

## Graduate School Statement of Purpose

**Task:** Please write a short essay (500 to 1,000 words) about yourself and your interest in science. You do not need to write about astronomy or space, and you are encouraged to be creative. If you wish, you can say something about topics in astronomy that are of particular interest to you. Your essay is an important part of your application and will be read carefully.

In my family there is a tradition of interest in science: my grandmother was college professor in chemistry and physics, and both my parents were trained as mechanical engineers in college. When I was a kid, my mom showed me a box full of extremely tiny gears – those that table clocks are made out of – and told me what each part was for, and I remember thinking “this is the coolest thing I’ve ever seen!” I have been interested in mechanical structures and the inner working of human-made and natural things ever since.

My interest in natural structures and systems began with photography. I find it an almost magical technique of preserving any natural phenomenon from large to small. It also gives me a chance to look at things very closely and wonder about them for as long as I like. I took photographs extensively when I travelled in China, and later in my first year of college. My interests intensified and went beyond just apparent forms, when during my first summer in college I read about linear and nonlinear dynamics, emergence behavior, game theory, neuroscience and spatio-temporal pattern formation in books intended for undergraduate students or the general public. I decided that my appreciation for nature would only deepen and advance if I learned about the underlying theory of the nature of beauty, instead of just the beauty itself. I’m also more and more convinced that we can gain insights into the very large structures in our universe by looking at smaller structures like cellular pathways or subatomic particles.

In order to understand the physical world further, I enrolled in both physics and mathematics programs. Even with the strong theoretical emphasis in my curriculum choice, I still find physically touching, seeing and manipulating things among the best ways to understand them. I enjoy doing lab works in physics, and I have worked in a machine shop, sculpture studio, art museum, and taxidermy studio. However, the elegance, simplicity, and power of theory are even more appealing to me as a scientist. As I acquire more and more background in mathematics, I realize what a powerful language and metaphor it is to science. I enjoy engaging myself in philosophical arguments about the nature of mathematics and physics with my physics and astronomy professor Dr. Robert Harmon and my best friend in college who is a neuroscience student.

My research project last summer was on an eclipsing binary star system, LV Hercules, which has high orbit eccentricity. From the beginning of the project, I was very enthusiastic about teaching myself observational astronomy from scratch. The project was sponsored by the Arkansas Center for Space & Planetary Sciences at the University of Arkansas, a new research center consisting of mechanical engineers, chemical engineers, astronomers, biologists and cosmologists. I enjoyed the interdisciplinary group dynamics during weekly seminars, while at the same time working in the physics

research building, where I could talk to other physicists about their work on material science, numeric and computation, or quantum optics.

During the process of learning about the universe – seeing, touching, experimenting, thinking, and researching--I also have learned about myself. I find the only way I can learn anything meaningful is to ask “why,” which is the central thread of any inquiry – experimental, theoretical, philosophical or intellectual. I always try to find the boundary to the chain of knowledge or reasoning. For example, in the world of astrophysics, I find the jets from black holes and pulsars interesting, I find cosmic background radiation interesting, and I find the origin of universe intriguing, since we do not know how these phenomena have come into being.

My liberal art education also has provided me inspiration and reflection on science education. Having found that college science outreach consists almost entirely of cool demonstrations of scientific phenomenon, I tried to create another area of interest in science and scientific thinking, by demonstrating the power of reasoning, logic and critical thinking. That was the main objective when I gathered students and faculty members and created the Freethinkers Club on campus last fall. We discussed the teaching of the theory of evolution in public schools, and pseudoscientific influence in public policy making. We tripled the size of our mailing list after just one semester.

The liberal arts approach gives me opportunities to explore all these different experiences and ways of learning. I want to continue exploring the beauty and elegance of our universe in my life, my studies, and my career. For me, seeking out and understanding such mysteries—large and small—is like discovering and collecting jewels, or something even more elegant, like the tiny gears of a mechanical clock.