

# 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

Supervisor : Prof. Margarida Carvalho

- 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**
- Montreal, QC, CA

Sept 2025 – Aug 2027
- BS** **Université de Montréal**, Economics - Honours Program

- 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
- Montreal, QC, CA

Sept 2022 – Aug 2025

## Research Projects

- 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
- 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

## Technical Skills

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**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

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### McGill-FIAM Asset Management Hackathon - Finalist [🔗](#)

Montreal

Nov 2025

- 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 2025

- 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

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### 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

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**French:** Native

**English:** Fluent

## Extracurricular Activities

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- 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