# Dhia Garbaya

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dhia680.github.io | github.com/dhia680

## Profile

Recently focusing on *RL, reasoning, distillation, and pre-training* of language models at scale.
Open to research and PhD opportunities in 2026.

## Education

**École Normale Supérieure (P-S), MVA**: MSc [Math, Vision, Learning] 2025 – 2026

- **Coursework:** Convex optimization · Reinforcement learning · Optimal transport · Generative modelling for images · Bayesian ML · Geometric DL · Graphs in ML · LLMs for code and proof · Robotics...

**École des Ponts et Chaussées (IP Paris)**, MEng [Applied Math, ML] 2022 – 2026

- **Coursework:** Machine learning (JAX) · Deep learning (torch) · Optimization · Operations research (Julia) · Advanced algorithmics (C++) · Vision · Stochastic processes · Statistical physics · PDEs · Game theory...

**Esprit Prépa, Tunis**, Prépa [Math, Physics] 2020 – 2022

- **Coursework:** Algebra/ Topology/ Analysis/ Probability/ Theoretical Physics/ Algorithms...

## Experience

**AI scientist Internship** || `Mistral AI - FR` Apr'26 - Oct'26 (upcoming)

- Team: `Reasoning/RL`
- Supervisor & Tutor: Albert Jiang & Michal Valko

**Research Visit/Internship** || `EPFL - Switzerland` Feb'25 - Jan'26

- Teams: `MLO` lab & `Swiss AI Initiative`
- Supervisor: Prof. Martin Jaggi
- Focus: efficient LLM pre-training (4k GPUs), knowledge distillation, architecture.
- Recently: over-thinking + exploration-exploitation in GRPO.

**Research Internship** || `TII - UAE` Jul'24 – Jan'25

- Teams: `AI theory` & `Falcon LLM`
- Supervisor: Dr. MEA Seddik
- Focus: knowledge distillation, pre-training (5k GPUs), scalable optimization algos
- Large-scale parametrization (MuP), param-free learning.

## Publications

**Terminator** : Learning Optimal Early Stopping in CoT Reasoning · **ICLR'26** Website · Openreview
UT Austin & EPFL & ENS Paris-Saclay & Télécom Paris - 2026

**FOG Architectures*** : Toward Pure FP8 LLM Training at Scale · **NeurIPS'25** arXiv · Openreview
EPFL & ETH Zurich - 2025

**Apertus*** : Democratizing Open, Compliant, and Multilingual LLMs arXiv (under review)
Swiss AI team - 2025

**Falcon3 family of Open Models*** : Showcasing transfer learning efficiency Official blogpost
Falcon LLM team - 2024

* first co-authorship

## Coding skills

**Languages:** Python, C++, Julia, R

**Tools, frameworks:** Pytorch, JAX, Megatron-LM, NeMo, HF libraries, GIT, AWS, Slurm, Run:ai

## Academic projects

**Solving PDEs with PINNs** [dhia680/pinns-24]

- Studied Physics-Informed-Neural-Networks for solving Helmholtz PDEs [w/ Airbus].

**Operations Research**

- Optimizing an offshore wind electrical network for RTE, FR
- Optimizing a car manifacturing chain for Renault, FR

**Deep RL for optimizing traffic using autonomous vehicles** [.../HighwayEnv]

- Inspired from CIRCLES project. Studied phantom traffic jam and drivers behaviour.
- Used existing codebase to train a policy with DQN, PPO.

**RL for push recovery of a wheeled robot**

- PPO, Reward shaping, curriculum, inductive bias · [Robotics (Willow, Inria)]

**Posterior Estimation and Importance Sampling** [dhia680/NPE-IS]

- Studying neural PE and IS for gravitational waves · [Bayesian ML (Mines Paris)]
- A focus on the forward KL divergence objective

## Distinctions

- **French government excellence scolarship**: Among 7 national holders of this scolarship, 2022-2026
- **Valedictorian** in both high school and Prépa
- **Research grant**: part of a large project on model compression, funded by the Swiss AI Initiative and led by D. Alistarh, M. Jaggi, T. Hoefler

## Languages

- **Arabic** (Native) · **English** (Fluent) · **French**: (Fluent) · **German**: (Intermediate)

## Volunteering

- **Reviewer** for ICLR'26, MenaML'25.
- **Project Manager** in the Junior Enterprise of Ecole des Ponts (2023 - 2024).