Yadang Alexis Rouzoumka

Quantitative Researcher / Quant ML Candidate (PhD)
Statistical Learning, Probabilistic Modeling, Signal Intelligence

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Summary

PhD candidate at CentraleSupélec / Université Paris-Saclay, conducting research within ONERA / SONDRA, an international France–Singapore radar research alliance. Background in statistical learning, probabilistic modeling, uncertainty quantification, robust detection under distribution shift, and heavy-noise settings. I build reproducible research pipelines in Python, design rigorous evaluation protocols, and translate theory into robust code. Currently seeking Quant Research / Quantitative ML roles where strong statistics, fast experimentation, and signal-based modeling matter. Recent quantitative ML competition work includes a current top-6% public leaderboard ranking among 1,100+ participants.

Strengths

- **Statistical modeling:** hypothesis testing, estimation, Bayesian inference, uncertainty quantification, robust modeling under heavy-tailed noise and distribution shift.
- **Time series & signals:** ARIMA/SARIMA, stochastic processes, state-space intuition, feature design for structured signals, detection and anomaly scoring.
- **Machine learning:** supervised/unsupervised learning, representation learning, variational autoencoders, diffusion models, model evaluation, bootstrap confidence intervals, leakage-aware validation.
- **Research engineering:** reproducible experimentation, packaging, CI/CD, testing, documentation, Docker, Git, Linux, modular Python pipelines.
- **Quant-oriented interests:** market microstructure, transaction-cost-aware experimentation, order-book simulation, execution baselines, and systematic signal research.

Education

PhD in Machine Learning and Deep Learning Applied to Robust Radar Target Detection *CentraleSupélec / Université Paris-Saclay* 2023–2026 (expected)
In collaboration with ONERA / SONDRA. Research topics include out-of-distribution detection, generative modeling (VAEs, diffusion models), complex-valued learning, and theory-backed detection under challenging noise and clutter. Selected coursework and background: stochastic processes, statistical learning, time-series analysis, optimization, inference.

Master's Degree in Applied Mathematics and Statistics *Université Clermont Auvergne* 2021–2023

Experience

PhD Researcher *ONERA / SONDRA — CentraleSupélec / Université Paris-Saclay* 2023–Present
Palaiseau / Gif-sur-Yvette, France

- Develop robust detection methods for complex and noisy signals using variational autoencoders, diffusion-based methods, and statistical detection tools.
- Design and benchmark evaluation pipelines for out-of-distribution detection under compound clutter and thermal noise.
- Build reproducible experimental workflows in Python / PyTorch with structured data processing, ablation studies, and statistical evaluation.

R&D / Scientific Software Engineer *PHIMECA* 2022–2023
Cournon-d'Auvergne, France

- Worked on uncertainty quantification, reliability studies, Bayesian correction, and scientific Python tooling.
- Developed Python modules and reusable workflows for scientific computing and measurement-error correction.

- Contributed to software engineering practices: documentation with Sphinx, CI/CD with GitLab CI and Docker, testing, packaging, and executable delivery.

Teaching Assistant *IUT Computer Science — Université Paris-Saclay* 2024–Present
France

- Teach mathematics for signal processing, Java software development, and SQL/database fundamentals.
- Support students on implementation, debugging, and structured problem solving.

Quant Projects & Independent Research

Quantitative ML Challenge – Cross-Sectional Return-Sign Prediction 2026

- Current public leaderboard: **#64 / 1,121 participants** (**top 6%**) in a quantitative ML challenge on cross-sectional return-sign prediction.
- Built a robust ML pipeline for next-day return-sign prediction using group-aware feature engineering, LightGBM-based ensembles, temporal validation, leakage checks, and threshold calibration.
- Focused on robust public/private generalization, group-wise performance analysis, ablations, and submission-risk control rather than purely leaderboard-driven overfitting.
- Full technical details and code kept private while the challenge is active.

MicroAlpha Research: Market Microstructure, Execution & Alpha Research Platform Code | Dashboard

- Built a four-phase research platform for limit-order-book modeling, separating **execution**, **directional alpha**, and **robustness under market shift**.
- Designed a top-of-book execution benchmark with explicit liquidity and spread costs, comparing **TWAP**, **VWAP**, liquidity-only, alpha-only, and a proposed hybrid policy **MALP**; obtained lower held-out implementation shortfall than TWAP/VWAP.
- Developed real walk-forward alpha benchmarks from order-book features (spread, imbalance, microprice, signed flow, short-horizon returns) with explicit transaction-cost penalties and regime adaptation.
- Proposed **RAMP-R** and **CAMP-R**, hybrid microstructure + ML strategies with drift-aware fallback logic; achieved positive net-bps performance on real historical data and external transfer evaluation.
- Built a reproducible research stack with benchmarking scripts, result summaries, plots, and a Streamlit dashboard to inspect phase-by-phase behavior, robustness, and cost-aware performance.

Selected Publications

- **Backbone-Equated Diffusion OOD via Sparse Internal Snapshots**, submitted to NeurIPS 2026, arXiv preprint, 2026.
- **GEPC: Group-Equivariant Posterior Consistency for Out-of-Distribution Detection in Diffusion Models**, ICML 2026.
- **Latent-Space Metrics for Complex-Valued VAE Out-of-Distribution Detection under Radar Clutter**, IEEE ICASSP 2026.
- **Out-of-Distribution Radar Detection in Compound Clutter and Thermal Noise through Variational Autoencoders**, IEEE ICASSP 2025.
- Additional publications in ICASSP, EUSIPCO, GRETSI, and IEEE Transactions on Signal Processing. Full list available on personal website / Google Scholar.

Skills

Programming	Python (NumPy, Pandas, SciPy, PyTorch, Tensorflow), R, SQL, Bash, Git, Docker
Statistics / ML	Time series, stochastic processes, Bayesian inference, uncertainty quantification, hypothesis testing, generative models
Research Engineering	Reproducible experiments, validation design, bootstrap CIs, CI/CD, testing, packaging, Linux workflows
Quant / Finance	Market microstructure, execution modeling, backtesting principles, signal research (project-based)
Languages	French (native/fluent), English (professional), Spanish (basic)

References

Available upon request.