

## **Personal, Relevant Background and Future Goals**

I want to make a difference. I want to influence policy, encourage sustainable change, inspire stewardship and promote STEM education. Earning my PhD is essential in accomplishing these goals. Through coursework, studies, collaborations, fellowships and outreach, both home and abroad, I am learning to effectively conduct and communicate sound science. **I am developing STEM education** for Texas K-12 classrooms, including a network of PhD students available to present their work and paths to higher education. In the final year of my program I will pursue a National Oceanic and Atmospheric Administration (NOAA) John A. Knauss Marine Policy Fellowship to better understand the politics behind my field so that I can effectively create change. **I am earning my PhD so that I can become the director of a nonprofit organization, facility or government program to help bridge the gap between research, stakeholders and the general public.**

**Intellectual merit:** I have **conducted research in two languages and four countries**, in zoological, academic, field and government settings. I have worked in teams with people from Argentina, Spain, Australia, Portugal, Costa Rica and the United States. I have hand tagged over 250 bumblebees (*Bombus impatiens*) and counted the number of times male guppies (*Poecilia reticulata*) performed gonopodial thrusts. I have recorded the duration of drill (*Mandrillus leucophaeus*) mating, performed ultrasounds on 400 pound green sea turtles (*Chelonia mydas*), and pulled a whole red toothbrush, bristles and all, out of a loggerhead (*Caretta caretta*) turtle's stomach. All of these experiences have been critical in my evolution and development of skills as a biologist. They have instilled in me an interest in animal behavior and mating systems and a passion for research and outreach.

As an undergraduate at UC San Diego I held **three research internships** that introduced me to hands-on science, international collaboration, outreach and the possibility of graduate school. On campus I conducted *a priori* tests on bumblebee food preference for a graduate student in Dr. James Neih's lab. This was my first exposure to graduate students; working with them demystified research and made me realize that I, too, could aspire to pursue graduate training. Junior year, as an exchange student in Spain, I sought out an internship at the Barcelona Zoo where **I worked with an international team of researchers**. I conducted ethograms, in Spanish, of the behavioral responses of female drills to the introduction of a new male. Working at the zoo I interacted with international guests, school groups and local families. I looked forward to this integration of research, collaboration and public interaction three days a week and I concluded that it was a model for the rest of my life. One month after leaving Barcelona, I was at the University of Western Australia. Again, I sought out an internship. Working with Dr. Jon Evans I investigated the behavioral responses to variation of sperm competition risk and intensity by male guppies. This was the first project I worked on that was truly mine. I hypothesized that male guppies would alter their reproductive behavior as predicted by sperm competition risk and intensity theory, but my results did not support my hypothesis. Instead, I found that while their mating behavior varies among individuals, it showed no significant correlation with the abovementioned theories. I am now **writing a manuscript** describing the results from this project for submission to a scientific journal.

Upon graduation from UCSD I pursued an internship with Dr. Jeffrey Seminoff of the NOAA Marine Turtle Ecology and Assessment Program. I prepared samples for analyses in the stable isotope lab, working on a novel project to age sea turtles. In the field I **collaborated with government scientists, volunteers, graduate and undergraduate students**. I recorded data, captured, measured, and assisted with blood samples and ultrasounds on green turtles. Through

this internship I was introduced to the work of my now co-advisor, Dr. Pamela Plotkin. Dr. Plotkin et al. contributed a chapter to a book I helped Dr. Seminoff edit. Her chapter discusses the conservation implications of the reproductive behavioral polymorphism exhibited by olive ridley sea turtles (*Lepidochelys olivacea*). Some *L. olivacea* nest synchronously (>10,000 individuals) on a few, distinct, beaches while others nest solitarily on multiple beaches. The intensity of these divergent reproductive tactics, unknown in any other turtle species, fascinated and inspired me to read Dr. Plotkin's book on this topic. In their book she and Dr. Joseph Bernardo explore this behavioral phenomenon and its evolutionary implications. I looked further into this intriguing behavior and found the literature lacking. I spoke with Dr. Plotkin about their work and asked some of the questions this behavioral phenomenon had evoked in me. Does the availability of males or certain environmental cues contribute to which behavior is expressed? What are the evolutionary implications of the answers to these questions? Dr. Plotkin's response to my slew of questions was simply, "We don't know yet, but you should find out." Three years later I am starting my second year at Texas A&M (TAMU) working with Drs. Plotkin and Bernardo to answer some of those questions.

In my first year of graduate school **I received the NSF GRFP Honorable Mention**, a TAMU Marine Biology Fellowship and a Texas Sea Grant Grant-in-Aid of Research. I attended three symposia, and presented at two<sup>1,2</sup>, **sharing my dissertation research** for the first time at the Animal Behavior Society Conference<sup>1</sup>. I discussed my ideas with established behavioral experts, giving new insight to my project. It reiterated the value of networking, as a result of this presentation I will be a **guest speaker** at Bethune-Cookman University in Florida, a historically black college, and will **serve on a US Fish and Wildlife Service conservation working group**.

I conducted a gut content analysis in **collaboration** with NOAA Hawaii of four Pacific sea turtle species (N=80), all bycatch of pelagic longline fisheries. I dissected and identified the gut contents, am **mentoring an undergraduate** who is helping weigh and analyze the data and am writing a manuscript to be submitted for **publication**. I found an alarming amount of ingested plastic, including a red toothbrush in one turtle and eight plastic bags in another. This publication will give insight to the feeding habits of these species, influence fisheries management and become a tool for marine debris awareness education. It is already being used in educational programs in San Diego and will be presented at the 2014 International Sea Turtle Symposium.

I spent a week at TAMU Galveston training in the stable isotope lab of Dr. Kim Reich (the sea turtle stable isotope expert). I learned the methods I will use in the field to collect data and the tools in lab I will use to process and analyze it. I then practiced these newly acquired methods in the field on a ten-day trip to Costa Rica where I surveyed 12 potential study sites and met with enthusiastic **collaborators**. This trip brought to life the phenomena that first inspired me and left me with rejuvenated wonder for this study system and its many open questions.

In my first semester, faculty came to talk to the incoming graduate students and many emphasized that you teach to facilitate your research. While that is an important role, I was often the only student brave enough to raise my hand and say, "I want to do something different." **I am doing research to facilitate teaching. I want to reach people of diverse backgrounds and academic levels through formal and informal education.** I will use my research to share my awe of nature, utilizing charismatic sea turtles to instill in people a passion for our natural world and the importance of respecting and conserving it.

**Broader Impacts:** As a senior at UCSD I volunteered with the non-profit Ocean Connectors Program. Ocean Connectors brings **free science education to 1,500 underserved kids** (40 classes per year) in low-income school districts of San Diego. I worked directly with 10 of these

classes. I talked with them about local conservation issues in their classrooms and took them to the NOAA study site on San Diego Bay. The students talked with the scientists, or *real live biologists* as the kids called them, and they got to see live 400 pound green sea turtles. On my first study site field trip I could not believe that for some of these kids this was their first time seeing the ocean up-close, even though they lived only 20 minutes from the beach.

Two years later I started working as the Lead Educator at the Living Coast Discovery Center (LCDC) a small, but powerful, non-profit zoo and aquarium located on a national wildlife refuge. I was hired to assist the Director of Education in creating and teaching fee-based programs, from scratch, in only two weeks with a second, larger, session to follow three months later. Four years later, the programs are thriving and include year-round day camps, overnight programs, scout programs and outreach. During my time there the day camps alone **reached 3,000 children** ages 4-18. They ranged from **low-income families, kids from homeless shelters to special needs children who came from California, Alaska, China and Mexico**. Over 700 people participated in the overnight programs, 600 of which were Girl Scouts. I taught and created nearly all of these programs, including *The Apprentice*, with versions for 1<sup>st</sup>-12<sup>th</sup> graders that promote scientific career exploration. I brought local scientists and PhD students to present their research to the kids and talk about being *real live scientists*. Since many campers lived part time in Mexico, I translated our exhibit graphics, activities and camp information into Spanish. **I promoted cross-border conservation education** during an interview on Telemundo and on the Tijuana children's show *Chuty Estimulación Temprana*. I planned and taught student and teacher workshops in Spanish in Oaxaca, Mexico for the 2012 International Sea Turtle Symposium.

I initially took my job at the LCDC as a placeholder while I decided what type of research I wanted to pursue. Little did I know that it would instill a passion in me and inspire me to continue on the path of conservation education. Having a first grader run up to you holding a leaf to her face after a photosynthesis lesson, exclaiming, "I can feel it giving me oxygen!" will make you smile. Having an autistic child blow the class away with the expertise of his animal presentation is unforgettable. My time with the kids has shown, whether it's singing songs or dissecting squid, that there is a powerful magic in nature. A magic that inspires people to explore, play, and most importantly, care.

As scientists, it is critical that we foster relationships between the public and nature. In my first year of graduate school I gave two invited talks on marine biology, **mentored for the NSF funded Louis Stokes Alliance for Minority Participation** program, am training an undergraduate, gave a talk at the LCDC and created social media outreach platforms<sup>3-4</sup>.

My goal is to become the director of a nonprofit or government organization, like the LCDC or a NOAA program, so that I can **promote the use of facilities, study sites and natural areas as educational tools to bridge the gap between research, stakeholders and the general public**. Having kids grow up 20 minutes from the beach and never having their feet in the water is unacceptable. I will change this when I hold that position of power and earning my PhD is key in achieving that goal. **Receiving this fellowship is fundamental in allowing me to make this impact**. It will allow me to conduct fieldwork critical to my dissertation. I will work directly with Costa Rican communities, national parks and NGOs in both research and outreach. I will **collaborate** with Costa Rican locals, providing them with jobs and education. This fellowship will greatly increase my capacity to conduct research, develop outreach and begin bridging the gap, both home and abroad. **References:** <sup>1</sup>Wedemeyer et al. Evol. & maintenance of female alt. repro. tactics in *L. olivacea*. Poster: Animal Behavior Society; Aug 2013. <sup>2</sup>Wedemeyer et al. Evol. & maintenance of female alt. repro. tactics in *L. olivacea*. Poster. TAMU Student/Post-Doc Research Conference; Oct 2013. <sup>3</sup>twitter @krwedemeyer. <sup>4</sup>blog: katiwedemeyer.wordpress.com.