**Statement of Research Interests**

David Vasquez

[Vasquezd@oregonstate.edu](mailto:Vasquezd@oregonstate.edu)

(925) 818-1172

I often wish that animals had Instagram accounts, the ability to get an intimate and personal look at their lives would be fascinating. I would immediately follow a Great White Shark, and probably shiver in fear at their photos of unsuspecting surfers floating contentedly above them; I grew up in Southern California and often surfed off the coasts. Of course this is absurd but it ties together two of my research interests, ecology and technology. Specifically, I am interested in utilizing marine bioacoustics and innovative technology to advance our understanding of marine ecosystems.

My interest in bioacoustics started during a graduate statistics class where I became friends with another graduate student who was doing research with Professor Klinck who was part of the CIMRS Bioacoustics Lab at Oregon State University. I had been searching for how to bring my background in statistical analysis, software and hardware development to the field of ecology and this research area grabbed my attention immediately. I began to speak with other faculty at Oregon State University and attended a Marine Biology Conference where I fell in love with the field.

**Research Goals**

I am very curious about the world around me and the more unknown and remote a place the more I am drawn to understand the ecosystem and the effects that humans have on these environments. I am particularly drawn to the depths of the oceans and the remote corners of the world like Antarctica and the Artic.

There are a lot of reasons I am drawn to this particular research and the opportunities it would open for me as I pursue a career towards becoming a Professor. One of the most important is the methods used to conduct this research and how utilizing bioacoustics opens the ability to research a broad range of unanswered questions. As a Research Assistant in the Department of Nuclear Science and Engineering at Oregon State University I worked extensively creating images of radioactive decay, a process referred to as spectroscopy. Spectroscopy analyzes energy deposition and count rate, which is a similar process to working with a spectrogram created from anthropogenic noise or marine mammal vocalizations.

When starting my research I had never used a scintillation detector or an amplifier or applied 900 volts to a small tube hoping to trigger a Townsend avalanche. The first stages of my research saw me practically living in the lab gaining knowledge of the intricacies (and oftentimes stubbornness) of the equipment. My persistence paid off through full funding through the Nuclear Regulatory Commission and being nominated by Faculty as an ARCS Fellow. I even had a newer Nuclear Engineering professor ask me to help TA in his lab as he had not used the analog equipment as intensely as I had. I plan to bring this same level of persistence and dedication to being a marine biologist.

If selected for this position my primary research goal would be working to understand the effects of anthropogenic noise on killer whale prey. While working on this research I would also apply myself diligently to gaining a greater understanding of current and trends in bioacoustics research. One particular research area that stands out is using this data to analyze the effects of invasive species, similar to your research in the New York State Canal System.

Another major component of what I hope to engage in as a researcher includes my desire to utilize and advance the use of technology in biological research. The NSF has a program for advancing biological informatics and depending on how my research is going I would be interested in working to explore these grants as an additional way to bring in funding to the lab. The Advances in Biological Informatics program seeks to develop tools and resources to advance scientific knowledge and disseminate this knowledge to other researchers and the public. The development of new research methods includes using bioacoustics and also novel methods of deploying these acoustics like a glider that will be deployed in the Ross Sea to create acoustic surveys and map zooplankton and silverfish. My background has been centered heavily on the skills needed to develop and implement new technology.

I would like to utilize machine learning and artificial intelligence as a foundational component of my research. Computational methods open up the opportunity for a deeper understanding of data by looking for patterns that might be missed by a smaller team of researchers. A few practical examples of this include utilizing and building upon existing Python AI libraries, tapping into Googles Vision and Speech APIs and the development of new algorithms.

I also hope to bring in research funding related to developing tools for more efficient data collection, analysis and dissemination. I find this to be an important area of exploration that could have dramatic impacts on the future of scientific progress. Through my personal projects, research and work experience I have gained the ability to develop and implement these ideas. I still have a lot to learn in this area and look forward to continuing to grow my knowledge in all of these areas.