Maxwell A. Fine

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Summary

Data scientist and astrophysicist with a strong foundation in mathematical modeling, probability theory, and computational data analysis. Experienced in developing high-performance data pipelines, real-time processing systems, and machine learning applications for large-scale datasets. Skilled in statistical inference and scientific computing. Record of publications, working for open-source projects and working in large science collaborations.

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, Monte Carlo methods, 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.
- Published a first-author paper in the Monthly Notices of the Royal Astronomical Society, demonstrating advanced computational techniques for real-world data applications.
- 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 ($6000)
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)