GABRIEL SASSEVILLE

PhD student in Computer Science at Mila

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Gabriel-Sasseville | 0000-0001-8845-2025 | Website

PROFILE

Excellent academic and research record | Scientific teaching and popularization experience | Involved in the academic/non-academic community

An enthusiastic and hardworking student, with a passion for machine learning and its applications to real-world problems. Currently pursuing a PhD in Computer Science at Mila where I am developing symbolic reasoning methods for symbolic regression in the context of scientific equation discovery. I am currently leveraging LLM reasoning capabilities for this task.

EDUCATION

PhD in Computer Science - Symbolic Regression by Reinforcement Learning with Human Feedback

Supervised by Pierre-Luc Bacon at Mila Institute - University of Montreal (GPA X/4.30)

September 2025 - Present

Relevant courses:
- IFT 6162 - Reinforcement Learning and Optimal Control
- IFT 6757 - Autonomous Vehicles, Introduction to Robotics

M.Sc. in Physics - Machine Learning for Asynchronous Time Series Interpolation of Astrophysical Data

Co-supervision with Julie Hlavacek-Larrondo (University of Montreal) and Daryl Haggard (McGill University) (GPA 4.10/4.30)

August 2023 – August 2025

Relevant courses:
- INF 8245E: Machine Learning

B.Sc. in Physics and Computer Science

University of Montreal (GPA 4.14/4.30)

Sept 2020 – May 2023

Relevant courses:
- PHY 3051: Modern Data Analysis in Physics
- PHY 3214: Advanced Statistical Mechanics
- PHY 3075: Numerical Modelling in Physics
- IFT 2505: Introduction to Numerical Algorithms
- IFT 2015: Data Structures
- IFT 2505: Linear Optimization
- IFT 1025: Advanced Object-Oriented Programming

RESEARCH EXPERIENCE

Artificial Intelligence Research Internship - LSTM for Hydrology

Environment and Climate Change Canada

January 2025 – August 2025 | Montreal, Canada

- Defining a hierarchical generalized linear model to fit the M-sigma relation while including upper limits
- Stan programming for Bayesian Inference and MCMC sampling
- Python/R programming for data analysis
- Writing a scientific article for publishing

Research Internship in High-Energy Astrophysics - Bayesian Inference Problems

Physics Department University of Montreal
Ciela Institute supervised by Julie Hlavacek-Larrondo

May 2022 – August 2022 | Montreal, Canada

- Defining a hierarchical generalized linear model to fit the M-sigma relation while including upper limits
- Stan programming for Bayesian Inference and MCMC sampling
- Python/R programming for data analysis
- Writing a scientific article for publishing

Research Internship in Numerical Biophysics - Drug Discovery

Physics Department University of Montreal
Normand Mousseau's Research Group

May 2021 – August 2021 | Montreal, Canada

- Use of Compute Canada's supercomputers for various calculations
- Molecular dynamics simulations for two projects: SARS-CoV-2 and Alzheimer's disease
- Python/C/Bash programming for numerical simulations and data analysis
- Writing a scientific article for publishing

Research project in Photodynamic Therapy

Mathematics Department of Cégep de l'Outaouais

January 2019 – May 2019 | Gatineau, Canada

- Model conceptualization and simulation with CrossLight
- Employing the variation of parameters method
- Model optimization
- Data analysis using MatLab

Astronomical Observation and Instrumentation Assistant

Mont Mégantic Observatory

June 2022 – Now | Notre-Dame-Des-Bois, Canada

- Conducting scientific observations with the 1.6 meter telescope
- Learning to use and analyze data from CPAPIR and PESTO instruments
- Training summer interns to use the instruments

TEACHING EXPERIENCE

Teaching Assistant for Advanced Electromagnetics PHY 2441

University of Montreal

January 2024 - May 2024 | Montreal, Canada

- Assist in the development and preparation of course materials such as assignments and practical work
- Provide guidance and support to students in understanding course concepts and solving problems
- Hold office hours to address individual student questions and concerns
- Conduct review sessions and tutorials to reinforce key concepts covered in class
- Assist in grading assignments, exams, and other assessments, providing constructive feedback to students

Class on Bayesian Inference and MCMC in Astrophysics

Brebeuf College

August 2022 | Montreal, Canada

- Preparing a class for high school level physics and computer science

PUBLICATIONS

Peer-Reviewed

- Sasseville, G., Hlavacek-Larrondo, J., Berek, S. C., Eadie, G. M., Rhea, C. L., Springford, A., … Haggard, D. (2024). A Novel Approach to Understanding the Link between Supermassive Black Holes and Host Galaxies. *The Astrophysical Journal*, *978*(1), 48. Publisher: The American Astronomical Society. doi:10.3847/1538-4357/ad93d4
- Haddad, M., Gaudreault, R., Sasseville, G., Nguyen, P. T., Wiebe, H., Van De Ven, T., … Ramassamy, C. (2022). Molecular Interactions of Tannic Acid with Proteins Associated with SARS-CoV-2 Infectivity. *International Journal of Molecular Sciences*, *23*(5), 2643. Number: 5 Publisher: Multidisciplinary Digital Publishing Institute. doi:10.3390/ijms23052643
- Hlavacek-Larrondo, J. (PI), Rhea, C. (CoI), ..., Sasseville, G. (CoI), ... Tremblay, G. R. (2024). Mapping a Black Hole Accretion Flow with JWST/NIRSpec. Accepted JWST Cycle 3 Proposal. Link here.

HONORS AND AWARDS

Research Scholarship Academic Excellence Award

Computer Science PhD Entrance Scholarship - 2500$ — **2025**
Department of Computer Sciences and Operations Research (DIRO), University of Montreal

Richard J. Schmeelk Canada Fellowship - 10 000$ — **2025**
Schmeelk Canada Foundation

PhD Research Scholarship - 120 000$ CAD — **2025-2028**
Natural Sciences and Engineering Research Council of Canada (NSERC)

Recipient of Doctoral Research Scholarship - 100 000$ CAD - Declined — **2025-2029**
Fonds de Recherche Du Québec (FRQNT)

Excellence Scholarship for Graduate Studies - 5000$ CAD — **2024**
J.A. DeSève

Excellence Scholarship for Artifical Intelligence Research - 10 000$ CAD — **2024**
Hydro-Quebec

Excellence Scholarship for DIRO graduates - 1000$ CAD — **2023**
Department of Computer Sciences and Operations Research (DIRO), University of Montreal

Master's Research Scholarship - 40 000$ CAD — **2023-2025**
Fonds de Recherche Du Québec (FRQNT)

Canada Graduate Scholarships for Master's - 17 500$ CAD — **2023-2024**
Natural Sciences and Engineering Research Council of Canada (NSERC)

Recipient of the Bursary of Excellence - 1000$ CAD — **2022**
Department of Computer Science and Operations Research (DIRO), University of Montreal

Excellence Scholarship from DIRO Graduates and Professors - 2000$ CAD — **2022**
Department of Computer Science and Operations Research (DIRO), University of Montreal

Supplements of the NSERC Undergraduate Student Research Awards bursary - 1500$ CAD — **2022**
Natural Sciences and Engineering Research Council of Canada (NSERC)

Undergraduate Student Research Awards bursary - 6000$ CAD — **2022**
Natural Sciences and Engineering Research Council of Canada (NSERC)

Laureate of the Undergraduate Introduction to Research Scholarship - 6500$ CAD — **2022**
Institute for Data Valorization (IVADO)

Excellence Mention — **2020-2023**
University of Montreal

SCIENTIFIC COMMUNICATION

Scientific Talk Posters

June 2025
Athens, Greece

February 2025
University of Amsterdam, Anton Pannekoek Institute

E-Poster entitled "Understanding the link between supermassive black holes and their host galaxies" July 2024
European Astronomical Society

Talk entitled "Interpolating Sagittarius A* multi-wavelength data using machine learning" June 2024
Harvard CfA. Click here for the video.

Talk entitled "Understanding the link between supermassive black holes and their host galaxies" May 2024
Centre for Research in Astrophysics of Quebec annual meeting

Presentation entitled "AI for understanding the supermassive black hole at the center of the Milky Way" March 2024
IVADO Digital Futures event. Click here for the video.

Interview on Black Hole Physics and Hawking Radiation December 2023
Quebec Science magazine, interviewed by Marine Corniou

Presenting the scientific paper: First Detection of an Over-Massive Black Hole Galaxy: UHZ1 – Evidence for Heavy Black Hole Seeds From Direct Collapse? October 2023
Depqartment of Physics, University of Montreal

Video presentation entitled "Applying a new Bayesian statistical model to better understand supermassive black holes" May 2023
Association Francophone pour le Savoir (ACFAS). Click here to view the video.

Poster presentation on fitting the M-sigma relation with a Bayesian lognormal hurdle model March 2023
Annual Symposium of Physics for a Future in Research and Industry (SAPHARI)

Presentation on fitting the M-sigma relation with a Bayesian lognormal hurdle model September 2022
Daryl Haggard's research group

VOLUNTEERING AND LEADERSHIP ACTIVITIES

Committee Position Volunteering

Member of SAPHARI committee September 2023 - Now
Organization of a 3 day physics event with conferences from academics and companies

Volunteer at Astronomy on Tap September 2023 - Now
Volunteer and astronomy science presenter for the general public

Volunteer at Cafe Planck January 2023 - Now
Volunteering at the student cafe

Mentor for the Student Life Mentorship Program August 2022 - May 2023
Mentoring new students at University of Montreal

Volunteer at La Place Commune September 2022 - January 2023
Solidarity cooperative cafe aimed at offering a workspace in a low-income neighbourhood

Vice President of Annual Physics Games (JDLP) Committee August 2022 - January 2023
Participating Universities :
- University of Montreal
- Polytechnique of Montreal
- McGill University
- Concordia University
- Laval University

Volunteer for the Orientation Week August 2021 and August 2022
Organize activities to welcome new students in Physics at University of Montreal

Volunteering for the Hundredth Annivesary of Physics at University of Montreal event October 2021
Help with the organization of the event, including activities and conferences

ADDITIONAL TRAININGS AND SUMMER SCHOOLS

Machine Learning in Astrophysics Summer School
June 2024 — Center for Research in Astrophysics of Quebec, Montreal, Canada

AstroAI Workshop
June 2024 — Center for Astrophysics Harvard and Smithsonian, Boston, USA

Generative Flow Networks (GFlowNets) Workshop by Yoshua Bengio
November 2023 — Mila Institute, Montreal, Canada

Centre for Research in Astrophysics of Quebec (CRAQ) Summer School on Cosmology
June 2022 — McGill University, Canada

Canadian Astronomical Society (CASCA) Summer School
June 2022 — Montreal, Canada

TimeWorld Artificial Intelligence Congress
May 2022 — University of Montreal, Canada

Quebec Network for Advanced Materials (RQMP) Summer School on Computing in Materials Science
August 2021 — Montreal, Canada

SHARCNET Summer School on Advanced Research Computing
June 2021 — Montreal, Canada

Calcul Quebec Summer School on Data Science and Parallel Computing
May 2021 — Montreal, Canada

PROJECTS

PolyHacks Hackathon
February 2023 — Polytechnique of Montreal, Canada

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February 2022 — Polytechnique of Montreal, Canada

Click here to view this project

McGill Physics Hackathon
October 2021 — McGill University, Canada

Click here to view this project

MyVision McGill and Agorize Case Competition
September 2019 - November 2019 — McGill University, Canada

Competition organized by RBC/Microsoft/ITAC on "How to use technology for social good"

LANGUAGES

English
French
Spanish