



It was during my degree in Molecular Biology at Guelph University that I had realized my true interest was in astrophysics. The following year, I switched degrees and entered an Astronomy and Physics Honors program at the University of Toronto. My educational background in astrophysics and my experience with research, teaching, and outreach since then has motivated a pursuit to join graduate studies in astrophysics at Leiden University. My research experience in the interstellar medium and star formation has led me to my primary research interests and has provided me with skills in programming, data reduction and analysis, and scientific communication which have prepared me well for graduate research.

For my first summer project, I analyzed James Clerk Maxwell Telescope (JCMT) observations of molecules in Perseus dense cores. I investigated tracers of core infall and the relationship between core contraction and core stability using Python analysis. This project continued as a full year research course and led to a first-author paper that was written in my spare time over the following year which has been resubmitted for publication in the ApJ and incorporates improvements in response to the referee. I was also accepted to present a poster on this research at the Canadian Conference for Undergraduate Women in Physics. This project has been a great opportunity for me to carry out my own project from start to finish and to learn how to communicate my research through writing a paper as well as presenting my research poster at a conference.

This past summer during the Leiden/ESA Astrophysics Program for Summer Students at Leiden University, I constructed a Python code that analyzes observations of molecules in a star forming region made with the Atacama Large Millimeter/submillimeter Array. My code performs molecular line identification and creates intensity, velocity, and velocity dispersion maps as well as temperature and column density maps. This project introduced me to the topic of computational astrophysics, which was an exciting way to advance my programming skills and broaden my research interests. This opportunity also allowed me to experience life at Leiden University which solidified my interest in graduate studies at Leiden.

For my year long undergraduate thesis, I analyzed JCMT and Herschel Space Telescope (HST) continuum images of a massive star forming region to investigate how the resolution degradation of HST affects flux density measurements. Using Python, I convolved a $450\text{ }\mu\text{m}$ JCMT image to the resolution of a $500\text{ }\mu\text{m}$ HST image (a factor of ~ 4 difference) and compared flux density measurements made using the convolved JCMT map and the native resolution HST map. This project allowed me to learn about the complexities of massive star forming regions and their related instrumentation effects.

I have a strong interest in Python programming as well as data reduction and data analysis. While I have used Python in my research, I have also taken courses with an emphasis on programming. In an astronomy lab course I wrote a star-finding algorithm, obtained the light curve of a transiting exoplanet, and determined the orbital solution of an asteroid. I have also taken computational physics courses where I investigated Fourier analysis, the convolution theorem, Monte Carlo techniques, and response functions.

My ultimate goal is a career in research with an opportunity for teaching and outreach. Last year I was a Teaching Assistant (TA) for an astronomy course where I led discussion-based tutorials. I am currently TAing additional courses where I again run discussion-based tutorials, mark, respond to students emails, and run help sessions. I



am also the Outreach Director for the Astronomy and Space Exploration Society where I organize public astronomy events and have participated in many other astronomy-related outreach activities. I find these experiences very rewarding and they have motivated me to pursue a career in astrophysical research.

Leiden University offers many opportunities to challenge my research potential. I am interested in working with Dr. Hogerheijde on protoplanetary disks as discussed via email, as well as with Dr. Bouwens and Dr. Hodge, though I am very curious and would be excited to apply my skills to new areas of research. Leiden University also provides exciting courses in radio astronomy and star formation as well as astrochemistry seminars which would be exciting opportunities to advance my knowledge in the field and strengthen my skills as a researcher. The research and learning opportunities provided by the Astronomy Research stream strongly motivate me to wish to join Leiden University, and I hope to be given the chance to learn from and contribute to your community.