National Science Foundation Personal Statement

Somewhere in the night, I could hear the dilapidated bus rumble as it maneuvered across the moldering bridge. Rain trickled down through the tangle of branches and vines over my head, and off in the distance faint streaks of lightning traced across the sky. It was dark, and although the chorus of frogs and cicadas suggested a forest filled with life, I could see very little in the understorey that surrounded me. A mudslide had blocked our intended route from San Jose, capital of Costa Rica, to our field station, resulting in a day fraught with travel and travail for me and my fellow primatology students. We faced one final obstacle: a bridge too unsound to support a fully loaded bus. To lighten the load, I had disembarked with the others, stepping into the rainforest for the very first time.

Growing up, I fantasized about exploring rainforests such as this and other kinds of exotic environments. The steamy tropical forests, blistering African savannas, and frozen tundras recreated for me in zoos and museums, however, were so different from my suburban environment that they seemed unreachable and unreal. Instead, I explored the nature that did surround me (despite its lack of elephants or polar bears). I was one of those children always ' getting into trouble for raising tadpoles in the bathroom sink or storing bird nests in the cereal cupboard. At nature camps, I learned about the relationships between our native animals and their environment and, through patient observation, became able to observe these interactions for myself. The more I discovered, the more questions I had; every query I asked made me more curious about the world around me.

In high school, one of my childhood fantasies became reality when I served as a volunteer at the Jaguar Conservation Fund in one of the world's most endangered savannas, the cerrado grasslands of Brazil. Though it was teeming with unfamiliar flora and fauna, my excitement of being in a new ecosystem was tempered by the realization of how little savanna remained among the vast tracts of farmland. Using methods ranging from camera- and live-traps for measure species diversity to extracting hormones from feces to estimate stress and reproductive levels, I helped researchers as they developed a picture of how animals were faring as their habitat rapidly disappeared. This was my introduction to "real" scientists - hard-working researchers who showed me the process and importance of collecting scientific data and revealed how research could be applied to protect habitats under threat.

When I started university, my experience in Brazil inspired me to take "Conservation Biology", "Conservation Genetics", and "Endangered Species" classes, which focused on exposure to primary literature and taught me a great deal about methods scientists use to preserve threatened organisms. In addition to coursework, I also conducted my own research projects and have probed systems as diverse as the bacteria living in bird plumage to the parasites inhabiting a puma's intestines. Beginning my freshman year, I studied the antibacterial properties of feather pigments, characterized preening behaviors, sequenced DNA from tapeworms, and examined mate choice and the development of behavioral syndromes in fish. Independent research was a chance for me to apply theoretical principles from my classes to real-world processes. I learned techniques for characterizing behavior in different organisms, gene-sequencing methods, how to use PCR, SEM, spectrophotometers, and other instruments and gained a good grounding in a broad array of statistical methods. The national fellowships I earned, including the National

Merit and Goldwater awards, along with the $150,000 of other grants and scholarships I have received, have funded a majority of my research. I have presented my research at over 17 conferences and symposia and my preening behavior study is currently in press.

As interesting as I find the world beneath a microscope or inside a fish tank, I wanted to emulate the scientists I met in Brazil and conduct research in the field. I carried out my firstindependent field study while attending a class on Primatology & Conservation in Costa Rica. Conditions in the field were spartan, with no electricity or running water, in an area miles from civilization. Our study site was a muddy, treacherous lowland swamp forest that was swarming with mosquitoes. Yet I embraced the challenges of living and collecting data in this environment. I learned techniques for gathering behavioral information on individuals and groups of animals, how to design sound, repeatable methods such as setting up transects or plots, and how to characterize biotic and abiotic environmental conditions. I applied these methods in my independent research project, where I compared different species of monkeys as seed dispersal agents. The class also had an intense conservation focus. Lectures on anthropogenic disturbances and biodiversity loss were driven home by the habitat destruction we saw firsthand in the slash-and-burn pastures and barren monocultures encroaching upon the small patch of forest that we worked in.

I used the research techniques I learned at field school when I developed and implemented subsequent field research projects in Costa Rica, Panama, and Puerto Rico, studying competition trade-offs in hummingbirds, signaling plasticity in lizards, and developmental switchpoints in tree frogs. Not only have I learned a great deal working with a number of scientists during these projects, but the degree of habitat destruction and environmental alteration in each new location has deeply shocked and disturbed me. I have witnessed clear-cutting, illegal logging and poaching, seen the devastating effects of human expansion and pollution, and encountered multiple cases of meaningless destruction of animals due to prevalent local misconceptions.

In order to learn more about conservation initiatives while acting to protect endangered ecosystems, I have engaged in multiple volunteer projects around the world. After Brazil, I helped with the Monkey Bridge Project in Costa Rica to connect fragmented habitats for primates. Volunteering at the Cheetah Conservation Fund in Namibia, I not only learned how to collect important hormonal, genetic, and morphological data from these highly endangered carnivores, but I also discovered the importance of educating the local population and inspiring them to see their native wildlife as something worth protecting while making it economically favorable for them to do so. In Borneo, a biodiversity hotspot that is predicted to be completely destroyed by 2020, I worked with indigenous villages to develop an ecotourism business while also assisting with reforestation efforts and wildlife surveys.

My volunteer work and field research has opened my eyes to the devastation mankind is inflicting on these ecoregions and shown me what needs to be done if we are to save these areas for the future. As such, I plan on pursuing a graduate degree in biology with the goal of doing research that can be directly implemented for conservation efforts. My primary goal is to work with conservation organizations to develop better methods for monitoring, managing, and preserving wildlife. Receiving the NSF fellowship would enable me to conduct my proposed research project, which would involve working closely with Africa farmers to manage wildlife in such a way that the native people receive an economic benefit from maintaining wildlife populations while still being able to carry out their livelihoods. This project would enhance our

understanding of co-existence between people, livestock, and wildlife and produce results that could be applied to multiple ecoregions throughout the globe. I possess the field experience, research experience, and academic knowledge to be a successful scientist. Furthermore, I plan on engaging other students in my work to teach and inspire them the way that researchers took me under their wings when I was first starting out. Ideally, I can use my research to preserve that first moment of being in a tropical forest - the rain, the cicadas, the slimy bridges and amphibian chorus - for those who come after me.