Florence Cloutier

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Summary

I'm passionate about applying machine learning to graph-structured data for sustainable development.

Education

University of Montreal and Mila - Quebec AI Institute — Montreal, Canada
M. Sc., Computer Science (Thesis), Specialization: AI | CGPA: 4.3/4.3 — *Sep. 2024 – Aug 2026*

Polytechnique Montreal — Montreal, Canada
B.Eng. Computer Engineering, mention of excellence | CGPA: 3.98/4.00 — *Aug. 2019 – May 2024*

Publications

Cloutier, Florence et al. (2025). "Scalable Tree Search over Graphs with Learned Action Pruning for Power Grid Control". In: *RLC 2025 Workshop on Practical Insights into Reinforcement Learning for Real Systems*. URL: https://openreview.net/forum?id=SaY2IgSsDK.

Anonymous (2025). "M^4olGen: Multi-Agent, Multi-Stage Molecular Generation under Precise Multi-Property Constraints". In: *Submitted to The Fourteenth International Conference on Learning Representations*. under review. URL: https://openreview.net/forum?id=jH1UE2QiDe.

Research Experience

Montreal Robotics and Embodied AI Lab, UofM/Mila — May 2024 - Present
Machine Learning Graduate Researcher | Advisor: Prof. Glen Berseth

- Design and implement reinforcement learning algorithms that operate effectively on graph-structured data through graph neural networks (GNNs).
- Develop machine learning methods for power grid topology control, using a custom Gym wrapper built on the Grid2Op simulation environment.
- Research RL-based approaches for multi-property molecular generation in collaboration with the SAIT AI Lab (Montreal).
- Co-author of "Scalable Tree Search over Graphs with Learned Action Pruning for Power Grid Control" (submitted to RLC RL4RS 2025 Workshop).
- Co-author of "M^{4}olGen: Multi-Agent, Multi-Stage Molecular Generation under Precise Multi-Property Constraints" (submitted to ICLR 2026).

Machine Learning Undergraduate Researcher | Advisor: Prof. Glen Berseth

- Implemented a reinforcement learning environment to train a large language model to move objects and recognize spatial relationships between objects.
- Worked on creating innovative learning techniques to achieve state of the art results in spatial comprehension for LLMs.

LAMA-WeST Lab, Polytechnique Montreal — October 2023 - April 2024
Machine Learning Undergraduate Researcher | Advisor: Prof. Amal Zouaq

- Read and analyzed scientific articles on language models and text tagging techniques to apply and use state-of-the-art methods in my tasks.
- Trained a large language model to classify texts based on the gender of the text's object

Industry Experience

Microsoft - The Coalition, Vancouver, Canada June 2023 - Aug 2023
Software Engineer Intern *C++, C*

- Designed and implemented an improved testing infrastructure, enabling colleagues to have access to further testing data
- Refactored the online plugins for Unreal Engine Editor, to support multiple editor instances, allowing developers to test multiplayer scenarios

Ericsson and Polytechnique Montreal, Montreal, Canada Jan 2024 - May 2024
1ChipML: Capstone Project in Industry Partnership *C++*

- Implemented the Monte-Carlo method for reinforcement learning with optimized memory usage with 2KB of RAM
- Implemented Shortest Path and Tic-Tac-Toe prototypes to demonstrate usages of the Monte Carlo method for ML

Sony Interactive Entertainment Haven Studios, Montreal, Canada May 2022 - Aug 2022
Software Engineering Intern *Rust*

- Designed and implemented the game engine's animation system in Rust using Bevy ECS
- Implemented the hierarchical skeletal animation system and the propagation of movement

Ubisoft, Montreal, Canada May 2021 - Aug 2021
Software Engineering Intern *C++, Python*

- Prototyped distributed ThinLTO command-line options with clang-cl and LLD link using a Python script
- Debugged clang-cl and LLD-link in Visual Studio by using different LLVM tools to analyze intermediate files from build

Projects

Bayesian Graph Neural Networks for the Optimal Power Flow Problem - Mila 2024
Explored uncertainty-aware graph learning methods for power system optimization.

- Developed a Bayesian Graph Neural Network (GNN) model combining approximate inference techniques such as Variational Inference, Monte Carlo Sampling, Monte Carlo Dropout, and Ensemble Methods to capture predictive uncertainty.
- Implemented a baseline following the CANOS paper (Piloto et al., 2024) using the OPFDataset to benchmark performance on the Optimal Power Flow (OPF) problem.
- Applied Constraint-Aware Learning to enforce physical and engineering feasibility within neural network predictions by incorporating Lagrangian relaxation and dual methods into the loss function.
- Demonstrated that the Bayesian approach improves generalization, provides uncertainty estimates, and enhances robustness for high-stakes power grid decision-making.

Autonomous Driving – Université de Montréal - Duckietown Class 2024
Applied Simplified Inverse Reinforcement Learning (IRL) and DrQv2 for autonomous driving control.

- Implemented a Simplified IRL approach combining a predefined reward function with learned residuals to preserve interpretability while improving performance.
- Used expert trajectories to fine-tune the reward function, allowing the agent to learn realistic driving constraints.
- Demonstrated that the Simplified IRL agent learned subtle behaviors such as staying in the right lane, while the pure RL agent drove on the left.

Exploration Drones, Polytechnique Montreal Jan 2023 - May 2023
Application controlled drones *Python, TypeScript, C++*

- Built a web application in Vue to control exploration drones and visualize their exploration map
- Implemented the exploration algorithm in the drone's embedded system to explore and map an unknown terrain and avoid obstacles multiplayer scenarios

Data structure project, Polytechnique Montreal May 2020 - Aug 2020
Package delivery drone's system in Montreal *Java*

- Reduced the energy consumption of the drones by developing an algorithm to assign the packages to the right drone, based on the weight and size of the package, the availability of the drone, and Dijkstra's shortest path algorithm.

Embedded systems project, Polytechnique Montreal Jan 2020 - May 2020
Robot keeping his Covid preventive distances from a crowd *C++*

- Programmed a finite state machine defining the robot's reaction to 6 different scenarios.
- Improved the development efficiency by implementing scripts to automate deployment of the code.

Honours and Awards

NSERC - Canada Graduate Scholarship Master's 2025-2026
Natural Sciences and Engineering Research Council of Canada

FRQNT - Master's Research Scholarship 2026
Quebec Nature and Technology Research Fund

Mila Sustainability Scholarship - Mila Quebec AI Institute 2025
Scholarship to support research at the intersection of AI, climate, and sustainability

Varsity Student Athlete of the Year - Carabins University of Montreal 2023-2024
Award for academic and athletic achievements, all programs combined

Academic Excellence Scholarship - Carabins University of Montreal 2020
Based on academic success as a student-athlete

Admission Scholarship - Polytechnique Montreal 2019
Undergraduate scholarship based on academic success

Best R Score Reward - Lynx du CEGEP Édouard-Montpetit 2019
Award for the best R Score among all student-athletes

Award of Excellence in Philosophy - CEGEP Édouard-Montpetit 2018
Award based on academic success in philosophy among all students

Award of Excellence in Mathematics - Collège Durocher Saint-Lambert 2016
Award based on academic success in mathematics among all students

Leadership and Service

Student-Athlete – Women's Varsity Volleyball Team, Université de Montréal 2019–2025
Developed teamwork, communication and resilience

Captain – Women's Varsity Volleyball Team, Université de Montréal 2019–2025
Led the Carabins to three provincial championships and a 2nd-place national finish

Assistant Coach – Women's Varsity Volleyball Team, Université de Montréal 2025–2026
Support athlete development and mentorship within the Carabins volleyball program.

Member – Mila Sustainability Committee 2024–Present
Organize initiatives to reduce AI's environmental footprint; coordinated "Zero-Waste Month"

Organizer – RL-Sofa Reading Group, Mila 2024–Present
Host weekly seminars bringing together students and researchers in reinforcement learning.

Member – Social Committee, REAL Lab, Mila, University of Montreal 2024–Present
Plan bi-monthly social and networking events for lab members.

Member – Resource Management Committee (DRAC Application) 2024
Helped prepare the lab's DRAC funding application (ressource allocations).

Skills

Core Strengths
Fast learner, team player, and passionate about solving challenging problems.

Programming Languages
Python, C/C++, Rust, C#, TypeScript/JavaScript, Java, SQL

Technologies & Tools
Git, VSCode, Visual Studio, Linux, PyTorch/torch.geometric, HuggingFace, Slurm, Grid2Op, Gym