

DIMITRI SOTNIKOV

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EDUCATION

École Polytechnique, CMAP <i>CIFRE PhD Thesis:</i> Path signatures and mean-field games for modeling electricity markets and battery storage problems. <i>Supervisors:</i> Eduardo Abi Jaber, Charles Bertucci, Laurent Tur.	2024 – Present
Sorbonne University / École Polytechnique Master 2 in <i>Probability and Finance</i> . GPA: 19 / 20	2023 – 2024
Vega Institute Science Promotion Foundation Scholarship program. GPA: 5.00 / 5.00 <i>Research group:</i> Numerical experiments in rough volatility modeling, implementation of the PDE approach for local-stochastic volatility models. <i>Supervisors:</i> Charles–Henri Roubinet, Mikhail Zhitlukhin.	2021 – 2023
Moscow State University First year of Master’s program in <i>Applied Mathematics and Computer Science</i> . GPA: 5.00 / 5.00 <i>Coursework:</i> Approximation and asymptotics in the superhedging problem for a binary option. <i>Supervisor:</i> Sergey Smirnov.	2021 – 2022
Moscow State University Bachelor in <i>Applied Mathematics and Computer Science</i> (2021). GPA: 4.97 / 5.00 <i>Bachelor thesis:</i> Proximity of Bachelier and Samuelson models for different metrics. <i>Supervisor:</i> Sergey Smirnov.	2017 – 2021

WORK EXPERIENCE

PhD Quantitative Analyst, Engie Global Markets	Dec 2024 – Present
Quantitative Analyst Intern, Engie Global Markets Development and calibration of a stochastic volatility HJM model. <i>Supervisors:</i> Laurent Tur, Eduardo Abi Jaber.	Apr 2024 – Oct 2024
Scientific Coordinator, Vega Institute Science Promotion Foundation Curriculum development, assistance with the organization of conferences and schools, search for contacts and communication with lecturers and research group leaders.	Dec 2022 – Aug 2023
Quantitative Research Intern, VTB Capital Contributed to the development of a C# derivative pricing library, developed spreadsheets for risk evaluation.	Aug 2022 – Jan 2023
Expert, Center of Economic Analysis, Interfax Development and implementation of credit scoring models for small and medium-sized enterprises.	Jul 2021 – Jan 2022

AWARDS

- European Best Quant Finance Thesis Award (2024) — TopQuants & EY

PUBLICATIONS

- Abi Jaber, E., Attal, E., Sotnikov, D. (2026). *Stochastic control with signatures via Riccati equations on the tensor algebra*. arXiv:2607.03986.
- Abi Jaber, E., Attal, E., Sotnikov, D. (2026). *Affine Structure of the Brownian Signature*. arXiv:2606.29622.
- Abi Jaber, E., Rey, C., Sotnikov, D. (2026). *Malliavin calculus for signatures with applications to finance*. arXiv:2604.22528.
- Abi Jaber, E., Attal, E., Sotnikov, D. (2025). *Efficient Simulation of Hawkes Processes using their Affine Volterra Structure*. arXiv:2511.13554.
- Abi Jaber, E., Sotnikov, D. (2025). *Exponentially Fading Memory Signature*. arXiv:2507.03700.
- Abi Jaber, E., Gassiat, P., Sotnikov, D. (2025). *Martingale property and moment explosions in signature volatility models*. Accepted to Finance and Stochastics. arXiv:2503.17103.

- Abi Jaber, E., Bruneau, S., De Carvalho, N., Sotnikov, D., Tur, L. (2025). *Heath–Jarrow–Morton meet lifted Heston in energy markets for joint historical and implied calibration*. Accepted to Quantitative Finance. arXiv:2501.05975.
- Smirnov, S., Sotnikov, D., Zanoichkin, A. (2024). *Approximation and asymptotics in the superhedging problem for binary options*. Annals of Finance. 1-38. 10.1007/s10436-024-00454-5.
- Smirnov, S., Sotnikov, D. (2021). *Proximity of Bachelier and Samuelson Models for Different Metrics*. Review of Business and Economics Studies, 9(3), 52-76. doi:10.26794/2308-944X-2021-9-3-52-76

CONFERENCE TALKS

- 13th Bachelier World Congress, Bologna, Italy, June 29, 2026.
Signature volatility model: Martingality and Fourier–Laplace transform.
- French Rough Path workshop, Toulouse, France, June 9, 2026.
Chasing Stationarity: Exponentially Fading Memory Signature.
- Stochastic Control and Games for Risk & Regulation, Hammamet, Tunisia, April 27, 2026.
Chasing Stationarity: Exponentially Fading Memory Signature.
- 18th Colloquium Bachelier, Métabief, France, January 14, 2026.
Chasing Stationarity: Exponentially Fading Memory Signature.
- Stochastics & Computational Finance, Lisbon, Portugal, September 2, 2025.
Martingality in the Signature Volatility Model.
- 12th General AMAmE Conference, Verona, Italy, June 27, 2025.
Heath–Jarrow–Morton meet lifted Heston in energy markets for joint historical and implied calibration.
- 17th Colloquium Bachelier, Métabief, France, January 15, 2025.
Martingality in the Signature Volatility Model.
- Quant Careers Symposium, Amsterdam, Netherlands, December 2, 2024.
HJM Stochastic Volatility Model for Energy Markets.

SEMINAR TALKS

- Seminar of the CMAP MathsFi group, École Polytechnique, Paris, France, May 20, 2026.
Path-dependent stochastic optimal control via Riccati equation on the tensor algebra.
- Working Group “Stochastic Methods and Finance”, CERMICS, École des Ponts, Paris, France, March 17, 2026.
Chasing Stationarity: Exponentially Fading Memory Signature.
- DataScience@BI seminar, BI Norwegian Business School, Oslo, Norway, March 3, 2026.
Chasing Stationarity: Exponentially Fading Memory Signature.
- Doctoral Seminar at LPSM, Sorbonne Université, Paris, France, February 24, 2026.
Chasing Stationarity: Exponentially Fading Memory Signature.
- Seminar of the CMAP MathsFi group, École Polytechnique, Paris, France, December 10, 2025.
Chasing Stationarity: Exponentially Fading Memory Signature.
- Global Seminar, Vega Institute, Moscow, Russia, October 4, 2025. (Online)
Chasing Stationarity: Exponentially Fading Memory Signature.
- CEREMADE Young Researcher Days, Caen, France, June 5, 2025.
Probabilistic View on the Signature Method.
- Bachelier Seminar (Doctoral Session), Paris, France, May 2, 2025.
Martingality in the Signature Volatility Model.
- Young Researchers’ Seminar, Université Paris Dauphine-PSL, Paris, February 6, 2025.
Heath–Jarrow–Morton meet lifted Heston in energy markets for joint historical and implied calibration.
- Seminar of the CMAP MathsFi group, École Polytechnique, Paris, France, December 11, 2024.
Martingality in the Signature Volatility Model & Stationary Signatures.

PROFESSIONAL SERVICE

Bachelier Seminar

Technical management of the official website. Coordinating communications for the seminar’s global mailing list.

2024 – Present

TEACHING & MENTORSHIP

Student Research Project (PSC), École Polytechnique	2025 – 2026
Co-supervised a group of five undergraduate students on a six-month research project regarding the application of exponentially fading memory signatures to time-series modeling.	
Research Internship Supervision, Engie Global Markets	2025
<i>Student:</i> Mohammed Taha Belgnaoui (Master 2)	
<i>Topic:</i> Markovian Approximation of the Volterra iVi Scheme.	
Lecturer, Vega Institute	2024
Designed and taught the elective course <i>Non-Markovian Stochastic Volatility Models</i> (12h).	
Teaching Assistant, Vega Institute	2023
Led tutorials in <i>Applied Quantitative Finance II</i> for advanced undergraduate and master's students (28h). Developed and graded projects and assignments.	
Teaching Assistant, Vega Institute	2022
Led tutorials in <i>Advanced Monte Carlo Methods</i> for advanced undergraduate and master's students (20h). Developed and graded research projects, assignments, and final examinations.	

ADDITIONAL INFORMATION

IT Skills

Python (numpy, scipy, pandas, scikit-learn, sympy), C++, R, Matlab.

Languages

English (fluent), French (fluent), Russian (native)