

I fell in love with engineering when I became a founding member of a FIRST robotics team that was started during my senior year of high school. When the FIRST season was over, I felt the need to continue building on my engineering skills. I began to experiment with model rocketry, which is still my hobby. I converted my longboard to be electric. I welded the motor mount onto the back truck and hooked a Turnigy electric motor to it. I used an electronic speed controller paired with a transmitter and receiver to control the acceleration and breaking of the board. I learned how lithium polymer batteries worked and hooked two 5000 mAh batteries in parallel to power it. I began to realize that I naturally gravitated to math and science in high school and constantly surrounded myself with various engineering projects. I knew I wanted to continue my education in mechanical engineering, but I did not know what I wanted to do with a mechanical engineering degree. I began to explore my options for a career when I picked up an unexpected past-time, reading.

Reading became a big part of my life in university. I started to replace all my time wasters including scrolling through Facebook and TV shows with reading. The first book I read, *Space Chronicles* by Neil deGrasse Tyson, sparked a huge transformation of the interests in my life. For most, it is scary to think of something so huge and complex. I see opportunity. I see an adventure waiting to happen. It empowers me to join the force for space exploration and be at the forefront of human adventure. Reading books that let me explore the universe continues to inspire and invigorate me. It fills me with hope for the future. It is what made me fall in love with astronomy, physics and, ultimately, aerospace engineering.

To explain my interests, I must discuss the problems ahead. Flight is a wonder that has been a subject of research for hundreds of years. Most of our understanding of flight and testing of spacecraft have gone on in our atmosphere. Unfortunately, things change drastically from planet to planet when it comes to its atmosphere. Aerodynamics is a huge field with extreme unknowns about how spacecraft will act for different atmospheres. The Air Force Flight Test Center in Edwards Air Force Base provides some of the world's top aerodynamic and propulsion wind tunnels. I would love to be part of the research that is able to accelerate us, quite literally, into space more efficiently and reliably.

Space exploration is a very expensive endeavor. Reusability is a major problem that needs to be solved to enable space exploration to be financially feasible to both the country and the world. The engineering implications of rocket reusability require strong research and development. The Aerospace Systems Directorate Air Force Research Lab at the Wright-Patterson Air Force Base is home to fuel research and rocket testing facilities that have extreme importance to spaceflight. I would love to play a role in the type of research done there or at similar facilities that can make strides in alternative fuels and more reliable rocket engines.

Long-term space travel exposes harmful effects to the people traveling to worlds beyond low earth orbit. They would be exposed to the strong solar wind during their travels that would otherwise be blocked from the Earth's magnetic field. We need to be able to protect our payload carrying explorers from this radiation that ionizes our cells and causes cancer. The Directed Energy Directorate & Space Vehicles Directorate Air Force Research Lab in the Kirtland Air Force Base maintains strong research in spacecraft structures and an assortment of methods for spacecraft controls. Working for this facility or others like it will let me experience important research that has the capability of providing safer spacecraft for any payload leaving Earth.

What is so invigorating about the space industry is that some of the greatest challenges of humanity are in front of us. The problems listed above are core issues in the space industry that have significant interest to me. The three facilities I have chosen to be considered for will be able to provide the research that I would look forward to participating in every day.