. The sheer volume of experience and knowledge at the Beckman Symposium makes me proud to be a part of it, and proud of all the undergraduate research that is taking place at the University of Kentucky.

As I begin medical school at the University of Louisville, I take with me everything that my time as an undergraduate researcher has taught me. I know that my time in Dr. Cooper's lab will serve me well in my future and help me be the best physician and scientist I can be.