**Statement of Interest**

**David Vasquez**

**Introduction and Research Interests**

I have always had a strong fascination with oceans; their power and complex relationship with the Earth’s ecosystem makes them a fundamental aspect of life. They are a reflection of human’s impact on the environment and are critical to the sustainability of life. I believe our understanding of them will become more and more crucial as the Earth’s population continues to grow. I want my research to contribute to this understanding but also hopefully be able to be used to come up with solutions to the unique challenges we are facing.

What draws me particularly to Physical Oceanography is the mathematical and numerical approaches needed to develop models of the relationships across both time and spatial scales. I love working with large data sets, developing and utilizing algorithms to solve problems and simplifying the complex.

I am particularly interested in the research being engaged in by Professor Nash because of the important issues they are working to understand involving the flow of energy through the vast oceans and the challenging physics involved. What really draws me to this research is the methods used to study these problems. The work with Autonomous Research Vessels like ROSS is deeply fascinating to me. I have utilized software and hardware to solve my first master’s thesis designing digital radiation detection equipment and want to continue to use statistical, numerical and computational methods to solve interesting scientific challenges in the field of Oceanography.

**Past Research and Academic Work**

Some important skills I hope to bring come through my academic, professional and personal experiences. Academically I have completed two master’s degrees. One of these degrees involved intense data collection from real world radiation detection equipment in order to develop software that mimicked their functionality digitally. To conduct this research, I had to utilize existing research and mathematical mechanisms involved in radioactive decay and also develop mathematical models and algorithms of my own. The intense time spent in the lab led one of the newer Nuclear Engineering faculty members to ask me to join his undergraduate lab as a Teaching Assistant because the equipment had a tendency to be rather finicky. Issues were diverse and could come from many different areas including the wires used, voltage applied to specific detectors or isotopic sources that did not provide accurate readings.

While completing my master’s degree I worked as a Teaching Assistant for my Lead Professor at the undergraduate and graduate level. I also applied for and designed all the course materials and instructed Radiation Biology and Radiation Physics for the Diagnostic Imaging Program at LBCC. What I enjoy about academia and what made these experiences amazing was that I was being constantly challenged. This love of solving problems has led me to many personal projects including a current one where I am working on developing a secure encryption method utilizing a stateless encryption key which will hopefully provide the level of security of a hash (such as SHA1) and a UNIX timestamp. This is most likely infeasible but it is a fun challenge to be involved with.

Academically, I have taken a number of courses that would be helpful including Statistics 511 and 512, Integral Calculus, Differential Calculus, Vector Calculus and Differential Equations. My course work also includes a number of research methodology and computer science courses. This background would be useful as I gain a greater understanding of physical oceanography through CEOAS courses like the Geophysical Fluid Dynamics sequence.

**Bridging this to the Future**

I have discussed somewhat my interests but wanted to briefly address further why I am pursuing Oceanography. I was offered a full ride to study Medical Physics at the new joint program between OHSU and OSU upon completion of my first master’s degree. The reason I turned this down was I did not enjoy working in an Oncology Ward and the medical research was not an area I would desire a career in. After this I found funding to pursue an MBA with the goal of gaining a corporate position. What I realized during this time is that I have a love of research and academia and working with students.

This led to a search where I looked at what drives me, what I am passionate about and where I would be happy pursuing a lifelong career. There is the age old question what would you do if you had so much money you never had to work. I could answer that question instantly; I would be a Professor and I hope to do so in the field of Oceanography.

There are a number of reasons I will be motivated to learn and master this subject matter. The first is that I want to gain a PhD so my grades, research and publications will be important for admission. Second, I will not be able to be a successful researcher without a firm grasp of current literature. I hope to leverage my skills to be able to be involved in all aspects of the research process which will hopefully lead to a successful publication. Third, I would like to develop some useful and specific skills that will help me over the course of my academic career. I believe that projects like ROSS would allow me to gain these types of skills. I also hope to continue to improve my programming and statistical abilities.

In closing I would just like to reiterate that my short term career and research goal is to gain a masters and doctorate degree in Oceanography. My long term goal is to gain a tenure track faculty position at a leading research University. I am aware that succeeding in Academia requires dedication and hard work and will bring this knowledge with me in my day to day activities as a graduate student.