

Iliass Khoutaibi

khoutaibi.iliass@gmail.com | +1 (781) 434-8114 | [GitHub](#) | [LinkedIn](#)

EDUCATION

ENS Paris-Saclay, MVA (Mathématiques, Vision, Apprentissage)

2nd year Master of science

September 2025 – Present

Palaiseau, France

- France's [top](#) Master research program in **Artificial Intelligence, Computer Vision, and Machine Learning**.

Institut Polytechnique de Paris – Télécom Paris

Engineering Degree at one of France's top engineering schools.

September 2023 – December 2026

Palaiseau, France

- GPA: 3.99/4.0 (top 3% of students).**

Bachelor of Science

Undergraduate program.

September 2021 – July 2023

Marrakech, Rabat, Morocco

- Intensive two-year undergraduate program preparing for entrance into France's top engineering schools.
- 1st ranked student in Lycée Ibn-Tîmya Marrakech and awarded full scholarship to continue studies in Lycée Al-Zahrawi.

EXPERIENCE

Harvard AI and Robotics Lab

Visiting Research Intern

April 2026– Present

Cambridge, MA

- Investigating connections between **continuum mechanics and representation learning**, with applications to **self-supervised learning** and understanding deformation, transport, and optimal control dynamics in **flow matching**.
- Developing **Large Language Model methods for survival and time-to-event prediction**, with a research publication currently in preparation.
- Contributing to **Harvard's foundation model for ophthalmology**, focusing on multimodal AI and privacy-sensitive deployment.

COURSEWORK

- Mathematical Foundations:**
Convex Optimization · Computational Optimal Transport · Brownian Motion and Applications · Conditional Distributions, Mathematical Statistics and Martingales · High-Dimensional Probability · Markov Chains and Time Series · Poisson Processes and Applications · Numerical Analysis · Statistics: Linear Models.
- Machine Learning & Artificial Intelligence:**
Machine Learning · Optimization for Machine Learning · Reinforcement Learning · Machine Learning for Time Series · Time Series · Advanced Learning for Text and Graph Data · Large Language Models (LLMs) for Code and Proof · Robotics · Introduction to statistical learning for geosciences · Multimodal Explainable AI (xAI).
- Computer Vision, Signals & Graphics:**
Introduction to Deep Learning · Geometry Processing and Deep Learning · Representation of Signals · Representation learning for computer vision and medical imaging · Deep Learning for medical imaging · Remote sensing data: from sensor to large-scale geospatial data exploitation · Medical Image Analysis based on generative, geometric and biophysical models · Generative Modeling for computer vision.

RESEARCH INTERESTS

RESEARCH PROJECTS

▪ **Playing Video Games with Deep Reinforcement Learning:**

Implemented and analyzed Deep Q-Networks (DQN) and Proximal Policy Optimization (PPO) algorithms using OpenAI Gymnasium to train agents for Atari tasks. The network was used to train agents to play **Atari games, Super Mario Bros** and other **Mujoco library simulations**. This was a great introductory project to Deep Learning and Reinforcement Learning.

- **Listen, Attend and Spell (LAS)** – LSTM-based sequence-to-sequence speech recognition model
- **WaveNet** – Autoregressive deep neural network for raw-audio generation
- **SinGAN** – Single-image generative adversarial network for unsupervised learning

Reproduced and implemented state-of-the-art generative architectures for sequential and visual data, including WaveNet for raw-audio synthesis and SinGAN/DWGAN models for single-image generation. Evaluated model stability, fidelity, and diversity across datasets.

▪ **A Unified Framework for Structured Graph Learning via Spectral Constraints – Learning Graphs with spectral constraints.**

Reproduced and presented a recent paper introducing a unified optimization framework for learning structured graphs under spectral constraints. The study reformulates combinatorial structural priors (e.g., sparsity, connectivity, smoothness) as spectral properties of graph matrices, enabling a differentiable learning pipeline for interpretable graph recovery from data, particularly time series.

▪ **Diffusion Policy: Visuomotor Policy Learning via Action Diffusion – Robotics policy learning using diffusion models.**

Reproduced and presented a recent paper introducing diffusion-based generative models for visuomotor policy learning in robotics. The approach models robot actions as a diffusion process, where the policy is trained to denoise perturbed action sequences conditioned on visual and proprioceptive observations.

▪ **Lifting the Winding Number: Precise Discontinuities in Neural Fields for Physics Simulation – Geometric DL.**

Reproduced and presented a recent paper introducing a geometric deep-learning approach for representing discontinuous physical phenomena within neural fields. The study proposes a “winding number lifting” technique that enables neural implicit representations to capture precise discontinuities, such as shock fronts or material boundaries, while preserving differentiability elsewhere.

▪ **Quantifying Extrinsic Curvature in Neural Manifolds – Geometric characterization of manifold.**

Reproduced and analyzed a recent study investigating the geometric structure of neural representation spaces through differential-geometry tools. The project focuses on measuring *extrinsic curvature* of neural manifolds by projecting on subspaces and by using Variational Auto Encoders.

▪ **Combining deep learning and optimization for well theoretically grounded and interpretable hyperspectral image processing – Deep learning for hyperspectral satellite imaging.**

Developed an interpretable satellite hyperspectral unmixing approach combining deep learning and optimization within the plug-and-play paradigm, enabling recovery of material spectra and abundances from low-resolution remote-sensing data from satellites for reliable environmental monitoring.

- **LLM Agents for Structured Reasoning and Decision-Making – Agentic workflows, MCP tool use, and modular execution**

Designed autonomous LLM agents for planning, memory, tool use, and interaction in text-based environments, including MCP server-based architectures for structured tool access, external context retrieval, and modular agent execution.

- **Controlled and Efficient LLM Generation – Constrained decoding and transformer inference optimization**

Implemented controlled and efficient LLM generation methods, including DFA/FSM-constrained decoding, rule-based structured outputs, KV-cache optimization, LoRA adaptation, and FlashAttention-style memory-efficient attention.

- **Molecular captioning challenge – Kaggle challenge about molecular descriptive generation.**

Fine-tuned open-source language models and leveraged graph neural networks for molecular caption generation in the Kaggle Molecular Captioning Challenge. Adapted LLaMA, Gemma, and RoBERTa for domain-specific descriptive synthesis and evaluated performance using BLEU and BERT-score-based metrics.

EXTRACURRICULAR EXPERIENCE

Treasurer of Telecom Paris' Robotics association

January 2024 – August 2025
Palaiseau, France

- Oversaw and managed the association's annual budget, handled sponsorships, and ensured financial compliance for all robotics projects and events.
- Two times participant in France's Robotics national cup : La Coupe de France de Robotique.
- Contributed to the development of object-recognition, path-planning, and reinforcement-learning modules using **C++**, **Python**, and **ROS 2**.

SKILLS

- **Programming languages:** C, C++, Python, Java, JavaScript/Typescript, HTML, CSS and React.js.
- **Frameworks, AI libraries & tools:** PyTorch, TensorFlow, NumPy, Scikit-learn, OpenCV, Git, Linux, Bash/Shell.
- **Robotics frameworks and programs:** ROS2, Pinocchio, Mujoco, Arduino, Gymnasium.

HONORS AND AWARDS

- **Ranked 1st** in class at Lycée Ibn Timiya, Marrakech — recognized for outstanding academic achievement.
- **Full Merit Scholarship**, Lycée Al-Zahrawi, Rabat — awarded for exceptional performance and ranking in Lycée Ibn Timiya.
- **Government Scholarship (France–Morocco)** — granted jointly by the French and Moroccan governments to pursue higher studies in Paris, France.

- **Semi-Finalist**, French Debating Association of the Grandes Écoles of Paris — competed in Paris-level debates representing Télécom Paris.