Student's Name

Professor's Name

Course Name/Code

Date

Graduate School Essay Example for Stanford: Computer Science and Astrophysics

The first time I processed a light curve from the Kepler dataset, I was a physics junior trying to complete a computational methods assignment. The assignment asked me to identify a periodic signal in a noisy dataset. I found one, wrote up the method, and moved on. Three weeks later, I went back to look at what I had found. It was not in the catalog.

That experience, finding an anomaly and not knowing whether it was real or an artifact, became the question that organized my undergraduate research for the following year. I worked with Dr. Amara Patel at the Stanford Linear Accelerator Center on machine learning methods for transient detection in large astronomical datasets. We developed a classification pipeline for distinguishing candidate signals from instrumental noise in data from the Zwicky Transient Facility, and the pipeline is now being used by another research group in the department.

I am applying to Stanford's Computer Science PhD program because of the program's infrastructure for research at the intersection of machine learning and observational astronomy. Professor Kieran Walsh's work on neural network architectures for time-series astronomical data connects directly to the problem I have been working on: how to classify signals at the volume and velocity that next-generation surveys like the Vera Rubin Observatory will produce. The computational challenge will not be finding anomalies. It will be knowing which ones to follow up on.