Give information that will aid the selection committee in evaluating your potential for completing a graduate program of study.

There were always things that fascinated me growing up — lightning breaking across the sky, tides advancing and receding, or airlines floating miles in the sky. These phenomena seemed so inexplicable and without reason. I wanted to understand them, but didn't know how.

It wasn't until my junior year of high school while taking my first physics class that I realized the method for understanding these and so much more: physics. Mechanics, electrostatics, and fluid flows, all under the umbrella of physics, clearly explained these processes so precisely. This was the language that I had been searching for.

College physics was even better as the increased rigor and depth led to increased understanding. However, as my sophomore year of college began, I realized that I needed to begin using this science that had been accreting in my mind. Coincidently, in a physics seminar, I learned of the research one of our professor was doing with ultracold molecules. After an exchange of emails, I found myself in a windowless room in the basement of the physics building staring at tables full of mirrors, lasers, and vacuum pumps.

I was assigned to construction of a dye laser with another sophomore in the lab. Considering our mutual lack of knowledge of optical physics, we had much to learn about laser theory, optical components, resonant cavities, and quantum theory. We spent hours aligning laser beams, mirrors, and diffraction gratings. We fixed malfunctioning circulator pumps, cracked tubing, and broken circuits. When the tuning motor didn't rotate, we stripped the wiring, learned about Arduino-controlled circuit, and wrote a program through Python and Arduino to control the motor. When the lasing cavity didn't produce an output beam, we researched different cavity systems, reconfigured the cavity, and double the efficiency of the laser. Hours in the lab were hard, and often did not go according to plan, but there was always a simple beauty: real problem solving.

Although I loved the intellectual challenge that came with research, I was nervous about what full time research would look like. Those fears were extinguished when I was granted the opportunity to participate in a Research Experience for Undergraduates at the Laboratory for Laser Energetics over the summer. Given a project I had almost no knowledge of, I tested the problem solving skills I had been maturing. The days felt long and lonely while I muddled through Fourier optics, phase retrieval, and microscope theory. But as I continued to push forward, ideas came together and slowly turned into the completion of a rudimentary program to digitally recover focus from blurred microscope images.

These experiences have told me one thing: physics is a passion I not only want to pursue, but one I feel confident in. I am especially interested in < insert research at given school that I want to do > such as:

- Atom trapping and ultracold physics
- Laser physics, ultrafast lasers

- Plasma physics, and laser-plasma interaction
- Adaptive optics telescope systems