

My first introduction to physics research was through my work in the American University Laser Interferometer Gravitational-Wave Observatory, or LIGO, Lab. I did not know what I wanted to do with my Physics degree until my professors encouraged me to begin attending conferences and networking events. I had not considered graduate school until my professors mentioned it as a natural next step.

When I set my sights on a doctorate, I realized that lab experience would be essential. I consulted with upper class Physics majors about their research experiences. Based on their recommendations, one lab intrigued me: Professor Gregory Harry's "Gravity Lab." Not only did students in his lab do hands-on work studying optical mechanical loss with a vacuum chamber, but the lab also is part of the larger LIGO collaboration studying gravitational wave astronomy. As gravitational wave astronomy is a relatively new facet of space exploration, I found it to be fascinating. Additionally, I was enthusiastic about working in a hands-on capacity in a physical lab rather than focusing solely on equations.

When I confided in an upper class Physics student that I hoped to work for Professor Harry, she helped arrange an initial interview with him. Once I was hired, she became my primary mentor in addition to Professor Harry. My first assignments primarily consisted of smaller tasks. I ran tests on the silica disks we observed and recorded the results. I also began learning more about LIGO and more broadly about gravitational wave physics.

Through increasingly more complex conversations about LIGO, I came to understand substantially more about this interesting field. As a part of the learning process, Professor Harry consistently would correct me when I would forget a key detail or make small mistakes in phraseology. He patiently corrected any mistakes I made when describing LIGO or our research. Although this kind of mentoring is typical at American University, it is far from the norm elsewhere.

By the end of my sophomore year, I had accumulated enough lab experience to attend a conference in Baltimore. Needless to say, I was anxious about representing our team and presenting our lab research to an unfamiliar audience without assistance. However, the experience gave me new confidence as an aspiring physicist and made me realize the extent to which I was invested in LIGO's research.

In my two years as a part of the LIGO collaboration, I have begun to learn what it means

to be a scientist. Many LIGO members have worked on gravitational wave physics for most of their professional lives without ever even detecting gravitational waves. In my first year at LIGO, I grew to appreciate these efforts and the importance it has for the future of physics. Fundamentally, I learned to follow the results of the lab research and corresponding theory to its scientific conclusion, even in the absence of direct evidence.

My work the first summer was measuring optical coating samples that had been measured previously in 2002 to see if they had changed their thermal noise properties. This was a specific question that our funder, the National Science Foundation, had asked and American was the lab best suited within LIGO to answer it. This is an important question as we expect coating thermal noise to be the limiting noise in Advanced LIGO and the optics to be installed in LIGO India will have to be stored for many years. I spent the summer measuring the mechanical loss of these samples, which can be used to predict thermal noise. We determined that the mechanical loss had not noticeably changed, thus the optics for LIGO India should be fine.

It was stimulating to meet other scientists in the collaboration. I found that they appreciated my passion for the field and they were generous in sharing their knowledge and expertise. Upon LIGO's announcement of this groundbreaking gravitational wave detection, the collaboration's scientists shared the credit with all concerned. Following the announcement, I sat at my computer smiling, sharing the memorable moment with friends who had thrown a party to mark the occasion. The joy simply was contagious.

As a recent member of LIGO's email list-serve, I can count on a daily email reporting the newest five articles produced by the collaboration. Being a part of a community that works toward a singular scientific goal, knowing that the wider scientific community is both interested and supportive, makes the dedicated effort and hard work worthwhile.