

Maxwell A. Fine

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Summary

Astrophysicist and data scientist transitioning into quantitative finance, with a robust background in mathematical modeling, probability theory, and computational data analysis. Experienced in creating high-performance data pipelines, real-time processing systems, and machine learning solutions for large-scale datasets. Proficient in statistical inference and scientific computing.

Technical Skills

Skilled in Python, Bash, Linux, with experience using packages such as Numpy, Pandas, Pytorch, Scikit-Learn, Scipy, TensorFlow. Experienced in Bayesian analysis, Probability theory, stochastic processes, statistical modeling, Monte Carlo methods, time-series analysis, algorithm development, Convolutional Neural Networks (CNNs), Fourier analysis, signal processing, machine learning, deep learning, big data (Tb Scale), Git, Docker, and scientific computing. Experienced with RaspberryPi projects, and moderate knowledge in C++, Julia, SQL, Kubernetes, cloud computing (AWS), and High-Performance Computing (HPC) environments.

Work Experience

Research Scientist

ASTRON (*The Netherlands*)

June 2024 – Aug 2024

- Designed and implemented a real-time signal processing pipeline capable of handling ~1Gb/s data throughput in Python for detecting Fast Radio Bursts (FRBs).
- Applied unsupervised clustering algorithms and a Convolutional Neural Network (CNN) for anomaly detection and classification.
- Pipeline is open-source: [Github Repository](#).

Research Scientist

University of Toronto & CHIME

May 2022 – Apr 2023

- Conducted a multi-messenger search for X-ray and gamma-ray counterparts to CHIME/FRBs using Swift/BAT, an X-ray space-based telescope, and CHIME, a ground-based radio telescope.
- Developed a pipeline in Python using HEASoft (written in Bash), and XSPEC for fluence modeling.
- Member of the CHIME international scientific collaboration

Research Scientist

University of Toronto & POSSUM

May 2020 – Aug 2021

- Developed a novel algorithm for signal extraction in noisy environments, solving a complex Fourier-based inverse problem, integrated into the RM-Tools Python package.
- Published a first-author paper in the [Monthly Notices of the Royal Astronomical Society](#), demonstrating advanced computational techniques for real-world data applications.
- worked on large - 300Gb sized data files.
- Error tested the RM-Tools analysis pipeline for POSSUM collaboration.

Education

University of Amsterdam (UvA)

Sept 2023 – June 2025

Master of Science in Astronomy & Astrophysics

University of Toronto (UofT)

Sept 2018 – May 2023

Honours Bachelor of Science (HBSc) in Physics & Astrophysics

Awards & Recognitions

ASTRON Summer Research Fellowship, 2024 (€2,500 + Housing)

NSERC Undergraduate Student Research Award, 2021 (\$6,000)

Summer Undergraduate Research Fellowship 2020, 2021, 2022 (Total \$30,000)

Student Excellence and Leadership Award (UofT) (\$250)

John Pounder Prize in Astronomy (UofT), 2019 & 2021 (Total \$600)