The electrifying sound of a chain saw ripped through the air as I frantically crawled through the thick forest brush scooping dung beetles from insect traps I had laid. Local coffee growers were actively cutting down trees to protest our presence in their forest. Somewhere in the process of establishing a long-term biodiversity monitoring program in Cusuco National Park, Honduras, scientists from around the world had alienated a group of local people whose very livelihood came from that forest. I was heart broken to discover how the disconnect between our research aims and the priorities of local people made our biodiversity monitoring and conservation efforts futile. This was one of many emotional and transformative experiences that solidified my desire to not only advance scientific understanding but actively apply my research for the conservation of biodiversity and for the betterment of local communities who are directly impacted by continued global change.

Intellectual Merit-Research Experiences. Throughout my career thus far, I have gained research experience and training locally and abroad. I was first introduced to ecological experimental design in the [redacted] pond ecology lab. I learned how to manipulate variables such as temperature, nutrients, and predation in controlled environments to observe the affect on rates of tadpole metamorphoses. Next, I worked with a small team of undergraduates in the [redacted] tropical ecology lab. We modeled the relationship between endangerment status and functional traits (e.g. body size, activity rhythm) of seed dispersing mammals in tropical forests. I lead the group in conducting the modeling analysis in R Studio and in designing and presenting a poster of our work at the Rice Undergraduate Research Symposium. Our model predicts how and to what degree ecosystems will be altered by the loss of species that provide an ecosystem service (e.g. seed dispersal, pollination) based on that species' functional traits.

As part of the independent research component of my study abroad in Ecuador, I spent a month studying a troop of highly endangered Capuchin monkeys on a cloud forest reserve to evaluate their seed dispersal effectiveness. The freedom I had in designing and implementing my own project was incredibly rewarding. I developed the perseverance and flexibility to constantly adapt my questions and methodology when faced with limitations in the field. While I anticipated the steep forested terrain and limited time window into tree fruiting patterns, the troop's agitation at my presence and dependence on local human communities altered the natural applications of my study. In addressing the chronic threats of defaunation and deforestation in tropical forests, I determined that seed dispersing primates cannot effectively regenerate secondary forests because native plants of the primary forests are jeopardized by hyper-fruiting non-native species which are more accessible and energetically favorable to seed dispersers.

I discovered my affinity and talent for marine research while conducting transect surveys on the reefs around Utila as part of the Operation Wallacea Honduras Project. With the help of a Youth Activity Fund grant I worked as a research assistant under the guidance of numerous scientists conducting a variety of ongoing field experiments. Here I developed a cultural literacy by working with scientists from around the world and learned the tremendous coordination, flexibility, and dedication that is required to conduct research at a popular long-term study location. This experience will prove invaluable in successfully collaborating with international researchers in the future, especially at the field site of my graduate work at the Gump Station in Moorea, French Polynesia.

For my first marine research endeavor, I contributed novel methods and data to enhance our understanding of how coral reef health is affected by bioerosion and the degradation of reef carbonate substrate. In the lab of Dr. [redacted], I conducted my senior thesis in collaboration with the NOAA operation at Galveston, Texas, which manages the Flower Garden

Banks National Marine Sanctuary (FGBNMS) in the northern Gulf of Mexico. I developed a novel, reliable, and inexpensive procedure for quantifying macrobioeroder densities from photos of reef benthos and ground-truthed the procedure on the reef during a dive cruise using SCUBA. The procedure has exciting implications for coral reef conservation as it can be standardized for long-term monitoring sites around the world to monitor the impact of macrobioeroders to reef health overtime. By applying my method to a barnacle bioeroder in the dominant reef-building coral in the FGB, I calculated the first bioerosion rate for this region and added to the limited knowledge of bioeroder activity with depth and host colony surface area.

While presenting my research at the 13th International Coral Reef Symposium (ICRS) in Honolulu, Hawaii, I found several avenues with which to extend my research. I acquired a dataset of photos from more degraded reefs in the US Virgin Islands and as lead investigator am now preparing the results from both regions for publication. After applying my procedure to both healthy (FGB) and disturbed coral reefs, my conclusions will help define priorities for preserving a positive calcium carbonate budget with net growth of reef substrate. The trends in bioeroder activity I discovered demonstrate that deep reefs may provide a refuge from disturbance with less bioerosion and more reef accretion. Additionally, my raw data is currently being incorporated into coral population models for publication with NOAA's Southeast Fisheries Science Center. The BioSciences Department at Rice University awarded me the Distinction in Research Award and Julian Huxley Award for Excellence for the quality, quantity, and common dissemination of my research contributions as an undergraduate. I will continue to conduct innovative research with a special attention to obtaining a diverse network of collaborating researchers by attending conferences and disseminating my work in open access formats.

Career Goals and Motivation. My ambition is to be the principle investigator of a lab, and to frequently publish novel and interdisciplinary science through collaboration. For my PhD work with marine microbial ecologist Dr. [redacted] at Oregon State University, I will study how predation and nutrient pollution combine to affect the coral microbiome. With this research, I will utilize my ecological training and expand my skillset to master current genomics techniques. From the coral microbiome session at ICRS, I fully realized the incredible possibilities for adding molecular techniques to traditional ecological field experiments. Genomic sequencing technologies and bioinformatics methods are constantly transforming our view of microbial diversity. The Center for Genome Research and Biocomputing at OSU facilitates genome-enabled and data driven research through technology workshops where I am currently learning to navigate command-line interfaces for use in bioinformatics analyses.

The enthusiasm, support, and curiosity of my mentors and peers fuels my desire to understand the natural world. While sharing my work at ICRS, I received thought-provoking questions, insights, and theories from notable scientists in the field of bioerosion. I found seemingly endless questions, methods, and collaborators with which to expand my work. After the five days of networking and listening to accomplished scientists present their work, I realized that fieldwork would not be the aspect that sustains me through the many years of graduate studies and beyond. In studying a quickly degrading ecosystem, coral reef scientists recognize how imperative the sharing of scientific knowledge is to the field if we hope to reach conservation goals. Networks of collaboration also facilitate communities of academic support. I gain incredible fulfillment working closely with several younger female students interested in marine biology. I advise on everything from applying to marine internships to managing a healthy personal and academic life. I feel a strong responsibility and desire to use my experiences and skills in creating support networks to increase the representation of women and

underrepresented students like myself in the fields of quantitative biology and science communication.

Broader Impacts. My first week as an undergraduate I joined my university's chapter of Engineers Without Borders in the hopes of traveling to a rural community in Nicaragua. As a teenager, I had grown to love this far-away country and culture from which my family came. My dreams were realized when I traveled to Nicaragua to assess the community's needs and resources for a water distribution system. After spending a year coordinating with the local community, government agencies, NGOs, and engineers at my own university, I returned to the community and used my growing cultural understanding to introduce and integrate our modern technology. As I extend my fieldwork to new countries, I will prioritize attention to the unique cultural traditions and values of a particular community which can be an integral, fascinating, and effective part of regional conservation.

After participating in several conservation projects involving eco-tourism and biodiversity monitoring in Latin America, I have perfected my Spanish and gained some critical cultural understanding to contribute my own scientific findings from an independent and authoritative avenue. In association with my thesis work in the FGBNMS, I recently attended a Sanctuary Advisory Council meeting. Despite our mutual admiration for the sanctuary, I was astounded by how greatly the priorities of recreational divers, commercial fisherman, and oil and gas representatives differed from those of the world of research I know so well. This experience reinforced my profound desire to not only disseminate my research but to acquire the skills to effectively communicate the applications and significance of my work to multiple stakeholders. To this end I have led interactive workshops on coral reef data collection and conservation using 2-D reef replicas of the FGB reef benthos printed on vinyl to be used on land or sunk in a pool. I conducted workshops as a TA in a university SCUBA course and at public outreach events at the Houston Museum of Natural Science and with 4H high school students in Galveston, Texas, in collaboration with FGBNMS education and outreach. These endeavors culminated in me winning the Shell Center's Sustainable Development Award for my projects' dedication to expanding knowledge about the threats to sustainability in the Gulf Coast region. I am also confident that my enthusiasm and scientific accomplishments will both extend to and productively influence industry and policy. My thesis manuscript was recently recognized in a marine science paper competition by two industry-led organizations devoted to the preservation of marine environments.

In graduate school, I now aim to maximize the conservation applications of my research by collaborating with local communities and policy makers in enacting scientific knowledge into conservation practice. By sharing my scientific knowledge with developing coastal communities, I can deliver an immediate and positive impact on the urgently relevant subject of coral reef degradation. I am ecstatic to expand my cross-cultural understanding to communities in French Polynesia during my field seasons in Moorea. I will continue to design and conduct workshops to demonstrate the effects of climate change, overfishing, and pollution on coral reefs with special sensitivity to the values and customs of the local community. In Oregon, I will expand my audience by contributing my experiences and discoveries to our lab blog, the Cnidae Gritty, in English and Spanish. I will communicate my research to future scientists as well as stake holders in the management of marine resources. With these career goals in mind, graduate school will allow me to develop foundational knowledge, research collaborations, and academic and communication skills to expand scientific understanding in a capacity that is transferable to younger scientists, local communities, and policy makers.