

# Gaëtan Serré

## PhD candidate in Mathematics

Centre Borelli, École Normale Supérieure Paris-Saclay

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## Professional Summary

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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

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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

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- **Global Optimization Benchmark (GOB)**. A Python package 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*.

## Teaching Experience

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| 2023 - 2026 | <b>Introduction to Statistical Learning</b> , École Normale Supérieure Paris-Saclay<br><i>Professor:</i> Prof. Nicolas Vayatis<br>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<br><i>Professor:</i> Prof. Jacek Graczyk<br>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<br><i>Professor:</i> Prof. Pierre-Yves Le Gall<br>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        | <b>École Normale Supérieure Paris-Saclay</b> , Gif-Sur-Yvette, FR<br><i>Ph.D. in Mathematics</i>                             |
| 2022 - 2023 | <b>École Normale Supérieure Paris-Saclay</b> , Gif-Sur-Yvette, FR<br><i>M.Sc. Mathématiques, Vision, Apprentissage (MVA)</i> |
| 2021        | <b>University of Paris-Saclay</b> , Gif-Sur-Yvette, FR<br><i>M.Sc. in Artificial Intelligence</i>                            |
| 2018 - 2021 | <b>University of Paris-Saclay</b> , Gif-Sur-Yvette, FR<br><i>Double B.Sc. Mathematics &amp; Computer Science</i>             |

## Honors & Awards

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2024	<b>Winner of the Accenta RL Challenge</b> , 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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