The 6th grade students sit cross-legged on the classroom floor, staring intently at the 8-foot long stuffed seal and measuring tape I placed before them. I describe how large body sizes, thick blubber layers, and extreme physiological adaptations help seals survive in -60ºC air temperatures. The students' eyes light up as they take turns measuring the length and girth of the seal and guess the functional purpose of each body part. Because many of the students have strong preconceived notions about seals from their family's reliance on subsistence resources, putting the Alaskan seal harvest into a biological context is trial by fire. I ask questions about their subsistence experiences and use a mix of hands-on activities, videos, and data to show how the scientific method can be used to ask questions and critically challenge assumptions. I facilitate these visits to underserved Alaskan communities by partnering with UAA, the Polar Teachers and Researchers Exploring and Collaborating (PolarTREC) outreach program, the K-12 Anchorage School District, and another graduate student. After instigating inquiry-based interactions with over 1150 Alaskan students, teachers eagerly explain to us that the benefits from our visit last throughout the entire year and that the connections to the students' day-to-day lives convert science and math into tangible, approachable subjects. Several local newspapers have featured photos and stories of our outreach program.

Intellectual Inspiration: The outreach program was one of several experiences that have shaped my research and teaching motivations. As a first-generation American with a father who learned English as his fourth language and a mother who managed a company, I quickly learned to break through stereotypes with hard work and unyielding determination. With each passing day, I challenged myself to be smarter, stronger, and harder-working than ever before. After graduating high school, my acceptance into the undergraduate program at University of California Santa Cruz (UCSC) helped me become the first person in my father's family to attend college. At UCSC, I actively pursued a rigorous academic schedule and took advantage of every opportunity by being pro-active, enthusiastic, and engaged. During my time on UCSC's NCAA women's soccer team, I honed my leadership skills and learned how to balance my courses and extracurricular activities with the physical and mental stresses of being an intercollegiate athlete. I also participated in research and education across a broad range of taxa–from using an electron microscope to photograph hydrothermal vent larvae, to training captive sea lions, to taking young students inside the skeleton of an 87-foot blue whale. The scientific process provided me with a quantitative approach for indulging my curiosity and helped me understand the amount of time and effort needed to carry out high quality work.

Undergraduate Research: As the lead investigator studying long-term effects of herbivores on an island ecosystem, I secured $1000 in funding and established cross-institution collaborations with researchers from several local, regional and national institutions, organized a volunteer field crew, and travelled to the Channel Islands to quantify vegetation recovery 23 years after complete grazer eradication. My training in Wilderness First Aid and careful logistical planning ensured adequate preparation for all possible road bumps, and I set our team up for success by setting achievable daily goals. Our data showed an unmistakable transition from non-native grassland to native coastal scrubland, suggesting that active interventions were not necessary to achieve desired restorations. I presented our results at the Conservation Biology symposium, and have published our work[1]. This research is a prime example of how fortunate I am to participate in a subject that brings me so much enjoyment–I take great pride in seeing research go from planning stages to publications.

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[1] **Beltran et al**. (2014). *Passive recovery of vegetation from herbivore eradication on Santa Cruz Island, California*. Restoration Ecology. 22:6. Pages 790-797. Cover photo.

I discovered my interest in marine animals when I began working with a captive pinniped cognition laboratory under the direction of Dr. Colleen Reichmuth at UCSC. For two years, I helped graduate students in their aim to strengthen legislation on anthropogenic noise pollution by sustaining animal and facilities records, completing annual written reports, and subsequently providing mentorship to newer members of the lab. Through this work, I learned to establish research questions based on initial observations, to utilize theories as mechanistic explanations, and to draw appropriate conclusions using analytical methods. I continued to work with pinnipeds as a field and database technician in Dr. Dan Costa's functional ecology and physiology laboratory, where I assisted with elephant seal anesthesiology procedures and completed over 300 hours of detail-oriented laboratory work. My involvement in this research team culminated in primary responsibility over a study aimed to determine the influences of male elephant seal body mass on social dominance. I also co-authored a manuscript that underscores the importance of incorporating uncertainty in physiological metrics and provides several methods to minimize that uncertainty.

For my senior thesis, I worked with collaborators at UCSC and The Marine Mammal Center to validate photogrammetric methods for whisker length estimation. Supported by $1500 in student research grants, I used the newly-validated photogrammetry method to demonstrate that high-resolution whisker growth models can be used for temporal interpretation of stable isotope signatures in growing tissues. My colleague and I published the validation study results[2] and I presented the whisker growth models to more than 400 international scientists at the Biennial Marine Mammals conference in New Zealand where I received an award for the best student talk. This was the first time in conference history that an undergraduate student was given the award. My thesis was conferred highest honors by UCSC and I have since published it in a top-tiered marine ecology journal[3]. Upon graduating from my university, I was awarded a $3000 Thimann Scholarship, which is presented annually to a graduating senior who "shows the most promise as a future scientist in one of the scientific disciplines".

Graduate Research: Due to my scientific achievements and diverse background, I was accepted into the graduate program at University of Alaska Anchorage (UAA) under the guidance of Dr. Jenn Burns. I found the demographic consequences of environmental change on seals to be a pressing global issue that intrigues me from a scientific standpoint and fits well within my expertise. Supported by a one-year NIH IDeA Networks of Biomedical Research Excellence fellowship, I have completed graduate courses, assisted in the first season of data collection, constructed and validated a dynamic energetics model, conceived a novel technique for estimating body mass using 3-dimensional photogrammetry, instructed an undergraduate laboratory, become a council-member of the Association for Polar Early Career Scientists, and presented preliminary results at two international conferences with support from a $1500 AnT-ERA travel grant. In order to fine-tune my modeling and analytical skills, I participated in an Agent-Based Modeling workshop in Germany supported by a $3000 LGL Research Award. I have also laid the groundwork for a collaborative study with scientists from the Australian Antarctic Division to study the demographic implications of sea ice extent on polar marine mammals. My past experiences during 5 years as a Model United Nations delegate and 2 months as a visiting researcher in France have prepared me for such international networking.

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[2] Connolly, **Beltran** and Reichmuth. (2014). *A calibration procedure for measuring pinniped vibrissae using photogrammetry.* Aquatic Mammals. 40:2. Pages 213-218.

[3] **Beltran** et al. (2014). *Whisker growth dynamics: a validated approach for assigning timescales to stable isotope analyses.* Marine Ecology Progress Series. In Press.

Campus & Community Initiatives: My mentors' sincere interest was instrumental to my personal and professional development; I now strive to foster a similarly rewarding opportunity for others. Additionally, my unique perspectives on the challenges facing scientists from under-represented groups have motivated me to encourage and enable the participation of women and under-represented minorities to become more involved in STEM fields. I began volunteering for the San Diego Zoo, Wild Animal Park, and Scripps Birch Aquarium during my first year of high school and have worked continuously for science education programs ever since. As a supervisor at the Seymour Center public aquarium, I created experiential trainings for the docents. During my two-year tenure as an orientation leader at UCSC, I facilitated transitions of first-year students by providing a welcoming environment and using my fluency in Spanish to communicate with non-native speakers. I have also discovered that SCUBA diving is an effective way to bridge the gap between science and public interest. After obtaining my AAUS scientific diving certification, securing a $1000 grant from the Women Divers Hall of Fame and becoming sponsored by Diving Unlimited International, I aided several dive instructors as an underwater teaching assistant for scientific diving courses. I plan to continue using the outreach program I created in Alaska to infuse learning and knowledge with the excitement of scientific discovery during future class visits.

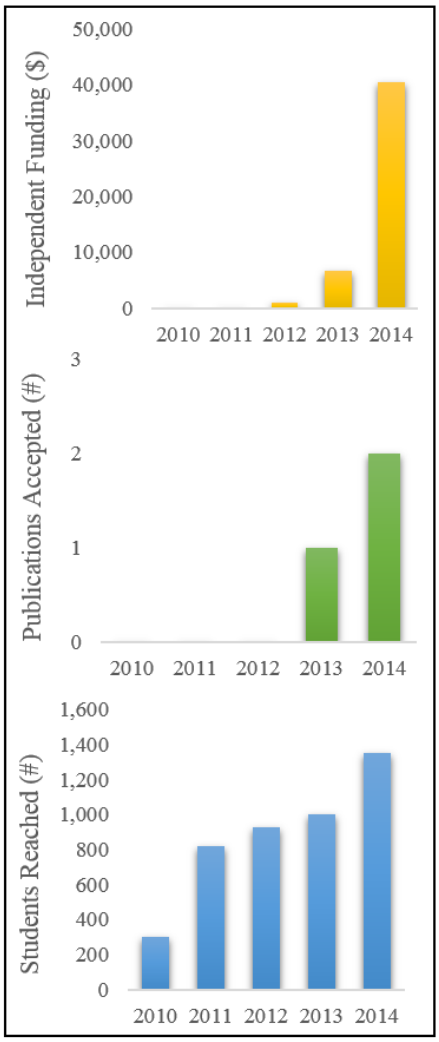

Fig 1. *My professional development is evident in the increased amount of funding, publications and students reached since my first year of undergraduate study at UCSC.*

Future Goals: I plan to continue conducting research in marine ecology following the completion of my graduate and post-graduate research. I intend to share my enthusiasm and knowledge with students who are beginning their careers just the same as I did. I believe that my passionate dedication to scientific discovery coupled with my versatile skill set will help me be an influential role model in global change biology. Since my first venture into science and education in high school, I have learned so much as a student and researcher–I gained rigorous theoretical knowledge through my academics, practical hands-on experience through various field courses and SCUBA fieldwork, strong foundations in lab protocol through my seal biology and stable isotope analysis work, writing experience through multiple publications and grant proposals, interpretation opportunities by teaching in both formal and informal contexts, and a sophisticated scientific understanding through the design and implementation of transformative research projects (Fig. 1). Becoming an NSF Graduate Research Fellow will be an extraordinary opportunity for me to conceive interdisciplinary research, to mentor a diverse group of students, and to make a positive and lasting contribution to science.