

Jeremy Rothschild

PH.D. PHYSICS · QUANTITATIVE RESEARCHER · DATA SCIENTIST

☎ 514-702-0071 | ✉ jeremy@rothschild.science | 🏠 rothschild.science | 📷 jrbRothschild | 🌐 jerrothschild | 📍 Toronto, ON

Summary

I am a **creative problem-solver** with over a decade of experience analyzing complex systems at the intersection of physics, machine learning, and biology. I am passionate about tackling challenging problems that foster the growth of my **critical thinking** and drive impactful, innovative solutions.

Skills

Programming	Python, C/C++, R, Git, SQL, Bash, Matlab, LaTeX, CSS, JavaScript, Docker
OS	Linux, Windows, MacOS
ML/DL	Pytorch, Tensorflow, Scikit-learn, Pandas, JAX, Numpy, Matplotlib, MPI, CUDA, Pipenv
Mathematics	Statistics, Linear algebra, Multivariable calculus, Predictive modeling
Languages	French (fluent), English (fluent)

Experience

ML/AI Research Scientist

10/2023 - 05/2025

Extropic AI

Boston, USA

- Pioneered a novel methodology integrating thermal computing and machine learning, demonstrating its transformative potential for lowering energy costs of generative AI.
- Optimized stochastic simulation algorithms in JAX and PyTorch, leveraging my **statistical expertise** to achieve a 100x improvement in runtime efficiency, uncovering critical insights.
- Developed Python libraries to simulate, analyze, and visualize statistical dynamics of advanced chip circuitry, driving innovation in circuit design and maintained them in CI/CD pipelines.
- Acquired, cleaned and analyzed real-world chip data in laboratory setting, characterizing the underlying dynamics of stochastic circuitry for research and development.
- Collaborated on ongoing support of a Slurm Linux server for high-performance, parallel computations; trained colleagues in creating streamlined workflows on the platform.
- Translated physics results to the engineering teams, enabling effective **collaboration** to implement physical models into software and hardware product pipelines.
- Managed and mentored incoming interns, providing technical guidance and oversight to ensure their successful integration and contribution to projects.
- Conducted company operational projects to grow the company such as building a company information management system using Docker, ensuring financial compliance in Canada and orchestrating an office relocation.

Founder

05/2023 - 12/2024

🔗 *Data Insights Toronto*

Toronto, Canada

- Drove business growth by implementing diverse client acquisition strategies, securing government funding opportunities, and building strategic partnerships with startup incubators.
- Led technical projects to deliver **data-driven** solutions for clients, such as video object detection systems for hockey organizations and resource analysis for labor unions.
- Founded and expanded 🔗 HLML at the University of Toronto, a self-teaching and skill-sharing community. Organized weekly coding workshops on advanced topics such as Transformers (LLMs), Diffusion Models, and Random Forests, fostering knowledge exchange and skill development.

Research Scientist

07/2017 - 06/2023

Physics Research Group at University of Toronto

Toronto, Canada

- Advanced scientific understanding in stochastic biophysics by designing and executing original research, developing novel analytical 📊 population models.
- Enhanced open science initiatives by contributing code to public repositories such as GitHub, publishing findings in 🎓 high-impact journals presenting research at international conference.

Vice President Unit 1

CUPE Local 3902

06/2018 - 05/2019

Toronto, Canada

- Provided strategic leadership as the democratic voice for 8,000 teaching members, effectively advocating for their concerns with the employer.
- Oversaw the management of a \$2.3M budget, ensuring **responsible** allocation of over \$1M in member support funds to maximize impact.
- Played a key role in high-level decision-making as a board member, shaping policies and initiatives that advanced union priorities.
- Led and mentored a team of 7 employees, fostering a collaborative and efficient work environment.
- Directed and managed critical union projects, driving initiatives that strengthened member support and organizational effectiveness.

Education

University of Toronto **Ph.D in Physics**

2017 - 2023

McGill University **M.Sc. in Physics**

2014 - 2017

McGill University **B.Sc. with Joint Honours in Mathematics & Physics**


2011 - 2014

Personal Projects

Project Lead

03/2023


Hack-the-Mist, Hackathon

- Won University of Toronto's Hack-the-Mist hackathon:  Washing away Greenwashing.
- Showed the disconnect between a company's climate action marketing and steps fulfilling their environmental pledges with **inventive** use of webscraping and NLP models (Transformers/Word2vec).
- Engaged with the public by creating an interactive display using Spark to share our results.




Project Lead

06/2019

Undiagnosed Hackathon, SVAI

- Coordinated a team of 6 peers across 3 parallel strategies to identify the affliction of an undiagnosed patient using medical history.
- Implemented an original  data-driven diagnostic tool which projected the patient symptom vector onto a medical database and suggested candidate diagnosis of patient with confidence metrics.
- Presented our results to the hackathon organizers and participants.

Publications

PNAS	 Mechanics limits diversity and promotes heterogeneity in confined bacterial communities , T Ma, J Rothschild, et al.	2024
PLoS Comp Bio	 Spatial exclusion leads to tug-of-war ecological dynamics between competing species in microchannels , J Rothschild, et al.	2023
PNAS	 Phenomenology and dynamics of competitive ecosystems beyond the niche-neutral regimes , N Leibovich, J Rothschild, et al.	2022
Physical review E	 Pleiotropy enables specific and accurate signaling in the presence of ligand cross talk , D Kirby, J Rothschild, M Smart, A Zilman	2021
Nature materials	 The entry of nanoparticles into solid tumours , S Sindhvani, AM Syed, J Ngai, BR Kingston, L Maiorino, J Rothschild, et al.	2020
PLoS genetics	 Predicting ancestral segmentation phenotypes from Drosophila to Anopheles using in silico evolution , J Rothschild, P Tsimiklis, et al.	2016