

# Mehdi Nedjar

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*Research interests: Optimal Transport (dynamic and multimarginal), variational methods and PDEs, convex/functional analysis, probability on metric spaces.*

## Research Interests

Optimal transport (static/dynamic formulations, multimarginal problems), calculus of variations and PDE-inspired methods on spaces of measures, convex and functional analysis, probability and metric/topological structures on probabilistic objects.

## Education

- 2025–2026   **M2 — MMMEF**, Université Paris 1 Panthéon-Sorbonne, Paris  
(expected)
  - **Focus:** Optimization, Neural network, Advanced Machine Learning, Fixed Point Theory, Probability, Data science and mathematical methods for economics/finance.
  - **Selected topics:** optimization; data science; stochastic calculus.
- 2024–2025   **M1 — Applied Mathematics (Economics & Finance)**, Université Paris 1 Panthéon-Sorbonne, Paris  
  - **Probability:** conditional expectation; Hilbert spaces; characteristic functions; Gaussian vectors; convergence; martingales; stopping times; Markov processes.
  - **Statistics & time series:** measure-theoretic foundations; parametric estimation and tests.
  - **Econometrics / data analysis** (English-taught modules included).
  - **Differential equations; functional analysis and optimization** (English courses).
- 2023–2024   **BSc (Year 3) — Pure Mathematics**, Université Paris Cité, Paris  
  - Integration and Fourier series; topology; differential calculus; complex analysis; abstract algebra; differential equations; optimization.
- 2020–2021   **BSc — Applied Mathematics for Social Sciences (MIASHS)**, Université Paris 1 Panthéon-and Sorbonne, Paris
- 2022–2023
  - Measure theory and probability; analysis, optimization and convexity.
  - Computer science: databases; Markov chains; data processing.
  - Mathematical economics: macro/micro; mathematical models in market finance.
- 2019–2020   **CPGE ECS**, Lycée La Bruyère, Versailles
- 2019   **Baccalauréat Scientifique (Engineering Sciences), Mathematics track**, Lycée Robert Doisneau, Corbeil-Essonnes, Honours: Mention Assez Bien

## Research Experience & Academic Activities

- 2025–present   **Master's thesis (in progress)**, Paris  
  - **Topic:** dynamic formulations and multimarginal optimal transport; existence/stability beyond compact settings.
  - **Current reading:** *Metrization of probabilistic metric spaces* (Bachir–Nazaret); *Optimal transportation for the determinant* (Carlier–Nazaret); Fields Institute talk on dynamical multimarginal OT.
  - **Goal:** identify minimal tightness/coercivity assumptions ensuring existence and equivalence between static multimarginal couplings and dynamic formulations on general spaces.

- Guided introduction to optimal transport theory (reading/study), supervised by Philippe Bich.
- Proof-driven study of Kantorovich duality (l.s.c. costs bounded below): convex-analytic perspective (Fenchel–Rockafellar / separation), tightness and weak convergence tools.
- Seminars and talks attended: SMF at Institut Henri Poincaré; BFM (as available).

## Teaching Experience

2022–2024 **Mathematics tutor**, *Partadom / Complétude*, Paris, 15h/week

- One-to-one and small-group tutoring (middle school to high school; including advanced mathematics track).
- Designed method sheets and structured practice sets.

2024–present **Founder (education services)**, *Private tutoring / educational services*, Paris

- Designed pedagogical offer and produced learning resources ( $\text{\LaTeX}$  materials, online community support, exam preparation).
- Content creation and outreach (Instagram: @maths.france).

## Professional Experience

2023 **Executive assistant**, *Services du Premier Ministre*, Paris, Full-time

- Data analysis within the Ministerial Procurement Office.
- Compliance checks and administrative support for financial programming units.

2022 **Business support**, *HSBC Continental Europe*, Paris

- Support to Corporate Bank Coverage teams; client information monitoring and updates.
- Onboarding certifications (e.g. fighting financial crime, GDPR).

2021–2022 **Sport & academic supervisor**, *FC Fleury 91*, Fleury-Mérogis, Full-time

- Coaching and supervision for youth teams; monitoring collective and individual progression.

## Awards & Distinctions

2021–2022 **Selected participant**, *Programme “La Parole aux 18–28”*, Le Cercle des Économistes (Aix-en-Provence)

- Selected for the Rencontres Économiques d'Aix-en-Provence (youth program).
- Co-author: *Et si vous transformiez le monde, quelles seraient vos priorités ?* (Éditions Nathan).

## Skills

Mathematics Measure-theoretic probability; functional analysis; convex optimization; differential equations.

Programming Python (scientific computing); automation scripts; reproducible workflows.

Typesetting  $\text{\LaTeX}$  (course notes, assignments, structured documents).

## Languages

English Native

English Advanced *written, spoken*

Spanish Intermediate *spoken*

Arabic Intermediate *spoken*

## Service & Interests

Volunteering Coordinator at the solidarity restaurant “LaCop1ne”. Member of the General Assembly of Article 1; outreach project to popularize mathematics for high-school students (Ma1son).

Sports Football (forward), long-term practice with intensive training and competitive matches.