

Pierre-Louis Lemaire

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Education

Polytechnique Montréal

Expected August 2025

Research M.Sc. in Applied Mathematics (current GPA: 4.00 / 4.00)

Montréal, Canada

- **Research project:** Physically constrained deep generative learning for multivariate climate downscaling. I am currently interested in diffusion models and how to use them to emulate and downscale climate models.
- **Course work:**
 - * MTH-1115D - Differential Equations (grade: A)
 - * MTH-6420 - Continuous Optimization (grade: A*)
 - * MTH-8107 - Mathematics of Deep Learning (grade: A*)
 - * MTH-8245E - Machine Learning (grade: A)
 - * (MILA) IFT-6135 - Representation Learning (grade: pending)
 - * (MILA) IFT-6168 - Causal Inference & ML (grade: pending)

INSA Toulouse

Expected August 2025

Engineering Diploma in Applied Mathematics

Toulouse, France

- **Relevant coursework:** Statistical Modeling, Machine Learning, Data Analysis, Continuous Optimization, Non-Differential Optimization, Signal Processing, Advanced Probability, Markov Chains - Python, R & Git

Experience

Acsystème

June 2023 – August 2023

Optimization Engineer Intern

Saint-Malo, France

- Conducted a literature review on the 3D Knapsack problem to design a combinatorial optimization algorithm for truck palletization.
- Designed and implemented a program in MATLAB that increased items by pallet by 40% while being 20x faster to compute.

Coolset

June 2022 – February 2023

Climate Analyst

Amsterdam, Netherlands

- Analyzed regulations and news on carbon accounting to write monthly articles and guides targeting ESR managers from European SMEs.

Independent

August 2020 – December 2023

Mathematics & Coding Tutor

France

- Tutored mathematics and coding online and in person to students from high school to university preparatory classes.

Projects

On the necessity of human insight to improve natural adversarial robustness | IFT-6168 final project (PyTorch, WandB)

- Investigated adversarial attacks under a causal perspective and reproduced with PyTorch a causally-inspired adversarial training method.
- Proposed and implemented with PyTorch a style-free contrastive regularization method to improve natural adversarial robustness.
- Compared distribution alignment methods and vanilla learning with natural adversarial augmentations on natural adversarial robustness and found that the proportion of natural adversarial samples per batch plays an important role for robustness.

Data analysis of Paris bike-sharing service | Python, Scikit-learn, R

- Implemented (in Python and R) dimensionality reductions algorithms (PCA, LDA), clustering methods (kmeans, HAC, GMM) and advanced factorial methods (CA, MCA, MDS, NMF).
- Provided in-depth interpretation and analysis of the results of all the above methods.

Certifications & Skills

English: TOEIC (score: 990/990 in 2023) - TOEFL (score: 100/120 in 2019).

Code: Python (Scikit-Learn, PyTorch), MATLAB, R.

Other: Technical content writing.