

Team GEARUP sends students into elementary schools to teach kids about science through hands-on activities. I traveled with a team of six students and a professor to a school in Hollywood, South Carolina. I led an activity in which a soda can is propelled through the air using hydrogen gas. POW! As the can rocketed off across the room, the students scattered in fear. I wondered why. After we calmed the students, we set up "labs" so that they could do the activity themselves with our supervision. While we were setting up, students started to ask questions. It broke my heart to hear their teachers respond: be quiet! The students we were teaching had never done anything like this, and we were the first instructors to answer their questions with questions that guided them to answers. Creativity and curiosity had been crushed in this poor socioeconomic community, and the schools were not helping. From that experience, I resolved to pursue science and research to help foster curiosity about our world through science.

I continue to take an active role in teaching others. The most important lessons that I teach students are how to ask the right questions and where to look for the answers. Through teaching, I mentor fellow students in physics classes and labs. Very often students ask what equations they should be using for a particular problem. I always redirect their thoughts by asking them to draw a picture or explain what they think would happen. I found that students naturally ask relevant questions and discover useful answers when they put problems into language or symbols that they can understand. I use the same tools in my research. When my research seems to halt, I take a step back and look at the problem with a broader perspective. The same questions that I teach others to ask are the same questions that I start asking. This has enabled me to excel in research areas such as computational biophysics, theoretical atomic physics, and experimental biochemistry.

My love of science extends far beyond the lab and research. Passion and curiosity drive me to pursue recreational activities with science as well. At the end of my junior year at Clemson, a couple of my friends and I decided to launch a weather balloon to obtain photos of near-space. After careful planning and obtaining permission from authorities, we launched the balloon from a field in front of campus. While we were making our final preparations, many students, teachers, and police stopped by to see what was happening. We took time to explain what we were doing to anyone who asked. We were surprised when a reporter from the campus newspaper showed up and interviewed us. The event gave us an opportunity to show the community that science is fun, and we obtained some great photos with the blackness of space juxtaposed to the blue hue of the upper atmosphere. This fall, a graduate student from wildlife biology read the article in the campus paper and contacted me for some help. He needed to test the fracture of balloons set free during football games and to see if the balloon fragments harm wildlife. This danger is great; some of the balloons have been known to reach the coast where sea turtles may ingest ruptured balloon plastics. On November 12th, we launched a weather balloon with a net containing many inflated game-day balloons and retrieved the fragments later that day. It really excites me that something my friends and I were doing for fun ended up helping someone else conduct research. I have already been contacted by other professors at the university requesting my help with similar projects. I hope that I will be able to help them as well.

My interest in science and research also drives me to lead others. When I started at Clemson University, the Society of Physics Students was defunct. I worked hard to revive it, and

the organization now has thirty members (roughly a third of our undergraduate population in physics). At the beginning of every semester, my peers and I present our research to freshman. We encourage them to pursue undergraduate research early in their college career and to apply for summer REUs. Through a lot of hard work with other students, the organization is now very active, serving the university and surrounding community by coordinating science demonstrations and tutoring our peers. A local chapter of Sigma Pi Sigma, the physics honors society, was also reinitiated at Clemson with my help. I hope that the work done through these societies will enable students to excel in both academics and research at Clemson University.

There is a great need for scientists and researchers to become active leaders within their communities. Our influence must extend far beyond the classroom because students are only in class for short periods of time. It is crucial that we become involved mentors by being open to helping students. In my own experience, I am a mentor to many students through my position in the Society of Physics Students, but I also am a mentor in my role as a resident assistant in my residence hall. I work with students to help them become active members of the community. Through service projects, such as cleaning up our campus's forest, I develop close relationships with my residents. I enjoy the opportunities that I have to advise and mentor others. My goal is to lead by serving, teaching, and growing others.

For me, the NSF fellowship will enhance my ability to continue doing what I love to do: collaborating with others and showing everyone how much they can do with science. Teaching and working with others is a very rewarding experience that I never want to give up. No matter where my career takes me, I plan to share my experiences with others and encourage them to chase their dreams just as I have.

My abilities as a researcher have been tested over the past five years. I have stretched my mind to understand new problems and information. I read literature in my fields of study so that I don't lose a sense of relevance. Scientific research is like an adventure: I constantly look for something, but I do not always find what I expect. In fact, it is when I stumble upon something unexpected that I am most excited. Moments of such discoveries led me to truly desire a future in research. I realize the necessity of utilizing various methods, theoretical and experimental, to approach difficult problems like protein modeling. What worked yesterday in the lab may not work for the next problem, but the principles of problem solving will still guide my way. When I tackle problems like the ones mentioned above, I take time to understand the scientific principles that are at the heart of the problem. Then I develop methods based upon those principles to solve the problem. I might not always get the results I want or expect, but this is the excitement of research: a chance for discovery.