

Aldric Labarthe

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EDUCATION

• Ecole Normale Supérieure de Paris Saclay

2022 - today

Bachelor and Master's degree

Gif-Sur-Yvette, France

- 2024 - 2025 : Master's degree *Mathématiques, Vision, Apprentissage (MVA)* in applied mathematics and AI
Relevant courses: convex optimization, computational statistics, probabilistic graphical models, geometric data analysis, reinforcement learning, time series, graphs, bayesian models.
- 2023 - 2024 : Master's degree *Master of Economics* in quantitative economics and mathematics.
Relevant courses: computer science (Python, R, C++), linear algebra, analysis, convex optimization, optimal control, microeconomics, econometrics, macroeconomics, game theory.
- 2022 - 2023 : Bachelor's degree, major in quantitative economics and electives in mathematics and management.
Relevant courses: microeconomics, market finance, measure theory, probability theory, statistics, corporate finance, macroeconomics, game theory.

• Lycée Turgot

2020 - 2022

Preparatory class

Paris, France

- Intensive 2-year class preparing for entrance examinations to the French Grandes Ecoles with first class honours.
- I studied mathematics, macroeconomics, microeconomics, economic history and philosophy.
- At the end of my scholarship, I was admitted into the Ecole Normale Supérieure de Paris Saclay, as major in the competitive exam.

• Université Panthéon-Sorbonne

2020 - 2022

University Education

Paris, France

- A two-year cursus in quantitative economics with first class honours.
- I studied macroeconomics, microeconomics, public accounting, and mathematics (linear algebra and statistics).
- Grade: 17,19 / 20 (86%)

• Institution Saint-Charles

2020

Secondary Education

Athis-Mons, France

- Baccalauréat [High-school diploma] in Mathematics and Economics with first class honours.
- Grade: 18,91 / 20 (94,55%), ranked first

WORK EXPERIENCE

• Université Panthéon-Sorbonne

january 2024 - today

Teaching assistant

Paris, France

• BeyondSolutions

may 2023 - september 2023

Financial Analyst Intern

Paris, France

- Conducting an econometric study on the success causes of employee incentive plans in France over the past 10 years. The report required data collecting and processing from public and private sources and data analysis with linear models on time series.

TEACHING EXPERIENCE

- **Mathematics: Multivariate analysis and metric spaces topology** 2025-
Second year, Bachelor of mathematics (Université Panthéon-Sorbonne) Teaching Assistant of G. Groce
- **Microeconomics: Uncertainty, insurance and game theory** 2024-
Third year, Bachelor of economics (Université Panthéon-Sorbonne) Teaching Assistant of F. Bloch
- **Microeconomics: Decision theory and consumer theory** 2024-
First year, Bachelor of mathematics (Université Panthéon-Sorbonne) Teaching Assistant of S. Gauthier

PROJECTS

- **Artificial social networks analysis** november 2023 - today [G]
Tools: convex optimization, graph theory, probabilities, C++, R
 - Developed two artificial social network generators from scratch in C++ (an optimizer and an agent-based model) that are able to reproduce human networks from empirical data and test hypothesis in dynamic simulations.
 - Created with my colleague Yann Kerzreho from the ENS the mathematical framework with a latent space that justifies generators processes and relevance.
 - Currently working on geometrical properties of the latent space, and on the consequences of this geometry on the shape of the network.
- **Reinforcement learning agents in artificial markets (oligopolies)** 2024 [G]
Tools: microeconomics, reinforcement learning (markov games, Deep deterministic gradient algorithm), C++ and R
 - Developed a simulator for artificial markets (Cournot and Stackelberg duopolies and oligopolies)
 - Implemented a DDPG algorithm in a multi-agent setting
 - Studied algorithmic collusion and gave some new insights on how the choice of the RL algorithm could affect the market outcome.

PATENTS AND PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [S.1] Aldric Labarthe, Yann Kerzreho (2024). **Generating social networks with static and dynamic utility-maximization approaches**. Manuscript submitted for publication in *Physical Review: E*. ArXiv preprint: *arXiv:2411.16464*.
- [T.1] Aldric Labarthe (2024). **Strategies and equilibria on selected markets: a multi-agent simulation and stochastic modeling approach**. Master thesis advised by J. Randon-Furling, graded 19/20 by the ENS Paris-Saclay jury . *Currently working on a manuscript for a Physics journal*.

SKILLS

- **Analysis:** real analysis, topology, convex analysis, convex optimization, primal/dual theorems, interior points methods, Newton methods
- **Algebra:** linear algebra, ODE, Cauchy-Lipschitz theorem
- **Statistics:** M-estimator, Z-estimator, maximum likelihood estimator, causal inference, tests, MCMC methods and Gibbs algorithm, inverse sampling, EM Algorithm
- **Probability:** set and measure theory, graphical models, bayesian inference, markov chains
- **Generative models:** probabilistic graphical models, autoencoders, VAE, standard and riemannian latent spaces
- **Econometrics:** generalized least square, panel data, causal inference, time series analysis (ARMA, VAR, ARIMA, DTW, and new ML methods), non-linear least square estimator, discrete choice models (probit, logit), parametric/non-parametric estimators
- **Dynamic Programming:** optimal control, intertemporal optimization, hamiltonian, Bellman equation, dynamic programming, viability theory, deep reinforcement learning, bandits, multi-agent markov games
- **Game Theory:** static games (Nash equilibrium : existence, selection, ... , Bayesian Nash equilibrium), dynamic games (subgame-perfection, backwards induction, repeated games), signaling games, market design.
- **Microeconomics:** decision theory, insurance, uncertainty and imperfect information, network economics
- **Programming Languages:** C++, R, Python, Stata, Matlab (and Java, PHP, html/CSS)

CERTIFICATIONS

- **International English Language Testing System (IELTS)** Score: 7.5 (CEFR: C1+) november 2023
- **TOEIC:** Score: 940 / 990 (CEFR: C1) march 2022

ADDITIONAL INFORMATION

Languages: French (Proficiency level), English (Proficiency level)

Interests: Hiking, climbing (indoor or outside, bouldering and lead climbing)

REFERENCES

1. **Julien Randon-Furling**

Full Professor,

CPJ Mathematical Modelling[s] in the HSS,

Centre Borelli, Department of Mathematics,

ENS Paris Saclay, Université Paris-Saclay,

Email: julien.randon-furling@ens-paris-saclay.fr

Relationship: Thesis advisor, research advisor