

# Naoufal BERQUECHA

Applied Mathematics & Artificial Intelligence Engineer

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## Research Profile

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Final-year engineering student in Applied Mathematics and Data Science seeking a CIFRE PhD in Artificial Intelligence and Machine Learning. Strong expertise in **statistical learning, robust ML, uncertainty quantification, explainable AI** and data drift mitigation. Experienced in building reproducible ML pipelines and deploying models in industrial environments.

## Core Technical Competencies

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**Mathematics:** Probability, Statistics, Linear Algebra, Optimization, Time Series

**Machine Learning:** Gradient Boosting, Random Forest, Cross-Validation, Hyperparameter Tuning, SHAP

**Robust AI:** Data Drift Detection, Covariate Shift, Uncertainty Estimation

**Deep Learning:** MLP, LSTM, Model Evaluation (ROC-AUC, F1-score)

**Programming:** Python (Scikit-learn, Pandas, NumPy..), SQL, Scala, Java

**Data Engineering:** Spark, Hadoop, ETL Pipelines

**Tools:** Git, Jira, Power BI

## Education

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### CY Tech – Engineering Degree in Applied Mathematics & Data Science

France • 2023 – 2026

Relevant coursework: Statistical Learning, Deep Learning, Big Data, Predictive Modeling, Probabilistic Modeling.

### IAE Pau – Double Degree in Management & Information Systems

France • 2022 – 2023

### CPGE MP – Advanced Mathematics & Physics

Morocco • 2020 – 2022

Intensive training in mathematical rigor and theoretical foundations, and Physics.

## Professional Experience

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### Bpifrance – Data Supervision & Business Analytics Apprentice

France • Sept 2024 – Present

- Designed a data supervision architecture: KPI definition, anomaly detection metrics, statistical monitoring pipelines.
- Implemented ETL workflows for financial datasets.
- Contributed to regulatory e-invoicing reform (FacturX format).
- Developed dashboards for operational decision-making.

## Ministry of Agriculture – Data Analyst Intern

Morocco • July – Aug 2024

- Large-scale data preprocessing using SQL and Python.
- Integrated supervised ML models into production systems.
- Performed feature engineering and model evaluation.

## Selected Research & Academic Projects

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### Robust Classification under Data Drift

- Built Gradient Boosting pipeline with uncertainty estimation.
- Simulated covariate shift and concept drift.
- Integrated SHAP explainability for interpretability.
- Evaluated robustness via cross-validation and economic metrics.

### Deep Learning for Parkinson's Disease Detection

- Developed MLP and LSTM models for medical classification.
- Compared models using ROC-AUC, precision, recall and F1-score.

### Time Series Modeling – ARMA / ARIMA

- Stationarity testing, parameter estimation and forecasting evaluation.

## Languages

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French (C1) • English (C1) • Arabic (C2) • Spanish (Basic)