

Vincent Souveton, PhD student

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🌐 <https://vincentsouveton.github.io/>



Education

- 2021 – 2024 📖 **Ph.D., Applied Mathematics, Université Clermont Auvergne.** The goal of my PhD is to study and develop algorithms to extract meaningful information from astronomical surveys for characterizing the large scale structure of the Universe. I am both interested in Machine Learning techniques and non-reversible Monte Carlo methods.
Thesis title: *Mathematical aspects in statistical inference of initial cosmological parameters through forward modeling.*
- 2019 – 2021 📖 **M.Sc., Mathematics, UCA.** Various courses about both fundamental and applied Mathematics. Specialization in Partial Differential Equations during the last year.
1st year thesis title: *Holomorphic functions on the disk and Aleksandrov-Clark measures.*
2nd year thesis title: *Mathematical aspects in statistical inference of initial cosmological parameters through forward modeling.*
- 2017 – 2018 📖 **Ensaï Rennes.** National school for Statistics and data analysis. I chose to leave after one year and a half to focus on a research-oriented education.
- 2015 – 2017 📖 **Classes préparatoires MPSI/MP*, Lycée Blaise Pascal, Clermont-Fd.** Preparatory years for nationwide competitive examination to the French schools of engineering.
- 2015 📖 **Baccalauréat scientifique, Lycée Jeanne d'Arc, Clermont-Fd.** With very high honours.

Employment / Community life / Responsibilities


- 2021 – 2024 📖 **Teaching assistant, UCA.** As part of my PhD, I have been giving tutorials to first year science students for two different courses.
Mathématiques S2: asymptotic analysis and Taylor expansion, vector spaces, linear applications, sequences.
Outils Mathématiques 2: logic and reasoning, functions of multiple variables, ordinary differential equations.
- 📖 **Responsibilities as a PhD student, UCA.** During my PhD, I was elected a PhD student representative at the Doctoral School (May 2022 - November 2023). I have also been involved in the deployment of actions for fighting against psychosocial hazard as well as sexist and sexual violence. Finally, I have been in charge of the PhD students seminar organization.
- Jan. - June 2021 📖 **Master's degree internship, UCA.** Interdisciplinary research internship between applied Mathematics and Cosmology. My work consisted in a bibliography search and I produced theoretical results regarding the convexity analysis of a sampling problem.
Thesis title: *Mathematical aspects in statistical inference of initial cosmological parameters through forward modeling.*
- 2020 – 2021 📖 **Tutoring, UCA.** The job consisted in helping first year science students with their maths homework and guide them through efficient preparation for the exams.

Employment / Community life / Responsibilities (continued)







- July 2018  **Volunteer, Archelon.** This Greek NGO aims at the protection of sea turtles. I was in charge of patrolling along the beaches, making public awareness and participating in the daily life of our international camp based in Matala (Crete).
- 2017 – 2018  **Administrator, Ensai Junior Consultant.** EJC is the junior enterprise of Ensai. It provides statistical analysis made by students from the school for clients both in the private and the public sector. As a quality rep, my job consisted in following the different projects, making sure that the legal framework was respected.

Research Publications





Accepted

-  V. Souveton, A. Guillin, J. Jasche, G. Lavaux, and M. Michel, *Fixed-kinetic neural hamiltonian flows for enhanced interpretability and reduced complexity*, 2023. arXiv: 2302.01955 [cs.LG].

Talks

- 11/28/2023  *Sampling with Neural Hamiltonian Flows.* Flashtalk at Institut d'Astrophysique de Paris during the "Debating the potential of Machine Learning in astronomical surveys" conference.
- 11/22/2023  *Introduction to Geometric Deep Learning.* Presented at the PhD students seminar in Laboratoire de Mathématiques Blaise Pascal (Clermont-Ferrand).
- 11/07/2023  *Algorithms for inferring the initial conditions of the Universe.* Talk as part of an interdisciplinary public colloquium called "Le Puy de la Recherche" (Clermont-Ferrand).
- 09/20/2023  *Sampling with Neural Hamiltonian Flows.* Talk during the workshop "Probabilistic sampling for physics: finding needles in a field of high-dimensional haystacks" at Institut Pascal (Orsay).
- 12/15/2022  *Sampling with Hamiltonian Normalizing Flows.* Presented at the Simatlab seminar as part of a scientific collaboration between Université Clermont Auvergne and Michelin.
- 11/25/2021  *Inferring the initial conditions of the Universe.* Presented at the Cosmology group seminar at the Oskar Klein Center (Stockholm).

Skills

- Languages  French (native speaker), English (full professional capacity) and Spanish (basis).
- Coding  Python/PyTorch, Julia, L^AT_EX.
- Web Dev  Basic knowledge of HTML and MARKDOWN.
- Misc.  Driver's license.