Gaëtan Serré

PhD candidate in Mathematics

Centre Borelli, École Normale Supérieure Paris-Saclay

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Professional Summary

I am a PhD student in mathematics at Centre Borelli — École Normale Paris-Saclay since 2023, under the supervision of Nicolas Vayatis and Argyris Kalogeratos.

I study and design global optimization algorithms, especially those modeled as systems of stochastic differential equations. I am also particularly interested in measure theory and in the formalization of optimization algorithms and their results using the L∃∀N proof assistant. I contribute to Mathlib, its mathematics library.

Publications

1. **Serré, G.**, Germain, P., Gruffaz S. & Kalogeratos, A. (2026). *Enhancing Exploration in Global Optimization by Noise Injection in the Probability Measures Space*. **ArXiV preprint**.
2. **Serré, G.**, Kalogeratos, A., & Vayatis, N. (2025). *A Unifying Framework for Global Optimization: From Theory to Formalization*. **ArXiV preprint**.
3. **Serré, G.**, Kalogeratos, A., & Vayatis, N. (2025). *Stein Boltzmann Sampling: A Variational Approach for Global Optimization*. In **Proceedings of The 28th International Conference on Artificial Intelligence and Statistics** (AISTATS 2025)
4. **Serré, G.**, Beja-Battais, P., Chirrane S., Kalogeratos, A., & Vayatis, N. (2024). *LIPO+: Frugal Global Optimization for Lipschitz Functions*. In **Proceedings of the 13th Hellenic Conference on Artificial Intelligence** (SETN 2024).
5. **Serré, G.**, Boguslawski, E., Donnot B., Pavão, A., Guyon, I., & Marot, A. (2022). *Reinforcement learning for Energies of the future and carbon neutrality: a Challenge Design*. **ArXiV preprint**.

Talks

2026 | **Budding math seminar**, Institut des Hautes Études Scientifiques (IHES)
Presented my work on global optimization and proof assistants to Bachelor students at IHES.

Research projects

- **GOB**. A Python package for Global Optimization Benchmarking. It includes C++ implementations of many algorithms as well as various benchmark functions.
- **L∃∀NGO**. A L∃∀N library dedicated to the formalization of global optimization algorithms.
- **LipoCons**. The L∃∀N formalization associated with the paper *Formal equivalence between global optimization consistency and random search*.
- **GPEP**. A Python package for Generalized Performance Estimation Problems. Inspired by the PEPit framework, GPEP relaxes linearity constraints on symbolic expressions by using global optimization techniques.

Teaching Experience

2023 - 2026 | **Introduction to Statistical Learning**, École Normale Supérieure Paris-Saclay
Professor: Prof. Nicolas Vayatis
Teaching assistant for a course of the M.Sc. Mathématique, Vision, Apprentissage (MVA). Led weekly exercises, and held office hours for a class of 30 students.

2023 - 2026 | **Analyse et Convergence**, University of Paris-Saclay
Professor: Prof. Jacek Graczyk
Teaching assistant for undergraduate course. Led weekly exercises, homework assignments, exams correction, and held office hours for a class of 30 students.

2023 - 2026 | **Préparation aux oraux de l'École Polytechnique de Paris**, University of Paris-Saclay
Professor: Prof. Pierre-Yves Le Gall
Organized and led weekly preparation sessions for the oral exams of École Polytechnique de Paris. Created practice problems and mock oral exams for a group of 20 students.

2025 - 2026 | **Statistical inference**, University of Paris-Saclay
Professor: Prof. Marie-Anne Poursat

Teaching assistant for undergraduate course. Led weekly exercises, homework assignments, exams correction, and held office hours for a class of 30 students.

Education

2023 - Present | **École Normale Supérieure Paris-Saclay**, Gif-Sur-Yvette, FR
Ph.D. in Mathematics

2022 - 2023 | **École Normale Supérieure Paris-Saclay**, Gif-Sur-Yvette, FR
M.Sc. Mathématiques, Vision, Apprentissage (MVA)

2021 - 2022 | **University of Paris-Saclay**, Gif-Sur-Yvette, FR
M.Sc. in Artificial Intelligence

2018 - 2021 | **University of Paris-Saclay**, Gif-Sur-Yvette, FR
Double B.Sc. Mathematics & Computer Science

Honors & Awards

2024 | **Winner of the Accenta RL Challenge**, Collège de France
First place in the Accenta Reinforcement Learning Challenge on carbon neutrality, organized by Collège de France and Prof. Stéphane Mallat.

Academic references

- **Prof. Nicolas Vayatis**, Centre Borelli, École Normale Supérieure Paris-Saclay. **Email:** nicolas.vayatis@ens-paris-saclay.fr
- **Rémy Degenne**, INRIA Lille, University of Lille. **Email:** remy.degenne@inria.fr
- **Prof. Alain Trouvé**, Centre Borelli, École Normale Supérieure Paris-Saclay. **Email:** alain.trouve@ens-paris-saclay.fr