

Gaëtan Serré

PhD candidate in Mathematics

Centre Borelli, École Normale Supérieure Paris-Saclay

✉ gaetan.serre@ens-paris-saclay.fr | ☎ +33 6 74 52 00 93 | 🌐 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 $\text{L}\lambda\text{vN}$ proof assistant. I contribute to Mathlib, its mathematics library.

Publications

1. **Serré, G.**, Kalogeratos, A., & Vayatis, N. (2025). Formal equivalence between global optimization consistency and random search. **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**.

Research projects

- **Global Optimization Benchmark (GOB)**. A Python package includes C++ implementations of many algorithms as well as various benchmark functions.
- **LipoCons**. The $\text{L}\lambda\text{vN}$ formalization associated with the paper *Formal equivalence between global optimization consistency and random search*.

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 M.Sc. Mathématique, Vision, Apprentissage (MVA) course. 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 | 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 | 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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