

Library Award Essay
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My research project was sparked after a conversation with renowned astrophysicist David Charbonneau of Harvard. While he was visiting the University of Maryland last spring, I met with him to discuss his research on extra-solar planets (“exoplanets”). When I asked him how I could dive into the field on my own, he spoke very optimistically about the possibility of detecting exoplanets with small telescopes at the University of Maryland Observatory, though it had never been done at our facility before. I quickly sought clearance and training to begin working at the campus observatory and I began developing software to turn telescopic images of the sky into measurements of stellar brightness.

Though I had great background training from my instructor Elizabeth Warner, I was probing uncharted experimental territory for the University Observatory. I had not been in contact with any professors that had done differential photometry themselves, and I did not have a mentor to sponsor the project. My solution was to look outwards for advice in the form of scientific publications on observational and computational techniques that could be used to detect exoplanets. Fortunately, the astronomical community has a relatively long history of using the internet to exchange publications, and the University of Maryland grants its students access to a wealth of subscriptions to digital publications.

I found many of these resources using popular astrophysical publication databases, like Harvard’s Astrophysics Data System (ADS). However, these databases just provide links to refereed full-text articles, which I would not have had permission read to without the subscriptions of the University of Maryland Libraries. Of the many publications that I read, particular ones that I had access to via JSTOR, the Wiley Online Library and the Astronomy And Astrophysics journal were of key use in my work (and are cited in my bibliography).

My criteria for selecting sources varied depending on the utility of the publication I was looking for. In the beginning, I was looking for sources that confirmed the fundamental viability of my experiment given the equipment at the University Observatory. Later on I spent a great deal of time sifting through more technical papers that explained how photometry is done algorithmically.

All of the work that I did in this project is expressly applicable to my career. I plan to continue my studies of astronomy in graduate school. In astronomy, it is common to pick a graduate school based on its faculty, which will enable a student to work on a thesis on a topic of their interest. Throughout the course of this project, I have grown more sure that I want to study extra-solar planets and observational astronomy, and I look forward to continuing the studies I began this past summer for the foreseeable future. In addition, the process of writing this paper and peer-reviewing it has been a valuable experience. I submitted this paper to the Scientific Terrapin, an undergraduate science

journal at the University of Maryland, and it was accepted and printed in the Fall 2011 issue.

After completing this project and writing this paper, I approached new faculty member Professor Drake Deming, another well known exoplanet astronomer. I had known of Dr Deming's work for years prior to coming to the University of Maryland, and his arrival at the Department of Astronomy was a great opportunity for me to dive headlong into exoplanet astronomy with a great mentor. I shared this paper with him and he promptly put me to work doing research with him. I am now studying an exoplanet observation taken by Dr. Deming at the 200 inch Hale Telescope at the Palomar Observatory in California. After a little tweaking, the code I wrote for the project in my paper has been adapted to his observations, and I will use it to determine the temperature of the atmosphere of the exoplanet HAT-P-7.