

As a child I spent extensive time in the forests and grasslands of the Midwest, curiously examining plants and animals. Since then, my understanding of the underlying biology behind nature has greatly increased, but my curiosity about the world has remained. As my career in science has progressed, these childhood curiosities have developed into more sophisticated questions that can be examined through rigorous scientific inquiry. Throughout my academic career I have taken advantage of a number of diverse educational opportunities. Some of these opportunities have been technical and have provided me with the knowledge and the ability to pursue scientific endeavors. Furthermore, a number of other experiences have enhanced my scientific education by instilling the importance of incorporating communication, education leadership, learning, diversity and into a multidisciplinary approach to science. I am passionate about continuing to integrate these ideas into my career as a research scientist. I have been fortunate enough to have come across opportunities to reach out to economically disadvantaged countries, high school students, peers, international populations in the United States, and the physically handicapped. The NSF-GRFP would facilitate my development as a scientist by providing the financial independence necessary to explore my own research interests and continue reaching out to the community.

In the United States, we have ample opportunities to expand our knowledge via our well developed education system. During my sophomore year as an undergraduate, I participated in a student volunteer trip to Ecuador which reinforced my understanding of the disparities in educational resources for minorities in other countries. I led fundraising efforts, established contacts in Ecuador, and planned the projects that the group would participate in during the following holiday break. Through contacts in the capital city Quito, we selected a small indigenous community two hours north of the city as the focus of our efforts. While in Ecuador for three weeks, our group of eight students provided the community with the manpower and funding necessary to begin the construction of a primary school. The villagers needed a school of their own so their children could have a place to learn without having to travel on foot five miles to the next village. It was extremely rewarding to contribute to diminishing the large gap in educational opportunity throughout the world. I appreciated the cross-cultural exchange, which has motivated me to continue to work hard to understand and participate in global issues.

There is little else more invigorating than sharing knowledge with another person, and helping them to understand difficult concepts. Not only does teaching cement your own understanding of a subject, but it allows you to articulate and successfully convey your ideas to others. Through my undergraduate research experiences, I was able to guest lecture on social insects to honors biology students at Plainfield High School in my hometown of Plainfield, Illinois. As a graduate student, I recently gave a presentation on how to find research opportunities on campus at the University of Illinois to three sections of an introductory Integrative Biology course. These merit based sections are focused on recruiting and retaining under-represented and rural students in biology as part of the NSF STEM initiative. During the last 3 months my lab group has collectively been teaching a physically disabled high school student through the Midwest Alliance STEM (<http://stemmidwest.org/>). As a lab we have been working with him to develop his research skills before he enters university next year. Peter's enthusiasm for science, regardless of his physical abilities, has been extremely refreshing. After teaching him the principles of measuring chlorophyll content in leaves and how this can be correlated with leaf nitrogen content he measured chlorophyll content using a Minolta SPAD 502 Meter and took leaf samples for analysis of N content. His contribution will be essential for interpreting the results of my maize experiment. With this small introduction to research, along

with the support of his family, our lab is developing a project for him to undertake over the next six months as part of his internship. After Peter has graduated, I would like to continue working with students from this program and others like it. Rich and diverse research experiences early in a career are critical for expanding an individual's capacity for creative scientific thinking.

According to *Science and Engineering Indicators 2006* "the media can affect the public's view of scientific issues" for which they give an example of a study that found that "the movie *The Day After Tomorrow* influenced individuals' opinions about climate change." I am personally committed to dispelling such misconceptions about climate change through my research and outreach. I also volunteer with a group funded by the state government of Victoria, Australia to map changes in distribution of endangered species of herbs and shrubs in the Wimmera region of central Victoria. While learning about these native species, I have been able to teach the other volunteers the physiological changes that occur in plants when experiencing drought conditions and how these are likely to change with elevated [CO₂]. I have met informally with local Australian farmers to talk in general terms about how their crops are going to be affected in the coming years. Unfortunately, converting scientific jargon into tangible concepts for people from various cultural and educational backgrounds is an area in which the greater scientific community often fails.

In a recent speech, NSF director Dr. Arden Bement, stated that the future of science and the general workforce "will rely heavily on people who can work together across disciplines and national borders, and who assimilate new knowledge and technology throughout their careers." The NSF-GRFP would help me to realize my potential as a student, researcher, and teacher by continuing to echo the above statement. My immediate goals that will accomplish this include working with the Anita Purves Nature Center in Urbana, Illinois to develop a short course for students and teachers that coincides with the *Naturalist in the Classroom* programs the center already has in place. K-12 schools from the surrounding county submit requests to the Nature Center for a specialist to visit the school and speak about various topics. I plan to focus on the impacts of climate change on plants and ecosystems and how this will shape humans through changes in ecosystems and agriculture. Targeting my outreach efforts to school children will utilize the diversity of Champaign county schools and will better inform the teachers of these students. The complexity of lessons for these students will increase accordingly to the age group. It is my goal to establish a baseline understanding about climate change and the scientific method so that this forthcoming generation of learners can make informed decisions when dealing with these issues directly in the future.

I am currently pursuing a Ph.D. in Plant Biology at the University of Illinois Urbana-Champaign. At the university, I conduct research at the Institute for Genomic Biology (IGB) which is an exciting new facility that has amassed world-renowned specialists in plant biology, ecology, genomics, statistics, and bioinformatics. For me, the IGB is not only a physical building, but a tool for exchanging ideas, building collaborations, and otherwise interacting with an incredibly diverse array of research scientists. With these excellent facilities available to me, and with the guidance of my advisor, Dr. Andrew Leakey, I am certain that this university is the perfect place for me to continue conducting multidisciplinary research in plant ecological genomics. I feel the combination of research facilities at the IGB and the broader resources provided by the GRFP would allow me to continue cutting edge scientific research on plants and global climate change. My fruitful academic, leadership, research and volunteer experiences have coalesced to form a strong foundation which will allow me to execute my proposed research plan and communicate the findings to the general public.