Personal Statement

I was born in [redacted area] and moved to [redacted area] when I was six years old. I didn’t speak any English at the time, and the differences between American and [redacted area] cultures were so stark, I initially found myself struggling to acclimate to this new environment. Now, I feel equally a part of the American and [redacted area] lifestyles, and the different cultures instilled in me have made me more empathetic to all cultures and more aware of cultural differences. This background lies at the root of my personality; I have a strong work ethic that I learned from my immigrant parents. I embrace and want to encourage those from cultures different than myself, and I love traveling and communicating with a broad, international community. With the NSF GRFP, I am enthusiastic to leverage my unique background to contribute to the scientific and broader community.

Intellectual Merit

I completed my biology B.S. in the Honors Program at [redacted area], the Department of Biology to discover if biological research interested me. The lab’s work on essential hypertension quickly piqued my interest and I spent three years of my undergraduate experience working there. During those three years, I progressed gradually from observing experiments beside a graduate student to being fully autonomous in the lab and enthralled in the research. In my second year, I took on my own project focusing on the role of oxidative stress and renal mitochondrial dysfunction in the development of hypertension in vervet monkeys, a species of non-human primates in the West Indies that develop spontaneous hypertension in 30% of adults. First, I determined that differences exist in the renal expression of several key genes that encode the oxidative phosphorylation (OXPHOS) chain. I then corroborated these results by exploring differences in protein production of these genes. Throughout my research, I’ve learned many molecular biology techniques such as isolating RNA, constructing cDNA, RT-qPCR, protein quantification, and histology. I also learned how to analyze data, interpret the results, and determine future directions. This research culminated in my writing a first author publication submitted to the American Journal of Physiology – Regulatory (1).

I am grateful to have been awarded support to further my research experience. I received competitive, funded fellowships from the American Psychological Society (APS) to conduct research throughout two summers (2-3). Thanks to this funding, my project advanced significantly as I started exploring differences in gene expression of upstream transcription factors of OXPHOS genes, further trying to elucidate the mechanism that causes differences in OXPHOS gene expression of hypertensive vervets. These fellowships and a competitive Undergraduate Travel Scholarship from [redacted area] allowed me to present first-author posters at three international conferences: Experimental Biology (EB) 2015, AHA’s Council on Hypertension 2015, and EB 2016 (2-4). Attending these conferences helped my public speaking and presentation skills and introduced me to the importance of collaboration and evaluation from scientists across disciplines. At the EB 2015 conference, I was one of 30 undergraduate first-author poster presenters granted the APS David Bruce Outstanding Undergraduate Abstract award out of around 100 submissions. Two separate panels of judges further evaluated awardees during poster presentations given at EB and one first place winner is chosen. My proudest moment in research so far was earning the first place David Bruce Excellence in Undergraduate Research award. It was incredibly gratifying to have my hard work recognized, and the competition boosted my scientific confidence and my presentation skills.
At these international conferences, I discovered how critical international collaboration is to the advancement of science. A competitive research scholarship from the Honors Program at the allowed me to conduct fieldwork on a colony of vervets in St. Kitts in the West Indies, where I got first hand experience in whole animal physiology. This included assisting with surgeries to extract telemetry devices, measuring blood pressures using forearm cuff plethysmography, and performing glucose tolerance tests on vervets. Through this experience, I saw how critical determining effects on whole organisms (in vivo work) is to parallel in vitro or molecular biology experiments, because phenomena observed on a smaller scale may not always translate at the organismal level. The combined experiences of this research abroad, the international conferences I attended, and my heritage have helped me to understand the differences in the perception of research and scientists in different countries. These differences highlight the importance of international collaboration as they foster synergistic perspectives resulting in more thorough research. Receiving the NSF GRFP will help further strengthen my international training by enabling me to take advantage of the Graduate Research Opportunities Worldwide (GROW) program for international collaboration.

Many different biology courses interested me at physiology, immunology, genetics, and neurophysiology. Electrophysiology research that began in my neurophysiology class even resulted in the publication of a series of related research articles (5,6). From these interdisciplinary classes, I also learned how different biological systems act together to exert effects on the whole organism. Thus, I prioritized finding a graduate school program with a collaborative research environment at the interface of different scientific disciplines. Conducting research using a variety of methods from different disciplines can strengthen findings and eliminate any subject-specific methodological bias. This type of thinking encourages research flexibility, critical thinking, and testing hypotheses using the best methods possible, even if that necessitates learning a new method or fostering a new collaboration.

I chose to join the at because it aims to train graduate students to integrate many different techniques and fields of biology in the context of complex physiological and developmental systems. After interviewing for the program, I was awarded the Fellowship, a highly competitive honor fellowship awarded to students nominated by individual departments. I am currently in my first semester, and working in the laboratory of, who is studying physiological functions such as salt regulation and their interactions with the immune system. is early in her career, but has already trained several graduate students and post-docs, and she was recently awarded the NIH New Innovator Award, which funds highly innovative research with the potential for significant impact and supports promising early stage investigators. I propose to pursue interdisciplinary research in this lab that fits with my research goals and is of broad community interest. Training in this lab will help train me to be a well-rounded, critical scientist.

Broader Impacts

I grew up in a STEM-inclined family, but I realized at a young age that not all children are exposed to science. As my passion for public outreach and improving public opinion of research has increased, I have sought out experience mentoring students and peers, specifically those that are less likely to be exposed to science. At some of my best experiences involved working as a biology tutor for groups of incoming freshmen through the, which helps minority students to succeed in college. There, I strengthened my teaching skills while making personal connections with students. To effectively teach every student independently, I adopted individualized teaching methods: verbal,
coded drawings on the board, videos online, practice problems, etc. Since my tutoring groups were the same throughout the semester, I also formed connections with each student, which enabled me to help them with any other personal or academic issues that arose. My boss, [REDACTED], promoted me to a Peer Academic Coach (PAC) after observing my tutoring sessions. As a PAC, I met weekly with minority second-semester freshmen on academic probation to improve their study skills, tutor them, improve their time management skills, and help them with personal problems that affected their academic performance. Being a PAC showed me first-hand the difference that being raised in an education-positive environment and having good mentors can make in individuals, and further fueled my passion for mentoring. My passion to share science broadly also led me to mentor undergraduates in [REDACTED] lab after I gained autonomy. Since I was recently “in their shoes” and knew what it felt like to be confused and overwhelmed in lab, I connected with them and this helped me to explain things in a more relatable way. This experience taught me the importance of relatable, effective teaching.

These experiences fostered my love for teaching and mentoring, and although I only just started in my graduate program, I have already become involved with outreach communities at [REDACTED]. I am involved with the [REDACTED] Program, an organization that develops support for women through mentoring, professional development, and science outreach in the community. As a woman in STEM, I know the struggles that we can face in science, so I hope to promote a love of learning and science in young girls while providing support for them. I am serving on the outreach committee of [REDACTED] to design and coordinate outreach opportunities for members. I am participating in and helping to develop the Big Brothers Big Sisters events, which bring mini science lessons/experiments to BBBS matches. I am also participating in [REDACTED], an educational enrichment program put on one Saturday each year by [REDACTED] by designing fun and engaging science lessons to pique high school students’ interest in science. Mentoring and outreach are important to my proposed thesis mentor, [REDACTED], as well, so I will be comfortable focusing on both my research and mentoring/outreach activities.

**Future Goals**

To date I have conducted independent projects, attended international conferences, written a first-author publication, conducted research abroad, tutored minority undergraduate students, mentored undergraduates in my lab, and participated in outreach opportunities to promote science among young girls. My future aspirations are to earn my PhD and ultimately conduct research independently as a basic research scientist at a research institution and to share my enthusiasm for science by educating our next generation of scientists. This will fulfill all my passions for research, teaching, and mentoring. Since the topic I am researching now has such a large impact on public health, I will focus on outreach events that explain my research to the public and how they relate to public health. While earning my PhD, I plan on continuing to mentor through my involvement in [REDACTED]. Since [REDACTED] is tied to the undergraduate campus, I can also continue to mentor undergraduate students in the lab, and I can be a teaching assistant in undergraduate classes. The NSF GRFP will grant me financial independence so that I can place a significant weight on mentoring and outreach opportunities; will give me access to programs such as GROW, which can help me to facilitate international collaborations; and will make me a competitive candidate for pursuing a career in academia after graduate school.