Gaëtan Serré

PhD candidate in Mathematics

Centre Borelli, École Normale Supérieure Paris-Saclay

✉ gaetan.serre@ens-paris-saclay.fr | 🌐 gaetanserre.fr | 🐙 @gaetanserre

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.**, Kalogeratos, A., & Vayatis, N. (2025). *A Unifying Framework for Global Optimization: From Theory to Formalization*. **ArXiV preprint**.

2. **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)

3. **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).

4. **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