

Maxwell A. Fine

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EDUCATION

UNIVERSITY OF AMSTERDAM

2023 - 2025 (EXPECTED)

MSc, Physics & Astrophysics

UNIVERSITY OF TORONTO

2018 - 2023

B.Sc (Hons), Specialist in Physics & Astrophysics

THESIS: *Hunting for Fast Radio Bursts (FRBs) with SWIFT/bat*

SUPERVISORS: Dr. Ziggy Plenus & Dr. Paul Scholz and Prof. Bryan Gaensler

THESIS: *Gravitational waves from magnetar giant flares*

SUPERVISORS: Dr. Sarah Gossan & Prof. Bryan Gaensler

SKILLS

I am highly skilled in **Python**, **Linux**, and **Git**, specializing in packages such as **Numpy**, **Scipy**, **Matplotlib**, **Pytorch**, **Pandas**, **Scikit-Learn**, **RM-TOOLS**, and **Astropy**. I am skilled in data analysis, Bayesian analysis, time-series analysis, algorithm development, Fourier analysis, signal processing, machine learning, deep learning, big data (Tb Scale), **Bash**, **Docker**, cloud computing, and scientific computing. Additionally, I am experienced in **C++**, **SQL**, **AWS**, and **Kubernetes**.

PUBLICATIONS

Maxwell A. Fine, Cameron L. Van Eck, & Luke Pratley “Correcting Bandwidth Depolarization by Extreme Faraday Rotation”, Monthly Notices of the Royal Astronomical Society 2023. ArXiv link.

SPEAKING ENGAGEMENTS

Panelist at ADL’s Never is Now Conference

FALL, 2022

The Anti-Defamation League (ADL) is the world’s largest organization dedicated to fighting antisemitism. I was invited to be a panelist as an expert on antisemitism on College campuses. The conference was at the Javits Center in NYC.

AWARDS

3rd Year John Pounder Prize In Astronomy

FALL, 2021

Awarded to a full-time student entering the third year of a physical sciences program on the basis of excellent achievement in astronomy courses (\$300)

Undergraduate Student Research Award (USRA)

SUMMER, 2021

Canadian Institute for Theoretical Astrophysics (\$6,000)

Student Excellence and Leadership Award

2019-2020

Department of Physical & Environmental Sciences

For academic excellence and community leadership (\$350)

2nd Year John Pounder Prize In Astronomy

FALL, 2019

Awarded to a full-time student entering the second year of a physical sciences program on the basis of excellent achievement in astronomy courses (\$300)

RESEARCH EXPERIENCE

Hunting for Fast Radio Bursts (FRBs) with the 25m Dwingeloo Radio Telescope (DRT) Summer 2024

Astron & JIVE Summer Research Program

Advisor: Dr. Tammo Jan Dijkema, and co-advisor Professor Jason Hessels .

Used the 25m DRT to search for bright repeating Fast Radio Bursts (FRBs) with goal being to show that the DRT can observe FRBs, and to understand the potential connections between repeating and apparently non-repeating FRBs. Learned radio astronomy techniques, and methodology. Built the data processing pipeline to find the extragalactic transient FRB signals. Tested the pipeline and methodology by looking at Pulsars and injecting simulations.

Hunting for Fast Radio Bursts (FRBs) with SWIFT/bat 2022-2023

Dunlap Institute: Summer Undergraduate Research Program (SURP)

AST425: Undergraduate Thesis

Supervisor: Dr. Ziggy Plenus & Dr. Paul Scholz and Prof. Bryan Gaensler

Searching for and placing limits on the X-ray & gamma-ray emission from CHIME/FRBs using Swift/BAT and GUANO.

Gravitational waves from magnetar giant flares

PHYD01: Undergraduate Thesis

Winter, 2022

Supervisor: Dr. Sarah Gossan & Prof. Bryan Gaensler

Determined if it is possible for the next generation of ground-based detectors to observe gravitational wave emission from magnetar giant flares.

Developing robust error analysis for radio polarization surveys

Dunlap Institute: Summer Undergraduate Research Program (SURP)

Summer 2021

Supervisor: Dr. Cameron L. Van Eck

Helped to develop part of the error analysis pipeline for Polarization Sky Survey of the Universe's Magnetism (POSSUM).

Hunting for radio sources in extreme magnetized environments

Dunlap Institute: Summer Undergraduate Research Program (SURP)

Summer 2020

Supervisor: Dr. Cameron L. Van Eck

Developed an improvement to the RM synthesis algorithm used in RM-Tools.

TEACHING EXPERIENCE

UofT Teaching Assistant

PHYA10: Introduction to Physics I for the Physical Sciences

Fall, 2021

Ran weekly two hour long practical sessions for ~ 10 -15 students, and marked assignments & exams

UofT Teaching Assistant

PHYA22: Introduction to Physics II for the Life Sciences

Winter, 2021

Ran weekly two hour long practical sessions for ~ 10 -15 students, and marked assignments & exams

UofT Teaching Assistant

PHYA11: Introduction to Physics I for the Life Sciences

Fall, 2020

Ran weekly two hour long practical sessions for ~ 10 -15 students, and marked assignments & exams

UofT Facilitated Study Group Leader

PHYA10: Introduction to Physics I for the Physical Sciences

Fall, 2020

Ran weekly study group sessions for ~ 10 -15 students. Attended lectures, created practice problem sets, and hosted review sessions for midterm and final exam.

UofT Facilitated Study Group Leader

PHYA21: Introduction to Physics II for the Physical Sciences

Winter, 2020

Ran weekly study group sessions for ~ 10 -15 students. Attended lectures, created practice problem sets, and hosted review sessions for midterm and final exam.

UofT Facilitated Study Group Leader

PHYA10: Introduction to Physics I for the Physical Sciences

Fall, 2019

Ran weekly study group sessions for ~ 10 -15 students. Attended lectures, created practice problem sets, and hosted review sessions for midterm and final exam.

COMMUNITY AND OUTREACH

25m Dwingeloo Radio Telescope (DRT) Outreach Volunteer

Summer 2024

I led public tours and demonstrations of the radio telescope. Group size of 1-7 people, showed a 21cm H line observation demonstration, and a pulsar observation demonstration.

Volunteer Age of the Universe

Summer 2023

I helped create one of the Jupyter-notebooks for a astronomy workshop for highschool students in Toronto. I helped make the notebook on the Cosmic Microwave Background (CMB). See the <https://github.com/simrannerval/Age-of-the-Universe> organized by Dr. Simran Nerval.

Dunlap Institute: Astrotours Volunteer

2022-2023

I answered questions from the public, and operated small optical telescopes.

Scarborough Campus Student Union: Director for Department of Physical & Environmental Sciences

2021-2022

Attended monthly Student Union meetings with the other director & executive officers. Aided in the planning of student lead initiatives including the fall of 2020 Climate Strike, served as liaison between student union and department association.

Winter Solstice Telescope Night

Winter, 2021

Telescope operator

Environmental & Physical Sciences Student Association: Director for Physics & Astrophysics

2018-2020

In charge of planning and programming events, including the physics & astronomy 'mix and mingle', organization of the Physics Study Centre, and participation in outreach events.

Environmental & Physical Sciences Student Association: Physics Tutor

2019-2022

Volunteer tutor at the Physics Study Centre

Dunlap Institute: Earth Hour Volunteer

Winter, 2019