SIMON GUICHANDUT

Astrophysicist ~ Data Scientist

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SUMMARY

Astrophysics PhD Student at McGill University, with a bachelor in engineering physics. With a strong background in mathematical modeling and computational physics, I am looking to transition into a data science or machine learning role. I am highly curious, willing to learn, and eager to take on challenging projects.

SKILLS

Languages: Python, Matlab, Fortran, Bash, C++, LaTeX

Technologies: Git, Scipy, Pandas, scikit-learn, Excel

Platforms: Linux, High-performance clusters (HPC), Google Cloud, AWS

- Fully fluent in english and french (native) -

PROJECTS

Data Science & ML — **Will My Flight Be Late?** — **Erdös Data Science Bootcamp (Online) - 2023**
Collected data from 20 million US domestic flights over 10 years. Trained classification models (Logistic Regression, Random Forest, XGBoost) to predict whether a given flight will be late depending on several factors. Built a web app where users can input their flight information and get a prediction. github link.
— `scikit-learn` • `pandas` • `selenium` • `seaborn` • `streamlit`

Physics simulation — **Explosions on neutron stars in 2D & 3D** — **Stony Brook University - 2023**
Moved to Long Island for 4 months as a visiting researcher to work on hydrodynamic simulations of stellar explosions using open-source C++ code. Used 20k node-hours on Perlmutter supercomputer (NERSC/DOE). Wrote several scripts in C++/Python that were merged into the main codebase. github link.
— HPC • C++ • `yt`

Physics simulation — **Explosions on neutron stars in 1D** — **McGill - 2022**
Learned and utilized open-source Fortran code to model the ignition, growth and radiation from explosions on exotic stars. Explained peculiar X-ray telescope observation from 2019. Ran code in parallel on canadian supercomputer, with custom bash scripts for automation. github link. arxiv link.
— HPC • Fortran • Bash

Physics model — **Outflows from neutron stars** — **McGill - 2021**
Developped a model for fluid dynamics in a star's atmosphere in general relativity. Wrote a $\sim$4000 line python solver with a command line interface. github link. arxiv link.
— `scipy` • `numpy`

Hackathon project — **Disease-spreading and contact tracing simulator** — **McGill Physics Hackathon 2020**
Code written in 24 hours. Models the spread of a disease in a population within a particles-in-box simulation. Implements a contact-tracing network via breadth-first-search. github link.
— `numpy` • `matplotlib`

Hackathon project — **Ocean tides from multiple moons** — **McGill Physics Hackathon 2019**
Code written in 24 hours. Solves the time-dependent motion of tides on a water planet with an arbitrary number of moons. Visualizations using cartographic projections. Winner of the "astro prize". github link.

LEADERSHIP

2021 — **Outreach Coordinator** — **McGill**
Main organizer of all outreach events for *AstroMcGill* (public talks, festivals, trivia events).
Social media & mailing list advertising, volunteer recruitment.

2019-2021 — **Graduate mentor** — **McGill**
Guiding undergraduate student through the graduate admissions process.

2018-2020 — **Astronomy public talks organizer** — **McGill**
Booking speakers and auditoriums, coordinating student volunteers.

EDUCATION

2018 - present — **M.Sc. & Ph.D. - Physics** — **McGill University**
Fully funded with competitive national scholarships. 4.0 GPA.
Teaching assistant for 5 undergrad level, 2 grad level courses. Lead >10 tutorials and gave 3 guest lectures.

2014-2018 — **B.Eng. - Engineering physics** — **Polytechnique Montréal**
Internships in neuroscience & biomedical physics. 3.85 GPA.