What Learning About Machine Learning Taught Me About Myself:

My Undergraduate Summer Research Internship

by Sophie Wu

Sophie Wu holds a neuron in Western's Muller Lab. The plush toy was a gift for a PhD candidate who had gone out of their way to help Sophie and her fellow interns with their research in the summer of 2022.

If you had told me five years ago that I would eventually be doing undergraduate research in a computational neuroscience lab, I would have had a pretty hard time believing you. I was interested in many things as a teenager, all of them unified by a desire to be creative and social. By the time I graduated high school, I was very convinced that science just didn't fit the bill. I've flitted between a lot of things since deciding not to take Grade 11 science at the age of sixteen, but I'm glad to say that I've found a lot of my misconceptions about the sciences to be untrue over the course of my undergraduate experience. A lot of this has been the result of studying mathematics alongside the arts and humanities, but I feel that many of my most important realizations have been embodied in my Undergraduate Summer Research Internship (USRI) at Western's Muller Lab this summer. This reflection will cover the three things that I have been most grateful for in my experience.

Firstly, I have deeply appreciated the novelties of my research. There is plenty of room for creativity in applied mathematics research because the tools that you are developing bridge so many disciplines and ideas. Around a month into my research internship, I settled into working on a project on analyzing chaotic dynamics using reservoir computing with another undergraduate student doing research in the lab. Every element of our research was entirely alien to me, and I had many moments throughout my summer when I felt like I was lost in the weeds. But now that I can look back on this summer holistically, I recognize that I did enjoy my research a lot more because of the wide breadth of content I could engage in. I know that exposure to new ideas is something I enjoy. Now that I know this, I will certainly be keeping this as a priority when making future career choices.

Secondly, I have really enjoyed being a part of a lab working on a group project. I'm not sure how often I will ever get to experience such a supportive and communal cold dive into an entirely new field, but regardless, I know that I am lucky to have been exposed to this sort of environment even once in my undergraduate degree. Right from the start of the summer, my supervisor (Dr. Lyle Muller) was exceptionally supportive about

seeing my USRI as a learning experience, from giving me the flexibility to choose my own research topic to offering me support as I experimented with different research methods. Additionally, being able to work with another student on the same project made the process of research feel significantly less daunting. I cannot emphasize enough how helpful it was to have someone to openly talk with throughout the ups and downs of the research process. Whenever possible, I now would like to lean towards research opportunities that offer collaborative and supportive environments in the future.

Lastly, I have been grateful that this experience has pushed me to recognize and be proud of my accomplishments and capabilities. My work this summer has been liberating and validating as I have overseen my learning and affirmed my capabilities. Regardless of how long it might take me to reach my future goals in my research, I know now that it is important that I recognize what I have learned along the way. For that reason, I am very glad that this project finished in a real and shareable output—the final paper that I along with the other undergraduate student working on the project wrote for Scholarship@Western.

In writing this reflection and thinking about the ways that I have grown through my USRI, I am glad to say that I have learned a lot about what kinds of things appeal to me in work, learning, and teamwork. I know that I would not be able to make these kinds of statements if I had not personally experienced this research internship this summer; there are, after all, many things that you can only learn about yourself in practice. I look forward to continuing to do research with the Muller Lab as a part of my fourth-year mathematics thesis course and to all the opportunities that this summer might lead me towards.