

Maxwell A. Fine

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Education

PhD in Physics & Astrophysics — McGill University (in progress)

MSc in Astronomy & Astrophysics — University of Amsterdam

HBSc in Physics & Astrophysics — University of Toronto

Summary

Astrophysics researcher with 5+ years of experience building numerical models and performance-sensitive Python pipelines. Strong background in statistical inference, time-series analysis, Bayesian modeling, and Monte Carlo simulation. Proven experience designing real-time systems processing high-throughput streaming data. Seeking quant research and trading roles.

Technical Skills

- **Languages:** Python, Bash, Julia
- **Numerical & ML:** NumPy, SciPy, Pandas, PyTorch, scikit-learn, TensorFlow
- **Statistics & Modeling:** Bayesian inference, time-series analysis, stochastic modeling, signal processing
- **Systems & DevOps:** Linux, Git, Docker, AWS, Kubernetes, Slurm
- **Data & Pipelines:** TB-scale data processing, real-time analytics pipelines, performance-sensitive systems

Publications & Awards

- First-author paper on RM synthesis methods: *Fine et al., 2023*.
- Contributed to four publications in collaboration with CHIME/FRB and ASTRON teams.
- Recipient of various academic and research awards totaling \$40,000.

Experience

Graduate Summer Research Fellow

June 2024 – August 2024

Advisors: Dr. Tammo Jan Dijkema & Prof. Jason Hessels

Astron & JIVE

- Developed a real-time FRB detection pipeline for the Dwingeloo Radio Telescope, processing streaming data at ~1 Gb/s see the [project's GitHub repository](#).
- Detected a burst from [FRB20240619D](#), telescope now apart of FRB follow-up campaigns, see associated paper [here](#).

PhD Researcher

Sept 2025 – Present *McGill*

CHIME/FRB Collaboration; Advisors: Prof. Vicky Kaspi & Prof. Jason Hessels

University

- Performed statistical analysis of >10,000 fast radio bursts (FRBs), bright, millisecond-scale radio flashes of unknown extragalactic origin, identifying correlations properties between using Python and Bayesian modeling
- Leading analysis of FRB property correlations for the 4th CHIME Repeating FRB Catalog.
- Maintainer and lead developer of the CHIME/FRB exposure pipeline, tracking on-source time, telescope downtime, and calibrating sensitivity using a pulsar reference catalog.

Research Intern

May 2022 – April 2023

Supervisors: Dr. Ziggy Pleunis, Dr. Paul Scholz

University of Toronto

- Conducted multi-messenger search for X-ray and gamma-ray counterparts to CHIME/FRBs using Swift/BAT.
- Developed a data analysis pipeline in Python with HEASoft (Bash) and XSPEC for fluence modeling.

Research Intern (2x)

May 2020 – August 2021

Advisor: Dr. Cameron L. Van Eck

University of Toronto

- Created a novel RM synthesis algorithm for sources with extreme bandwidth depolarization, contributing to the open-source [RM-Tools](#) Python package.
- Co-authored first-author paper published in *Monthly Notices of the Royal Astronomical Society*.
- Improved error analysis pipeline for the [POSSUM](#) survey, fixing underestimated polarization uncertainties.