

Statement of Professional Objectives

Joshua Haas

Over the past four years, I have been steadily pursuing a bachelor's degree in Electrical and Computer Engineering at Rowan University. This has required no small amount of work (ask anyone in my class about Digital Signal Processing), but has also been highly rewarding. I entered with a passion for computers and technology kindled mainly by my older brother, who received a bachelor's degree in Computer Engineering from Stephens Institute of Technology. I will be leaving the program with a firm foundation in math, electronics, programming, and communication, as well as the basics of doing research. I have learned, worked, explored, socialized, stressed out, and had fun during my time at Rowan. However, as graduation drew closer, I came to realize that my post-graduation plan was fundamentally flawed.

Since at least junior year, various professors, advertisements, and other sources had succeeded in convincing me to seek a master's degree upon graduation. Moreover, during junior year I had the opportunity to establish a good relationship with Dr. Polikar, the head of the Electrical and Computer Engineering Department. This was a result of both working on an Engineering Clinic project with Gregory Ditzler, a graduate student at Drexel University, and performing well in Dr. Polikar's Digital Signal Processing class. This led to a paid summer internship with Dr. Polikar, where I learned the basics of Machine Learning and Pattern Recognition, implemented several algorithms, experimented on sample data, and was introduced to his current project. This work has continued in my Senior Engineering Clinic as I work with Dr. Polikar and his current graduate students to further develop and test this algorithm. This was all in accordance with my intent to pursue a master's degree at Rowan University.

However, a few weeks ago, while talking with Dr. Polikar about this very application, he said one sentence that effectively pulled the rug out from under me. "Have you considered applying for the PhD program?" Of course my initial response was a simple yes, but as we talked I realized that any thought I had given that question was cursory at best. After discussing the pros and cons of pursuing a doctoral degree, he ended with another simple sentence: "Think about it." And that is exactly what I have been doing, especially over spring break. His description of research, recounting of his own experience, and belief that I had the ability to complete the program peaked my interest and led to a significant amount of soul-searching on my part.

First, I talked to my sister, who earned her PhD in Solid State Chemistry from Princeton University. She recalled working toward her PhD as both the most fun and demanding period in her life. I am no stranger to hard work, as my parents have always expected and supported my academic success. But what I took away from the conversation was her love of innovation. She told me how she always wanted to be a leader, to be on the forefront of scientific innovation, to invent the next big thing. She would never have been content simply doing busy work for a manager, and so she pursued and received a doctoral degree, which helped her get a research-based job at the chemical company Air Products.

Next, I talked to Greg, the graduate student I worked with for both semesters of Junior Engineering Clinic. In fact, he will be giving his PhD defense sometime in April, which I fully plan to attend. During my time working with him, I analyzed the presence of different species of

bacteria in humans using data visualization algorithms. He echoed my sister in regards to the hard work and enjoyment, but added his own insight. He believed that one should not pursue a doctoral degree “just because,” or for lack of another plan. A PhD should be part of some major personal goal. For him, the goal was teaching and doing research at a University. For him this translated to a position at the University of Phoenix. So he asked me what my goal was, and I did not have a concrete answer. To “get a good job” simply did not seem good enough. My dream job would be programming for Google, but that seemed impractical or at least long-term.

Finally, I talked to myself. I reviewed my time in Dr. Polikar's classes (both Digital Signal Processing and Advanced Digital Signal Processing) and realized that my interest lit up whenever we talked about something new and cutting edge. This was especially true for the final projects in these classes, as well as the very open-ended summer internship. Thinking about working with Greg, I kept returning to the parameters of the project. It was an open question, an opportunity for research. Rather than telling me to: “run this algorithm and report the results,” his instructions were much closer to: “find something interesting in this data.” Very open-ended, and, I realized, very enjoyable for me. And finally, reviewing my conversation with my sister, I realized that I, too, want to be on the cutting edge. I want to be the one making the cool new technology that amazes the coming generations.

As mentioned previously, my work with Dr. Polikar has been in the areas of Machine Learning and Pattern Recognition. These are some of the basic building blocks of Artificial Intelligence, a field that has captivated me and fuels my passion for technology. This past October I attended the IEEE Computational Intelligence Society Workshop at the University of Rhode Island with Greg, Dr. Polikar, and Dr. Bouaynaya. There were quite a few interesting presentations on emerging topics by leaders in the field. In fact, one of the talks from this seminar led me to code and test a Genetic Algorithm as the final project for Dr. Bouaynaya's class, Introduction to Engineering Optimization. I am currently further testing and editing said algorithm as an independent study project to fulfill the requirements for my minor in Computer Science. My name is on a submission to the International Joint Conference on Neural Networks, written by Dr. Polikar's graduate students Anthony Sanchez and Joseph Sarnelle with help from myself. In the future I hope to continue this work, developing the frameworks that drive the next generation of smart computing and even artificial intelligence.

Throughout my academic career, many subjects have come easily to me. I generally do not have to work as hard as other students to receive the same grade. But research is different. Rather than working to get an “A” in a class, I will be working to answer a problem that does not have a known solution. I will be working to see what I am truly capable of. And for the first time in a while, I have a concrete goal in mind; working at Google is no longer just my dream job. I plan to do everything in my power to reach this goal, and I believe that I will reach it. In working toward this goal via Rowan's doctoral program, I hope to not only develop my skills in math, programming, and research, but also make significant contributions to academia and the University. Thank you for your consideration.

Sincerely,
Joshua Andrew Haas