



# Loïc Maurin

Data Scientist & Ingénieur HPC Freelance • IA & Cloud pour l'industrie

Toulouse

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Research Engineer with 5+ years of expertise in High-Performance Computing and Machine Learning, specializing in GPU acceleration, physical simulation, and production ML systems. Strong background in numerical methods, deep learning frameworks (JAX, PyTorch), and collaborative research with leading European institutions (ECMWF, ACCORD-NWP Consortium).

## Professional Experience

**Research Engineer** *Météo France, Toulouse, France* August 2023 - Present

- Developed GPU-accelerated numerical weather prediction models using JAX and GT4Py for AROME forecasting system
- Implemented and evaluated Finite Volume Methods (FVM) for hectometric-scale numerical simulations
- Collaborated with ECMWF and ACCORD-NWP Consortium on European DestinE program for next-generation weather forecasting
- Optimized computational performance on HPC architectures, achieving significant speedup on GPU clusters
- Technologies: JAX, GT4Py, DaCe, Python, CUDA, HPC clusters, Linux

**Data Science Consultant** *MP Data - Safran Helicopter Engines, Pau, France* February 2022 - January 2023

- Developed deep learning models (PyTorch) for helicopter engine health monitoring and predictive maintenance
- Implemented Kalman filtering and neural networks for engine degradation prediction and anomaly detection
- Scaled ML pipeline to monitor 1,000+ turbine engines in production, improving maintenance scheduling efficiency
- Refactored avionics data decoder and deployed DevOps infrastructure for real-time monitoring dashboards
- Technologies: PyTorch, Python, Kalman Filters, Docker, Grafana, Airflow, DevOps

**Industrial Data Engineer** *EDF Renewables, Paris, France* September 2021 - January 2022

- Designed technical architecture for offshore wind farm monitoring data platform
- Developed ETL pipelines (Python) and web applications (ASP.NET) for meteorological and oceanic data processing
- Implemented data management systems for real-time monitoring of offshore wind energy production
- Technologies: Python, ASP.NET, Azure, SQL, Data Engineering

**Machine Learning Engineer (Intern)** *Dataswati, Massy, France* September 2020 - September 2021

- Conducted R&D on Design of Experiments optimization using Bayesian Optimization for food & beverage industry
- Developed ML-driven quality indicators from industrial time-series data for process optimization
- Built production data pipelines using Airflow for automated task orchestration in 10-person startup
- Technologies: Python, Bayesian Optimization, scikit-learn, Airflow, Time Series Analysis

**Industry 4.0 Data Scientist (Intern)** *Plastic Omnium Auto Exterior, Greer, South Carolina, USA* July 2019 - December 2019

- Applied Statistical Process Control and Machine Learning for automotive paint line quality optimization
- Performed root cause analysis and predictive maintenance for BMW supplier manufacturing processes
- Implemented ML models for defect prediction, reducing quality issues and production downtime
- Technologies: Python, Statistical Analysis, Machine Learning, Manufacturing Analytics

## Education & Teaching

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**M.Sc. in Engineering (Specialization - Computer Science & Artificial Intelligence)** *CentraleSupélec, Université Paris-Saclay, Saclay, France* 2017 - 2021

- Top-tier French engineering school (Grande École), formerly École Centrale Paris
- Focus: Machine Learning, Deep Learning, Optimization, Physical Modeling, Computational Fluid Dynamics
- Top 5% performance at French national engineering school entrance exams
- Coursework: Advanced Mathematics, Statistics, Numerical Methods, Computer Science, AI

**Lecturer in Stochastic Filtering & Data Assimilation** *ENSEEIH, Master Program HPC-Big Data, Toulouse, France* 2024 - 2025

- Teaching advanced data assimilation techniques for graduate-level HPC program

**Preparatory Classes for Engineering Schools - PCSI / PSI\*** *Lycée aux Lazaristes, Lyon, France* 2015 - 2017

- Mathematics, Physics, Engineering Sciences
- Intensive preparation for competitive entrance exams to top French engineering schools

## Technical Skills

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### Machine Learning & Artificial Intelligence

JAX (expert), PyTorch, TensorFlow, scikit-learn, Deep Learning, Bayesian Optimization, Kalman Filtering, Data Assimilation, Neural Networks

### High-Performance Computing (HPC)

GPU Computing (CUDA), GT4Py, DaCe, Distributed Computing, Performance Optimization, Numerical Methods, HPC Clusters, Linux

### Development & DevOps

Python (expert, 5+ years), C/C++, SQL, Bash, Docker, Git, CI/CD, Airflow, DevOps

### Data & Visualization




Grafana, PowerBI, ELK Stack, Matplotlib, ETL, Real-time Data Pipelines, Big Data

### Cloud & Infrastructure

AWS (Certified Cloud Practitioner), Azure, Docker, High-Availability Systems

## Languages

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-  **French:** Native
-  **English:** Proficient (Professional working proficiency)
-  **German:** Proficient (Professional working proficiency)

## Interests

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- Sports: Trail running, cycling, alpine skiing
- Travel: Bikepacking and outdoor adventures

## Achievements

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- Contributor to GPU-accelerated numerical weather prediction research in collaboration with ECMWF
- Deployed production ML systems monitoring 1,000+ industrial assets in real-time
- Lecturer in advanced data assimilation techniques for graduate-level HPC program
- International experience across France, USA, and European collaborative research programs

