

I have collected sperm from four different species; I barked at Fowler's toads, electro-ejaculated Eld's deer and Onagers, and sliced the vas deferens and seminiferous tubules of laboratory mice testicles. Over the past few years I have seen astounding variations in sperm morphology and reproductive systems first hand as an intern at research institutions across the country. Traveling to these positions and immersing myself in science around the world has been my version of the explorative voyages of young scientists in the 19<sup>th</sup> century. Unlike my predecessors, I did not collect samples of exotic flora and fauna to bring back for museums. Rather, the commonality of our experiences is that exposure to extraordinary biodiversity awakened a desire to study the way evolution has produced such variety. My interest in reproductive biology specifically, was inspired by Darwin's distinction between sexual selection and natural selection. In debating the division of these two categories with my peers and professors, I concurred with Darwin's rationale for the powerful influence reproduction has on evolution. Research in the past century and a half has only begun to elucidate how sex evolved, how mates are chosen, and especially, what happens after copulation. I am ready to transition from traveler and intern to focused doctoral candidate. I want to be part of the effort to understand the differences in sperm morphology, the role of the female reproductive tract in sexual selection, and how reproduction is shaping evolution.

My voyage started during a study abroad semester at the University of Tasmania, Australia. The reproductive organs of the animals I encountered contained an incredible story of evolutionary divergence, eutherian, marsupial and monotreme reproductive systems all on the same island. The lasting impact of my time in this unique ecosystem was an enhanced awareness of the intriguing variations in reproduction all around me. On returning to the United States, I undertook an internship to research assisted reproductive technologies research at the Memphis Zoo. I studied the physiological limitations of sperm production in fowler's toads with the goal of improving in vitro fertilization methods. I tested how the frequency of hormone-induced spermiation affected the quantity and quality of sperm. In addition to collecting and evaluating sperm, I also designed an experiment to test potential stress of our methodology on sperm characteristics, analyzed the data and prepared a manuscript on our research. This experience taught me the importance of considering both the details as well as the larger implications of a study when designing experiments.

Following graduation I sought out post baccalaureate positions to learn about different species, the female reproductive system and new techniques. At the San Diego Zoo Institute for Conservation Research I used fibroblast cells from rhinoceroses as a novel method for evaluating the role of estrogen receptor sensitivity to phytoestrogens in captive infertility. My results revealed differences among individuals and between species that previously went undetected. I then crossed the country to work at the Smithsonian Conservation Biology Institute, where I was involved in two projects. First, I compared Maned Wolf estrogen and progesterone profiles between natural and induced ovulation. Second, I tested

the efficacy of follicle culture methods on canine oocyte growth and survival. These zoo-based research institutions provided incredible opportunities; in addition to my own projects I was able to assist with sperm collections, cryopreservation and breeding behavioral studies. Currently, I am at the National Institutes of Environmental Health Sciences. My research investigates mechanisms of mouse oocyte activation in a human health context. I am using microinjection techniques to determine the role of G proteins in the resumption of meiosis. My journey has exposed me to an incredible breadth of techniques within different species and research contexts.

A theme in all of the research I have conducted is the importance of coordination between females and males to achieve successful fertilization. Throughout the process of reproduction there are many opportunities for selection and competition, mate choice is only the beginning. I am curious about the mystery of sexual selection that occurs after mating, the connections between pre-copulatory traits and post-copulatory success and the cryptic ways that females may influence offspring paternity. These interests have led me to the research of PROFESSOR. I am excited by their innovative work on sperm competition and seminal proteins and especially their study examining the genetics underlying female preferences.

I am attracted to UNIVERSITY because it has a collaborative and integrative atmosphere. I value that in addition to entering DEPARTMENT, I will also be able to engage with colleagues in RESEARCH GROUP. I am eager to join the UNIVERSITY academic community and share my enthusiasm for research, community outreach and education. My vision for my professional trajectory is a career in academia. My experiences as an undergraduate teaching assistant were wonderful; I found that the process of explaining material and interacting with students enhances my own research and scholastic endeavors. I would like to utilize my graduate degree as a professor, conduct and design my own research as well as advocate for future generations of scientists taking their own journeys.