Dimitri Sotnikov

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Education

École Polytechnique, CMAP 2024 – Present
CIFRE PhD Thesis: Path signatures and mean-field games for modeling electricity markets and battery storage problems.
Supervisors: Eduardo Abi Jaber, Charles Bertucci, Laurent Tur.

Sorbonne University / École Polytechnique 2023 – 2024
Master 2 in *Probability and Finance*. GPA: 19 / 20

Vega Institute Science Promotion Foundation 2021 – 2023
Scholarship program. GPA: 5.00 / 5.00

Research group: Numerical experiments in rough volatility modeling, implementation of the PDE approach for local-stochastic volatility models.
Supervisors: Charles–Henri Roubinet, Mikhail Zhitlukhin.

Moscow State University 2021 – 2022
First year of Master's program in *Applied Mathematics and Computer Science*. GPA: 5.00 / 5.00

Coursework: Approximation and asymptotics in the superhedging problem for a binary option.
Supervisor: Sergey Smirnov.

Moscow State University 2017 – 2021
Bachelor in *Applied Mathematics and Computer Science* (2021). GPA: 4.97 / 5.00

Bachelor thesis: Proximity of Bachelier and Samuelson models for different metrics.
Supervisor: Sergey Smirnov.

Work Experience

PhD Quantitative Analyst, Engie Global Markets Dec 2024 – Present

Quantitative Analyst Intern, Engie Global Markets Apr 2024 – Oct 2024
Development and calibration of a stochastic volatility HJM model.
Supervisors: Laurent Tur, Eduardo Abi Jaber.

Scientific Coordinator, Vega Institute Science Promotion Foundation Dec 2022 – Aug 2023
Curriculum development, assistance with the organization of conferences and schools, search for contacts and communication with lecturers and research group leaders.

Quantitative Research Intern, VTB Capital Aug 2022 – Jan 2023
Contributed to the development of a C# derivative pricing library, developed spreadsheets for risk evaluation.

Expert, Center of Economic Analysis, Interfax Jul 2021 – Jan 2022
Development and implementation of credit scoring models for small and medium-sized enterprises.

Awards

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

Publications

- 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., Zanochkin, 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

- April 27, 2026. *Chasing Stationarity: Exponentially Fading Memory Signature.* Stochastic Control and Games for Risk & Regulation, Hammamet, Tunisia.
- January 14, 2026. *Chasing Stationarity: Exponentially Fading Memory Signature.* 18th Colloquium Bachelier, Métabief, France.
- September 2, 2025. *Martingality in the Signature Volatility Model.* Stochastics & Computational Finance, Lisbon, Portugal.
- June 27, 2025. *Heath–Jarrow–Morton meet lifted Heston in energy markets for joint historical and implied calibration.* 12th General AMaMeF Conference, Verona, Italy.
- January 15, 2025. *Martingality in the Signature Volatility Model.* 17th Colloquium Bachelier, Métabief, France.
- December 2, 2024. *HJM Stochastic Volatility Model for Energy Markets.* Quant Careers Symposium, Amsterdam, Netherlands.

Seminar Talks

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

Professional Service

Bachelier Seminar 2024 – Present
Technical management of the official website. Coordinating communications for the seminar's global mailing list.

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
Student: Mohammed Taha Belgnaoui (Master 2)
Topic: Markovian Approximation of the Volterra iVi Scheme.

Lecturer, Vega Institute 2024
Designed and taught the elective course *Non-Markovian Stochastic Volatility Models* (12h).

Teaching Assistant, Vega Institute 2023
Led tutorials in *Applied Quantitative Finance II* for advanced undergraduate and master's students (28h).
Developed and graded projects and assignments.

Teaching Assistant, Vega Institute 2022
Led tutorials in *Advanced Monte Carlo Methods* 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)