

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). *LIP0+: 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

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| 2023 - 2026 | Introduction to Statistical Learning , 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 | Analyse et Convergence , 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 | Préparation aux oraux de l'École Polytechnique de Paris , 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. |

Education

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| 2023 - Present | École Normale Supérieure Paris-Saclay , Gif-Sur-Yvette, FR
<i>Ph.D. in Mathematics</i> |
| 2022 - 2023 | École Normale Supérieure Paris-Saclay , Gif-Sur-Yvette, FR
<i>M.Sc. Mathématiques, Vision, Apprentissage (MVA)</i> |
| 2021 - 2022 | University of Paris-Saclay , Gif-Sur-Yvette, FR
<i>M.Sc. in Artificial Intelligence</i> |
| 2018 - 2021 | University of Paris-Saclay , Gif-Sur-Yvette, FR
<i>Double B.Sc. Mathematics & Computer Science</i> |

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.
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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