

Statement of Purpose

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My time in the Marine Corps functioned as a time of enlightenment that ignited my passion for computer science. I served in the 3rd Infantry Battalion under the 24th Marine regiment as a Data Network Specialist. As I worked my way up the ranks, my superiors identified me as dependable, trustworthy and the “go-to guy” of my section. While deployed, I operated on a special assignment to maintain a satellite system called the VSNAP (Virtual SIPRNet NIPRNet Access Point) for operations from Ubaydi to Baghdad, Iraq, to process data that would identify potential terrorist movement. On this assignment I encountered a wide array of technology that served a vital role in my team’s capability to complete its mission. The software that plugged into my system gave us the ability to scan an individual’s fingerprint, send the image to a database in Washington DC and return all available information on the individual within 10 minutes. While it made me proud to know I had the ability to run these systems, I wanted to understand what was happening beyond reading a manual and pushing buttons. At that moment I knew I wanted to dedicate my life to understanding how these systems worked to their core and dedicate myself to advancing the field of computer science.

While overseas, I commenced the application process for Southern Illinois University of Edwardsville. Once I started classes, I quickly learned how to immerse myself within the problems and paradigms each course presented. After being exposed to an extent of different problems in computer science, I developed a love for data mining and algorithm development for databases. After investigating other research opportunities with different faculty, I chose to pursue research with Dr. Mark McKenney. Our research focuses primarily on writing an analysis framework for spatiotemporal databases. This framework consists of a small subset of common aggregate operations, for example min, max, difference, etc. The algorithms are written in CUDA and are run on a GPU processor to optimize the speed of the queries. The information is stored in a database utilizing a map-reduced model to support efficient storage and retrieval of data. I was amazed we had the ability to evaluate such massive amounts of data and excited by the idea of extending its functionality. The appealing facet of this research direction lies in the application of predicting potential hazards. We demonstrate this by querying the max overlays of a multitude of hurricane paths to show possible danger zones. Through partaking in this research, I realized that my fondness for technology combined with the motivation to solve larger problems bred passion in my work. During my research I wrote programs that collect, analyze, and store storm information in the database. I also set up and administered our UNIX based Hadoop cluster. We recently attended the 2013 COM.Geo conference in San Jose, CA where I presented a prototype and staged a poster of our work. The conference published our material to IEEE and is available on the IEEE Digital Library¹. Our future work² focuses on enhancing our algorithms to handle the increasing size of our data.

While attending school and carrying out research, I worked at an internship for Scottrade as a Java developer for a front-end application. Working at Scottrade opened my mind to many problems software engineers are facing today and became an outlet to exercise the methods and skills I gained from my courses. The most essential fact I learned from this internship was the importance of testing code. During the first three months my responsibility was to increase our code testing coverage. This

concept never hit home until I saw the purpose it served within the fully functioning software development team. I experienced first hand how testing can drive development and bring about effective communication amongst a team. Ultimately, having this internship served as an indicator that I truly enjoyed the work I was accomplishing and found that many other jobs, such as database administration, appealed to me as a potential career.

I first decided to investigate Washington University because the reputation this school holds is outstanding. My friends and colleagues who have attended your school boast about the quality of education offered. Professors are accessible to the best of their abilities and seem to cater to students needs if possible. Moreover, Washington University embodies a culture that attracts great minds and I want to attend a university where not only my professors but also my peers will challenge me to be the best I possibly can.

If I am accepted to Washington University, I would like to do research in data mining with Dr. Yixen Chen. I read about Dr. Chen's work, developing an algorithm to predict Sepsis in ill patients. This research falls in line with my motivation to study in this field by solving a critical problem. I believe that the experience I would gain will be useful for a career in database systems. Another field of research I am considering is computational biology with Dr. Michael Brent. I find this multidisciplinary research fascinating since it possesses an inherent challenge for both disciplines involved to apply their expertise in a different working environment. Being able to apply my skills outside of a traditional domain will equip me to be a versatile worker.

In conclusion, my goal in pursuing a master's degree in computer science is to focus on database systems, my primary area of interest. My undergraduate journey presented a multitude of subfields and taught me that I cannot learn each subfield to its core. By going after a master's degree, I hope to develop a profound knowledge of database systems and be able to apply this knowledge in industry. The experiences from my technical and military background have given me the attitude required to persevere in graduate school. Having an internship has given me a stronger understanding of what industry is like. Scotttrade has also given me a solid foundation of software engineering practices that can be applied to an academic arena. My background in research has prepared me to excel in research at your school by modeling policies and procedures taken while conducting research. Above are the reasons that support why I will make a perfect fit for the MS of computer science program at your school. I believe Washington University will advance my knowledge and enhance my prospects in my future career in industry.

¹ Brian Olsen and Mark McKenney, "Storm System Database: A Big Data Approach to Moving Object Databases." International Conference on Computing for Geospatial Research and Applications (COM.Geo), 2013. doi: 10.1109/COMGEO.2013.30

² Brian Olsen and Mark McKenney, "Algorithms for Fundamental Spatial Aggregate Operations Over Regions." ACM SIGSPATIAL International Workshop on Analytics for Big Geospatial Data (BigSpatial), 2013.