Bidias TIOTSOP

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Profile

Applied Mathematics student at École Polytechnique with a strong background in statistics, stochastic modeling, time series analysis, and deep learning. Highly motivated to contribute to research in quantitative finance. **I am seeking a 4–6 month research internship in quantitative finance and model development**

Education

École Polytechnique, Paris, France - Engineering cycle Sept 2023 - Present

- France's leading school of engineering
- *Relevant Coursework:* Deep Learning, Stochastic Modeling, Statistical Learning, Operations Research

National Advanced School of Engineering, Yaoundé, Cameroon - Preparatory classes Sept 2023 - Present

- Cameroon's leading school of engineering
- *Relevant Coursework:* Algebra, Calculus, Probability, Electromagnetism

Experience & Projects

Mean Field Game of Mutual Cross-Holding, École Polytechnique - Research Project Sept 2025 – Present

- Modeled a mutual holding situation through mean field games in discrete time. Analyzed how diversification affects the total system.
- Obtained results consistent with the literature: optimal diversification reduces shareholders' risk (variance)

Time Series Prediction, École Polytechnique - Class Assignment Nov 2025

- Implemented a time series classification task using Dynamic Time Warping and k-NN on photometric measurements of exoplanet WASP-126 b (transit vs non-transit events).
- Developed LSTM- and Transformer-based architectures in PyTorch to forecast future photometric values on the same dataset.
- Obtained 92% more precise estimates (in terms of RMSE) for the prediction task with Transformers.

Quant Risk Analyst intern, Abeille Assurances (ex Aviva France) – Bois-Colombes, France June 2025 – August 2025

Implemented models to improve the performance of the ESG under nominal rate shocks and default risk on private bonds.

- Designed and calibrated the Hull-White model for inflation rate modeling, ensuring numerical stability and achieving a **100+%** improvement in precision, leading to significantly more accurate bond pricing forecasts.
- Integrated the new inflation model into the existing ESG framework, enhancing its predictive robustness under stress scenarios.
- Developed a Longstaff-Mithal-Neis (LMN) model for credit risk on private bonds, leading to more accurate pricing of private bonds (0.01 factor gain in relative precision).

Portfolio Risk Modeling, École Polytechnique - Project Apr 2025 – June 2025

- Modeled portfolios consisting of options (calls and puts) in different configurations, estimating Value-at-Risk using advanced techniques such as importance sampling, last particle, and splitting methods.
- Utilized importance sampling to enrich rare-event scenarios where losses exceeded 90% quantiles.
- Leveraged an auto-regressive Markov chain to simulate conditional laws, enabling the implementation of last particle and splitting methods, and achieving higher speed and accuracy compared to Metropolis–Hastings for conditional law simulation.

Forex Trading Model Development, Lusis - Remote Project Sept 2024 - Apr 2025

- Built algorithmic trading models using Random Forest and XGBoost to predict Forex trends across 9 currency pairs, achieving a **Sharpe ratio of 2.96**.
- Developed a feature selection pipeline analyzing 15+ time series features (ATR, ADX, MACD, RSI, ...) with correlation analysis and custom scoring functions, optimizing model performance through grid search.

Multi-objective Evolutionary Algorithms, École Polytechnique - Project Dec 2024 - March 2025

- Implemented NSGA II algorithms with fast non-dominated sorting and results corroborated with Benjamin Doerr's article, which stated that we needed an exponential number of iterations to cover more than 2-valued functions.
- Obtained high percentage coverage of Pareto set on some m-LOTZ functions (100% for $m = 2$, 95% for $m = 4$) after a reasonable amount of iterations.

Miscellaneous

- **Technical skills:** Python (NumPy, Pandas, Scikit-Learn, PyTorch, TensorFlow), Java (Data Structures, OOP), Microsoft Excel, Financial Modeling, Risk Management
- **Soft skills:** Communication, Teamwork, Adaptability, Problem-solving, Attention to detail.
- **Languages:** French (native), English (C1 - 101/120 TOEFL iBT), Spanish (A2)
- **Volunteering and Community Service:** As part of *la Cordée de la Réussite* organized by the *Pôle Égalité des Chances*, I mentored students with a strong interest in mathematics, helping them reach their full potential.