CEREMADE, Université Paris Dauphine-PSL
Paris, France
omrani@ceremade.dauphine.fr
amal-omrani.github.io
Amal-Omrani
amal-omrani

Amal Omrani

PhD in Applied Mathematics

Research profile

I am a PhD candidate in applied mathematics at CEREMADE, Université Paris Dauphine-PSL. I work on stochastic modelling for quantitative finance. I am interested in climate change and green finance.

Keywords Mathematical modelling; risk management; super-hedging; transaction costs; dynamic programming; convex duality; climate risk

Positions

2026–2027 **ATER** (Temporary Lecturer and Researcher), Université Paris Dauphine-PSL, Dec 2026–Aug 2027

2023–2026 **Doctoral researcher** with teaching duties, CEREMADE, Université Paris Dauphine-PSL

2019–2023 **Professeure agrégée**, Preparatory Institute for Engineering Studies (IPEIM), Monastir, Tunisia

Education

2023–2026 **PhD in Applied Mathematics**, Université Paris Dauphine-PSL, CEREMADE
Explicit Computation of Super-Hedging Prices and Strategies under Transaction Costs
Supervisor: Emmanuel Lepinette. Defence: **17 November 2026**.
Main contributions: explicit super-hedging prices and strategies in discrete time, validated against exact benchmarks and on SPY data (2017–2025); a dynamic programming principle in Kabanov's solvency-cone model.
Referees: G. Di Nunno, L. Campi. Examiners: M. Rosenbaum, Y. Kabanov, E. Hubert.

2022–2023 **Master in Mathematics and Applications**, Université de Monastir (**ranked 1st**)
Thesis at LIMOS, Université Clermont Auvergne: reduced-complexity Gaussian processes for regression and classification (C. Samir, A. Fradi)

2019 **Agrégation in Mathematics** (Probability and Statistics), ENS Tunis (**ranked 3rd**)

Publications

[1] Lepinette, E., & **Omrani, A.** (2025). Explicit recursive construction of super-replication prices under proportional transaction costs. *Stochastics*, under revision (revised version submitted, October 2026). hal-05347450, arXiv:2503.02419

[2] Ben Amor, M. A., & **Omrani, A.** (2023). Chernoff's inequality in Riesz spaces. *Quaestiones Mathematicae*, *46*(9), 1777–1787. doi:10.2989/16073606.2022.2113474

[3] Lepinette, E., & **Omrani, A.** (2026). Computation of the super-hedging strategies for vanilla options with transaction costs. *Mathematics and Financial Economics*, under revision. hal-05626560

[4] Lepinette, E., & **Omrani, A.** (2026). Conditional random sets in Polish spaces with applications to the Skorokhod space. *Journal of Mathematical Analysis and Applications*, under revision. hal-05623197

[5] **Omrani, A.**, Fradi, A., & Samir, C. (2024). Reduced run-time and memory complexity regression with a Gaussian process prior. Conference paper, *55es Journées de Statistique (JDS)*, Bordeaux. jds2024.sciencesconf.org/528096

Manuscripts in preparation

[6] Lepinette, E., **Omrani, A.**, & Yan, W. Continuous-time markets with transaction costs: superhedging, dynamic programming, and path-dependent HJB–QVI.

[7] Ben Amor, M. A., & **Omrani, A.** Order-valued Bennett and Hoeffding inequalities in Riesz spaces.

Software

superhedge (with W. Yan, 2026): Python library for pricing and hedging options under transaction costs from bounded returns only: minimal capital, admissible hedges, calibration, backtesting. GitHub

Code for [1]: explicit recursion and optimal strategies; SPY backtest and sensitivity study. GitHub

Code for [3]: empirical SPY study, 2020–2026 (GitHub); strategies for calls and puts (GitHub)

Code for [5] (with A. Fradi): Gaussian-process regression with clustering. GitHub

Teaching

2026–2027 **Monte Carlo Methods** (Master 1), Paris Dauphine-PSL: 2 computer-lab groups in R and 2 tutorial groups; materials: sites.google.com/view/monte-carlo-methods

Spring 2027 **Statistics** (Bachelor L3), Paris Dauphine-PSL (scheduled)

2025–2026 **Introduction to Finance** (Bachelor), Paris Dauphine-PSL: derivatives, options (30 students, 40h)

2024–2025 **Statistics** (Bachelor L2), Paris Dauphine-PSL: lectures, tutorials and assessments (30 students, 50h)

2024–2025 **AI Projects**, Paris Dauphine-PSL: supervision of data-analysis projects in Python (30 students, 15h)

2019–2023 **Algebra I & II**, IPEIM Monastir: full responsibility for lectures, tutorials and exams (60 students/year, 18h/week); grader for the national engineering-school entrance exams

Supervision

2026–2027 Master's thesis: *Monte Carlo methods for PDEs: random walks and the Dirichlet problem*

Talks

Oct 2026 FiME PhD Seminar, Institut Henri Poincaré — Paris, France

Sept 2026 COSA 2026, CIRM — Marseille, France

June 2026 13th Bachelier World Congress — Bologna, Italy

Mar 2026 CEREMADE Third-Year PhD Day — Paris, France

Oct 2025 Stochastics in Mathematical Finance and Physics (SMFP 2025) — Hammamet, Tunisia

Sept 2025 Stochastics & Computational Finance (SCF 2025) — Lisbon, Portugal

June 2025 Young Researchers' Days, CEREMADE — Paris, France

Apr 2025 XXVI Workshop on Quantitative Finance — Palermo, Italy

Jan 2025 17th Bachelier Colloquium — Métabief, France

May 2024 55es Journées de Statistique — Bordeaux, France

Oct 2022 Functional Analysis and Operator Theory Workshop (FAOTSA22) — Kruger Park, South Africa

Schools and seminars attended

Jan 2026 23rd Winter School on Mathematical Finance — Soesterberg, Netherlands

July 2025 5th Barcelona Summer School of Stochastic Analysis and Quantitative Finance — Barcelona, Spain

June 2024 CIMPA School: Ordered Structures in Finance and Machine Learning — Sousse, Tunisia

May 2022 Workshop on Banach Spaces and Banach Lattices II, ICMAT — Madrid, Spain

Regular Bachelier Seminar — Paris, France

Academic service

2026 Co-organizer, COSA 2026, International Conference on Ordered Structures and Applications, CIRM, Marseille

2024–2025 Co-organizer, Young Researchers' Days, CEREMADE

2023 Co-organizer, COSA 2023 workshop, Tozeur, Tunisia

Skills

Computing Python (NumPy, SciPy, LP solvers), R, C++, MATLAB, Git, LaTeX

Languages English (fluent), French (fluent), Arabic (native), Italian (basic)