In my graduate program I want to focus on robotics research. During my undergraduate Computer Science courses I became interested in automation as a way to solve people’s problems. The complexity of this issue and its promise to make people’s lives better instilled in me curiosity and desire to master it.

The problem I want to study at \_\_\_ is that of autonomous motion in unmanned vehicles. While this is a broad area encompassing many fields, I am interested in developing algorithms that allow for more agile and intelligent movement in terrestrial and aerial environments. I plan to address challenges such as collision avoidance, real-time reaction to environmental changes, trajectory optimization and maneuvers in challenging terrains.

Tackling the problem of autonomous motion would require an interdisciplinary approach integrating knowledge from computer science, cognitive science and electrical and mechanical engineering. I therefore plan on taking as much coursework as necessary to bring me up to speed on current research, as well as allow me to undertake my own independent research. My liberal arts background has helped me think about problems holistically, and this is how I will approach my graduate education as well.

My confidence in tackling challenging technical problems stems from the broad spectrum of undergraduate computer science courses that I have been exposed to. An algorithms course introduced me to the ingenuity and creativity required to design an efficient algorithm. I have also been exposed to predicate logic and I was impressed with formalization of natural languages into concise form, which can be interpreted and understood by computers. A course in parallel and distributed programming has given me endless inspiration and musings about the power and possibilities of concurrent and distributed systems. Finally, a class in software engineering gave me an opportunity to study about and develop appreciation for elegant designs needed in developing complex software systems.

The class that I enjoyed the most, however, was my senior year compliers class, which included a semester long project in building a compiler for a small language. I enjoyed this class because it represented a synthesis of my entire undergraduate computer science education and included knowledge I obtained from different areas: finite automata, data structures and algorithms, object oriented design and patterns, systems programming and computer architecture. The complexity of the project presented a great challenge but overcoming it made me realize how far I had gotten since I first learned about arrays and for-loops.

Aside from my coursework, one of the most rewarding experiences for me while at Truman State University was sharing my knowledge of computer science with other students. While there, I was the teaching assistant for three courses: CS 180 (Foundation of Computer Science 1), CS 181 (Foundation of Computer Science 2) and CS191 (Computing Structures). I worked with students to help them better understand the material, clarify questions about homework and introduce them to the tools needed to complete the programming assignments. The best part of the job was seeing students go from being discouraged to solving a problem by themselves and being proud of their work. Getting them excited about computer science was a great source of inspiration for me and I hope that one day I can reach even wider audiences by becoming a professor and teaching the material on a daily basis.

In addition to my classes and teaching experience at TSU, my senior year internship in software development further increased my knowledge and interest in computer science. During this internship I learned to design and implement Android applications. In an Agile team of six people we learned to use version control, write automated tests and follow good OOP design patterns to write clear, maintainable code. We also used continuous integration server to detect problems early and deliver working software to the customer at all times. The biggest lesson I took away from this experience was the importance of collaboration and working in a great team. Teamwork is fundamental, especially in computer science where constant collaboration is essential in writing the best software possible.

My undergraduate coursework, the rewarding teaching experience and my senior year internship ensured me that I want to deepen my understanding of computer science and do research in robotics**.** I’m interested in the ­­­\_\_\_ because there are several active research projects underway that are closely related to the problem I want to study.

In particular, I’m interested in two of Professor Gabriel Hugh Elkaim’s projects, the FASTNAV and ROBUST UAV AUTOPILOT. The focus of the Autonomous Systems Lab of reducing cost and increasing robots’ sophistication is closely aligned with my purpose in undertaking research in this area as well. Furthermore, Professor Qi Gong has two ongoing research projects that are related to autonomous vehicle motion. I’d like to work with him on either Motion Planning for Autonomous Vehicles or Spacecraft Trajectory Optimization.

I believe that \_\_\_ has the necessary resources, support network and tradition to help me successfully complete my PhD and become an expert in my field.

Upon completion of my PhD I hope to work for a research university and split my time between research and teaching. By doing research, I hope to be exposed to new ideas and latest developments in computer science. Through teaching, I hope to transfer those ideas to other students and not only educate them, but more importantly, spark enthusiasm in them about the endless possibilities of computer science and its potential impact on people’s welfare.