

# 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  $\text{L}\mathcal{E}\mathcal{V}\mathcal{N}$  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). *LIPPO+: 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**.

## Research projects

- **GOB**. A Python package for Global Optimization Benchmarking. It includes C++ implementations of many algorithms as well as various benchmark functions.
- **LipoCons**. The  $\text{L}\mathcal{E}\mathcal{V}\mathcal{N}$  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	<b>Introduction to Statistical Learning</b> , École Normale Supérieure Paris-Saclay <i>Professor:</i> 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	<b>Analyse et Convergence</b> , University of Paris-Saclay <i>Professor:</i> 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	<b>Préparation aux oraux de l'École Polytechnique de Paris</b> , University of Paris-Saclay <i>Professor:</i> 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	<b>Statistical inference</b> , University of Paris-Saclay <i>Professor:</i> 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	<b>École Normale Supérieure Paris-Saclay</b> , Gif-Sur-Yvette, FR <i>Ph.D. in Mathematics</i>
2022 - 2023	<b>École Normale Supérieure Paris-Saclay</b> , Gif-Sur-Yvette, FR <i>M.Sc. Mathématiques, Vision, Apprentissage (MVA)</i>

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

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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

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