I am doing a masters in astrophysics at the University of Amsterdam to prepare myself to excel in Harvard's PhD program. I earned my undergraduate degree in astrophysics from the University of Toronto (UofT). I am the first author of "Correcting Bandwidth Depolarization by Extreme Faraday Rotation", published in the Monthly Notices of the Royal Astronomy Society in 2023. I was awarded UofT's John Pounder Prize in Astronomy on two separate occasions for my academic excellence, and worked as a Teaching Assistant (TA) for the 1st year Physics classes as an undergraduate. I wish to become a research professor, or work in national lab as an astronomer.

I have a keen interest in Fast Radio Bursts (FRBs) both in finding them and using them as tools to study the cosmos. Other areas of my interest include astrophysical transients, pulsars, radio astronomy, multi-messenger astronomy, radio interferometry, observational cosmology, cosmic magnetism, techniques, surveys, algorithms, and data science in astronomy.

I am interested in working in Professor Liam Connor's new research group studying FRBs. He focuses on FRBs, both in finding them and using them as probes to study cosmology. Additionally, he is focused on data science in astronomy - developing new transient detection methods and radio imaging with machine learning. These align well with my interests. I am confident that my research in FRBs, and radio astronomy make me great fit for Professor Liam Connor's group at Harvard.

My master's thesis is titled "Deciphering the local environments of repeating Fast Radio Bursts (FRBs) sources using scintillation" My supervisors are Professor Jason Hessels, and Professor Ziggy Pleunis.

This summer I worked at Astron, in the Netherlands as a summer research fellow. I developed a real-time FRB search pipeline using `Presto`, `Fetch`, and `Python` to detect repeating FRBs. My supervisors were Professor Jason Hessels, and Dr. Tammo Jan Dijkema. During this project I operated the 25m Dwingeloo Radio Telescope (DRT) to observe repeating FRBs and the Crab pulsar. I showed that the DRT was capable of detecting repeating FRBs if used in dedicated followup campaigns.

While studying at the University of Toronto, I worked on four research projects. Instead of doing one thesis, on special request I did two. Two of UofT SURP research fellowship projects focused on cosmic magnetism, specifically Rotation Measure (RM) synthesis. I was supervised by Dr. Cameron Van Eck, and Professor. Bryan Gaensler. One of these led to my above mentioned paper, that project was on improving the RM synthesis algorithm for extreme cases of bandwidth depolarization. I implemented those results in the `RM-Tools` package. The second was on error testing an error analysis pipeline for the Polarization Sky Survey of the Universe's Magnetism (POSSUM). For this project, I was awarded a grant from the Canadian Institute for Theoretical Astrophysics. I discovered that one of the error estimates was too small, and I implemented a correction based on modeling the error.

My second undergraduate thesis, which started as an UofT SURP research fellowship, was titled "Searching for and placing limits on the γ-ray emission from CHIME/FRBs using Swift/BAT GUANO data". My supervisors were Dr. Paul Schols, and Dr. Ziggy Pleunis. This research involved searching for γ-ray counterparts to FRBs using archived data from the Swift/BAT space-based telescope. I made no detections, and the γ-ray fluence limits I derived agreed with the current literature. I learned multi-messenger astronomy, and `Bash` scripting. My first thesis was "Gravitational waves from magnetar giant flares," supervised by Dr. Sarah Gossan and Proffessor. Bryan Gaensler. For this project I modeled a simple gravitational wave, and used gravitational wave detectors sensitivity curves to calculate an expected signal-to-noise ratio. Unfortunately, third-generation detectors will be unable to observe magnetar giant flares.

While at the University of Toronto, I was actively involved in the student community, and in outreach. I represented the physics department on the student union. I managed and volunteered at a a free physics tutoring center. My efforts were recognized with a 'Student Excellence and Leadership Award' given by the department. In my final year, I was a volunteer at the monthly department public outreach lecture and telescope viewings. Additionally, I organized a field trip to watch the Perseid meteor shower, and telescope nights.

Thank you for considering my application.

Astronomy is looking up!
Maxwell A. Fine