Mathys Loiselle

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Education

Concordia University – Bachelor of Computer Science (Honours) 2022 – 2026 (Expected)
Montréal, QC

- **Dean's List:** Summer 2023 – Winter 2025
- Quebec Perspective Scholarship Program (2023 – 2024), **$5000**
- Minor in **Mathematics & Statistics**
- Coursework: Data Structures & Algorithms (A+), Multivariable Calculus I & II (A+), Linear Algebra (A)

Technical Skills

Programming: Python, JavaScript, Java, TypeScript, C#, C++, C
AI/ML: PyTorch, TensorFlow, Keras, OpenCV, Dlib
Web & Cloud: React, Angular, Azure, Firebase, HTML/CSS, Bootstrap
Tools: VSCode, Git, JetBrains Products, Jupyter Notebook, Google Colab
Languages: English (Native), French (Native), German (Beginner)

Experience

Undergraduate Student Researcher Mar 2025 – Present (10 months)
Mila - Quebec AI Institute – Montréal, QC

- Supervised by Dr. Guillaume Lajoie and Dr. Matthew Perich
- Conduct research on **multimodal neural decoding** for brain-computer interfaces (**BCIs**)
- Develop **transformer-based architectures** to enhance BCI performance (PyTorch)

Lead Machine Learning Engineer Feb 2025 – Present (11 months)
Space Concordia, Space Health Division – Montréal, QC

- Lead a team of **10 ML engineer** students
- Develop a **transformer-based model** and compare with baselines (PyTorch)
- Conduct research on **brain structure prediction** during long-duration spaceflight

AI Software Developer - Internship Sep 2024 – Dec 2024 (4 months)
TaylorMade Golf – Carlsbad, CA

- Implemented **voice assistant** features for TaylorMade chatbot (Angular/C#/Azure)
- Developed an automatic color adjustment algorithm (Python/React)
- Introduced order processing **anomaly detection** system using Mahalanobis distance (Python)

Computer Vision Engineer Oct 2023 – Jan 2024 (4 months)
Nano Stride – Montréal, QC

- Built **real-time robotics** head motion control algorithms (OpenCV, Dlib)
- Collaborated with multidisciplinary engineers on robotics control systems

Research

N. Krishna, **M. Loiselle**, A. Ryoo, M. Perich, G. Lajoie, *Towards a Generalizable, Unified Framework for Decoding from Multimodal Neural Activity*, NeurIPS Workshop: BrainBodyFM (Accepted), Oct 2025

Projects

ConUHacks IX – Concordia Virtual Tour++ Feb 2025
Concordia University – Montréal, QC

- Placed **top 5** among 180+ project submissions at **Quebec's largest hackathon**
- Built real-time **3D Gaussian Splatting** visualization for a prospective Concordia Virtual Tour platform
- Integrated an **LLM-based** tour guide using HuggingFaceH4/zephyr-7b-beta

Reinforcement Learning Rocket League Agent Nov 2024

- Developed a **PPO-based reinforcement learning agent** with curriculum learning and reward shaping
- Designed a database-backed tracking and visualization system for learning progress

IEEE Smart and Radio-Controlled Marshmallow Cannon Jun 2024 – Aug 2024 (3 months)
IEEE Concordia – Montréal, QC

- Implemented **facial recognition and tracking** for automated marshmallow turret
- Integrated Haar Cascade detection with KCF tracking for efficient real-time control

Cody AI Service Robot Oct 2023 – Dec 2023 (3 months)
Nano Stride – Montréal, QC

- Implemented **facial recognition and tracking** for moving robot head
- Explored pairing of **TDOA system** with speech analysis for target speaker localization

Personal Portfolio Website Aug 2024

- Built a responsive personal portfolio website (React, Tailwind CSS)
- Hosted at mathysloiselle.work

Volunteering

HackDécouverte Nov 2025
Concordia University – Montréal, QC

- Ensured smooth event logistics and positive participant experience for CEGEP and high school hackers
- Provided bilingual support for technical project questions and hackathon logistics

Gina Cody School Open House Oct 2025
Concordia University – Montréal, QC

- Ensured smooth presentation setup, assisted speakers with tech needs, and maintained session schedules

Space Concordia Space Day Sep 2025
Concordia University – Montréal, QC

- Represented Space Concordia's Space Health division, engaged visitors, and answered questions about the division & club

Student Group Memberships

- Institute of Electrical and Electronics Engineers (IEEE) Concordia
- Google Developer Student Club (GDSC)
- Software and Computer Science Society (SCS)
- Concordia Ski & Snowboard Club (CSSC)

Research Interests

Machine Learning, Computational Neuroscience, Neural Decoding, Mathematics, Robotics, Language Modeling