

Personal and Educational Experiences

Throughout my upbringing, I was primed for a career in science. I could not escape the lure of discovery. This passion was instilled by my parents during family vacations to the Museum of Nature and Science, the zoo, research aquariums and many national parks and historic sites. These family trips, while entertaining, fostered a sense of inquiry and curiosity about the scientific world. In high school, I fed this curiosity through several lab-based science courses, where knowledge was gained by trial and error and not just through textbooks. In college, hands-on instruction both in a research lab setting and in lab-based courses, especially my first microbiology course, was influential in charting my career path. My professors' passion for teaching the biology of microbial infectious diseases made me appreciate the importance of understanding the mechanisms that drive microbial fitness and showed me how science can be effectively communicated to a broad audience. These experiences were augmented with lab experience that exposed me, not only to hypothesis-driven research, but also to training on how to share scientific discoveries with others, advance the knowledgebase, and drive the field forward in an ethical manner.

Undergraduate Research and Education: I completed my Bachelor of Science degree in microbiology at [REDACTED] with a minor in biomedical science. During my time at [REDACTED] I performed undergraduate research in the laboratory of Dr. [REDACTED], who studies opportunistic pathogens of the genus *Burkholderia*. In Dr. [REDACTED] lab, I worked on three research projects:

- In my first project, I identified the level and extent of antibiotic resistance for three unstudied strains of *Burkholderia* by determining the minimum inhibitory concentration of several antibiotics required to prevent or hinder growth. My results were published in a *BioMed Central* Research Notes article and a first author publication in the *Journal of Undergraduate Research and Scholarly Excellence*.
- My second project involved the study of a putative novel iron-acquiring system in an attenuated strain of *B. pseudomallei*. Here, I made deletions in known iron acquisition systems harbored by this strain and determined the fitness of the bacterium in the presence and absence of iron.
- In my third project, I worked with a temperature-sensitive plasmid replicon trying to pinpoint residues that contribute to temperature sensitivity. This research was supported by the American Society of Microbiology (ASM) Undergraduate Research Fellowship and culminated with a poster presentation at the 111th general meeting in New Orleans, LA. This project also became the foundation and subject for my honors thesis project.

The mentoring I received from Dr. [REDACTED] (Ref. 3) and Dr. [REDACTED] instilled a desire to broaden my knowledge in the field of microbiology. Therefore, attending graduate school in the biomedical sciences discovery was a natural progression in my training.

Graduate Research and Education: Completing my experience at [REDACTED] I applied and was accepted to several graduate programs. I chose to attend [REDACTED] to pursue an [REDACTED]. During my first year of coursework and laboratory rotations, I experienced firsthand the open and collaborative nature of [REDACTED] researchers through seminars and symposia, labs from different scientific facets share their work and accept feedback that ultimately propels investigation forward. For example, the department of [REDACTED] encompasses a diverse group of experts, presenting a

unique opportunity to utilize the knowledge in these broad fields. During the required rotations in the [REDACTED], I worked in labs encompassing basic biochemistry and bacterial pathogenesis. In two rotations, my work contributed to two publications; one in preparation and one published at the PNAS journal. I have since joined the laboratory of Dr. [REDACTED] (Ref. 1), who studies mechanisms of bacterial signaling. My project in Dr. [REDACTED] lab stems from the work that led to the PNAS publication. I will be probing an aspect of signaling systems in *Escherichia coli*. Specifically, I will identify how the expression or inhibition of the bacterial sensor kinase QseC results in deregulation of type 1 pili involved in *E. coli* adhesion. My current training merges molecular genetics, biochemistry, chemical biology, and pharmacology, in finding ways to impede bacterial communication. I plan to leverage this multidisciplinary training towards a career that will ultimately benefit human health.

Educational, Career Development, and Future Goals

My educational goals include completing a dissertation and earning a Ph.D. in Biomedical Science from [REDACTED] as a stepping-stone to my next phase of discovery. My ultimate goal is to pursue a career in infectious disease, more specifically, emerging infectious diseases and their epidemiology and pathogenesis. These diseases pose a significant threat to public health, especially with the increasing incidence of antibiotic resistance on a global scale. Given these interests, I aspire to work in a government lab for the Department of Defense (DoD) or the Centers for Disease Control and Prevention (CDC). Prior to achieving this ultimate goal and following my dissertation defense, I plan to apply for post-doctoral training either in one of these agencies, or at an institution that will foster my preparation for a career at the CDC or the DoD.

The training I will receive in Dr. [REDACTED] lab will prepare me for a career in this field given her strong educational background, excellent mentorship, and her research interest in bacterial signaling pathways. I will receive first-hand training in bacterial pathogenesis of urinary tract infections and the development of alternative therapeutics to treat infection worldwide. Together, Dr. [REDACTED] and I have initiated a development plan to monitor my progress and evolution. I have weekly one-on-one meetings, regular lab meeting presentations, involvement in grant and manuscript writing, and outreach/mentorship opportunities. I will present scientific findings regularly, by attending national and international meetings. On the institutional level, the education I will receive at [REDACTED] goes beyond didactic knowledge and is one of analytical understanding. We are required to think critically about many different areas of research. I will utilize various means afforded to me through the office of [REDACTED] at [REDACTED]. Career information and planning symposia are frequently scheduled that will allow me to continue to cultivate my skills. With the support of Dr. [REDACTED] I plan to attend the ASM Kadner Institute that provides graduate students and postdoctoral fellows a rigorous informational workshop regarding career choices. Collectively, these activities will enhance my writing, communication, and leadership skills and they will offer networking opportunities that will be invaluable for the next steps in my career.

Outreach, Leadership, and Mentoring

My experiences at [REDACTED] and now graduate school have taught me the importance of collegiality, collaboration, and most importantly the value of scientific outreach. As a result, I strive to give back to the community as much as I can. In high school, I was captain of the varsity cheerleading team and developed routines to coach elementary school cheerleading camps. I organized youth

events and helped run a small kitchen at a sailing club. As an undergraduate, I participated in scientific outreach programs like [REDACTED], where I encouraged middle school and high school students to delve deeper into science and share these results with their peers. At [REDACTED] I was also able to facilitate events for my undergraduate peers, through my involvement with the [REDACTED] (secretary, 2010-2011; president, 2011-2012). As president, I coordinated biweekly meetings, in which invited speakers presented career options available to students in the biomedical sciences. I coordinated events such as brewery tours, mock biosafety level 3 laboratory tours, a professor lecture series, and presentations by career counselors, medical laboratory scientists and biosafety officers. In addition, I organized social events such as science themed movie nights, and bacterial arts and crafts. I was voted Outstanding Graduating Senior by the faculty of the [REDACTED] department at [REDACTED] for my drive, achievements, and ability to interact with other students and faculty members during my time there. I look forward to continuing in leadership positions at [REDACTED] I was elected into the Microbes and Defense Academic Society (MDAS) as the Vice President of Community Outreach for the upcoming academic year. My responsibilities will include planning community outreach activities for MDAS members and non-members such as scientific outreach in K-12 schools, March of Dimes, lecture series and networking events. I have also been elected the [REDACTED] Graduate Student Association as an event coordinator for the upcoming year. In this role, I will organize educational and social events for current and incoming students in the department.

Mentoring young scientists is another form of outreach. As a graduate student I have already had the opportunity to mentor a high school student enrolled in a six-week summer research program. His research goal was to identify a one-step master mix and protocol for a multiplex PCR approach to improve identification of pathogenic *E. coli* strains present in clinical patient stool samples. These modifications to the current laboratory protocols will improve the epidemiologic surveillance of pathogenic *E. coli* in children in developing countries. During his time in the lab, I helped him with the experimental design and exposed him to the background information regarding our field of study in a tangible way. At the end of his program he was able present a poster that detailed his scientific experience, results, and conclusions. It was rewarding to see his hard work pay off and a complete story come together. It was even more rewarding to observe him presenting this information to professors and students alike and share the knowledge he gleaned with his peers. Currently, I am honing my mentoring skills as I train a first-year graduate rotation student in several assays frequently used in the lab. I realize that with every question I am asked, I learn something new pertaining to effective mentorship.

I also realize the power of effective communication. I believe there is a need, for scientists to aptly communicate with each other and also to successfully reach a broader/lay audience. Louis Pasteur stated, "To him who devotes his life to science, nothing can give more happiness than increasing the number of discoveries, but his cup of joy is full when the results of his studies immediately find practical applications". I intend to find global applications and contribute to the growing brain trust. My hopes are to use my knowledge and expertise to leverage the impact of organizations, such as the DoD and CDC, to positively impact the global scientific community and relay prevention, therapeutics, and knowledge to the masses.