Arthur Maffre

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Highlights

- Designing intelligent systems for **dynamic pricing** and **portfolio** generation
- Research funded by **IVADO** at **Mila** (20k/year)
- Finalist at **McGill-FIAM Hackathon** | 3rd place at **Polytechnique Datathon**
- Bridging **AI theory** and real-world impact — from **GFlowNet** to public spending

About Me

Graduate student at **Mila** (Université de Montréal), building intelligent systems that push the **boundaries of optimization** and decision-making. Currently exploring **GFlowNet**-based architectures for **pricing** and **portfolio generation**. I strive to turn complex ideas into actionable models — always aiming higher.

Education

MSC **Université de Montréal - Mila**, Computer Science — Montreal, QC, CA
Supervisor : Prof. Margarida Carvalho — Sept 2025 – Aug 2027

- Research on **GFlowNet-based** for dynamic pricing and portfolio generation
- Focus on reinforcement learning, **combinatorial optimization**, and AI planning
- Funded by a $20,000/year **IVADO research scholarship**

BS **Université de Montréal**, Economics - Honours Program — Montreal, QC, CA
Sept 2022 – Aug 2025

- Research assistant on a project supervised by Prof. Arbour
- Worked in collaboration with the Chief Justice of the Quebec Superior Court *(**$5,000 IQRDJ** research grant) on **public institution spending** modeling*
- Teaching assistant for ***Microeconomics I*** *(ECN-2040)*, a **core** 2nd-year undergraduate course
- **GPA:** 3.825/4.3

Research Projects

Bilevel Pricing with GFlowNet — Mar 2025 – present
Honours Thesis – Université de Montréal (2024–2025)

- Using a formulated a bilevel pricing model where consumers solve a knapsack problem to maximize utility
- Used GFlowNets with **Critic** to simulate consumer response and improve leader pricing strategy
- Integrated mixed-integer programming with generative flow dynamics

Transformer-GFlowNet for Sequential Portfolio Optimization — June 2024 – present
Finalist – McGill-FIAM Hackathon 2024

- Developed a **Transformer-based** model to generate vectors of asset allocations
- Modeled transaction costs, turnover constraints, and **dynamic Sharpe** ratio optimization
- Used **MCMC**-based simulation for sequence interpretability and **XMAP** evaluation

Meta-FlowNet — Mar 2025 – present
Mila – Master's Research Project (2025–2027)

- Designed a **novel** architecture combining **GFlowNets** with Physics-Informed Neural Networks (**PINNs**)
- Modeled the generation of CDF-like **structures** from reward-flow **trajectories** over continuous parameters
- Introduced adaptive sampling and active learning mechanisms to boost **efficiency** in hard regions

- Application: **dynamic portfolio** sequencing, stochastic optimization

Technical Skills

Languages: Python (advanced), LaTeX, Markdown, Bash, C (basic), Rust (beginner)

Machine Learning & Optimization Framework: PyTorch, Lightning AI, HuggingFace

Models: Reinforcement Learning (PPO, A2C), GFlowNet, PINNs, XGBoost

Tools & Dev environment: Git, Conda, Docker, JupyterLab

Competitions

McGill-FIAM Asset Management Hackathon - Finalist — Montreal, Nov 2024

- Top 10 out of 66 teams
- Built a **Portfolio Transformer** model that directly outputs allocation actions rather than predictions
- The objective function was the **Sharpe ratio**, optimized dynamically with transaction cost constraints
- Presented to a jury of finance professors and industry professionals

Polytechnique Montreal Datathon - 3rd Place — Montreal, Dec 2024

- Designed an AI system to generate **financial reports** and commentary from raw data in 48 hours
- Focused on financial language generation, analytics, and visual presentation of results
- Awarded a **$500** prize

Experience

Brasserie Henri - Birks Hotel, Busboy – Fine Dining — Montreal, QC
Delivered high-end service in a fast-paced luxury restaurant environment — Aug 2023 – Dec 2023

- Maintained exceptional client satisfaction during high-pressure shifts
- Developed attention to detail, **communication**, and teamwork skills

Sabrosa Restaurant, Busboy — Montreal, QC
Assisted with front-of-house service in a casual dining setting — Apr 2023 – Aug 2023

- Managed multiple tables and coordinated with kitchen staff under pressure
- Built interpersonal and **multitasking** skills applicable to client-facing roles

Languages

French: Native

English: Fluent

Extracurricular Activities

- Enjoy strength training and gym **discipline** — consistency builds both body and mindset
- Love working on personal tech projects, especially around AI, optimization, and simulation
- Driven by a long-term goal of launching a **startup** that transforms ideas into real-world impact