Nina Vesseron

Curriculum Vitae

About me

I am a PhD student at CREST in Paris-Saclay (France). My research interests lie at the intersection of optimal transport, generative modeling and sampling.

Education

2022 - present	**PhD in Applied Mathematics**, *CREST-ENSAE*, Paris-Saclay, Expected Graduation: 12/26.
	Dissertation Topic: Optimal Transport, Generative modeling, Optimization, Sampling
	Advisor: Marco Cuturi
2021 - 2022	**Master's Degree in Machine Learning**, *Ecole Normale Supérieure*, Paris-Saclay, Paris.
	Major in Mathematics, Vision and Learning. Highest honors.
	Main courses: Optimization, Computational Statistics, Optimal Transport, Machine learning with kernel methods, Generative models.
2019 - 2021	**Master's Degree in Computer Science**, *Ecole Normale Supérieure*, Lyon.
	Main courses: Machine Learning, Statistical Learning, Information Theory, Algorithmics, Complex Systems, Parallel and Distributed Algorithms
2018 - 2019	**Bachelor's Degree in Computer Science**, *Ecole Normale Supérieure*, Lyon.
	Main courses: Graph Theory, Algorithmics, Logic, Automata Theory
2018 - 2019	**Bachelor's Degree in Mathematics**, *Claude Bernard University*, Lyon.
	Main courses: Probability Theory, Statistics, Linear Algebra, Numerical Analysis

Publications

2025	Nina Vesseron, Elsa Cazelles, Alice Le Brigant, and Thierry Klein. On the Wasserstein Geodesic Principal Component Analysis of probability measures, 2025.
2025	Nina Vesseron, Louis Béthune, and Marco Cuturi. Sample and Map from a Single Convex Potential: Generation using Conjugate Moment Measures. In *Advances in Neural Information Processing Systems*, 2025.
2024	Nina Vesseron and Marco Cuturi. On a Neural Implementation of Brenier's Polar Factorization. **Spotlight Paper**. In *International Conference on Machine Learning*, 2024.

2021	Nina Vesseron, Ievgen Redko, and Charlotte Laclau. Deep neural networks are congestion games: From loss landscape to Wardrop equilibrium and beyond. In *International Conference on Artificial Intelligence and Statistics*, 2021.

Presentations

June 2025	**Conference Presentation**, Sample and Map from a Single Convex Potential: Generation using Conjugate Moment Measures, SMAI2025, Carcans Maubuisson.
May 2024	**Congress Presentation**, On a Neural Implementation of Brenier's Polar Factorization, National Congress on Numerical Analysis, Le-Bois-Plage-en-Ré, Ile de Ré.
May 2024	**Invited Talk**, On a Neural Implementation of Brenier's Polar Factorization, Ecole Normale Supérieure Seminar, Ecole Normale Supérieure, Paris.
April 2024	**Workshop Presentation**, On a Neural Implementation of Brenier's Polar Factorization, Optimal Transport Workshop, Institut d'Etudes Scientifiques, Cargèse, Corsica.
October 2022	**Presentation**, Quantile functions in high dimension and neural Optimal Transport, **Best student presentation award**, Junior Conference on Data Science and Engineering, INRIA, Paris-Saclay.
June 2022	**Invited Talk**, Deep neural networks are congestion games: From loss landscape to wardrop equilibrium and beyond, CentraleSupélec Seminar, CentraleSupélec, Paris-Saclay.

Research Internships

May 2025 - October 2025	***Research Internship in Computer Graphics – 3D Gaussian Splatting***, *Adobe Research*, Paris.
Advisor:	**Élie Michel**
February 2021 - July 2021	***Posterior sampling applied to inverse problems***, *ONERA*, Palaiseau. ○ Project: Analyzed gas flow dynamics during rocket take-off using tomography images. ○ Methodology: Reconstructed gas flow by parameterizing prior distribution with a normalizing flow and sampled posterior distribution using the Metropolis-adjusted Langevin algorithm.
Advisor:	**Frédéric Champagnat**
April 2020 - August 2020	***Posterior sampling applied to inverse problems***, *Hubert Curien Laboratory*, St-Etienne. ○ Project: Explored the relationship between deep neural networks (DNNs) and congestion games to apply theoretical insights from game theory to DNNs. ○ Achievements: Developed a model demonstrating that local minima are global minima of the DNN's loss function for specific architectures.
Advisors:	**Ievgen Redko** and **Charlotte Laclau**
June 2019 - July 2019	***The knapsack problem with conflict graph (KPCG)***, *INRIA*, Bordeaux. ○ Project: Developed and implemented a C++ algorithm for the REALOPT team to optimally solve the KPCG problem by finding the largest interval subgraph of a conflict graph.
Advisors:	**François Clautiaux** and **Pierre Pesneau**

Workshop Organization

2021 - 2022	**Workshop Organizer**, *International Conference on Learning Representations (2022)*, Gamification and Multiagent Solutions Workshop.

Teaching Assistant

2024 - 2025	**Optimal Transport: theory, computations, statistics and ML**, ENSAE, Paris.
2024 - 2025	**Algorithmics and Programming**, ENSAE, Paris.
2023 - 2024	**Optimization**, ENSAE, Paris.
2023 - 2024	**Algorithmics and Programming**, ENSAE, Paris.
2022 - 2023	**Optimal Transport: theory, computations, statistics and ML**, ENSAE, Paris.
2022 - 2023	**Optimization**, ENSAE, Paris.
2022 - 2023	**Python for Data Science**, ENSAE, Paris.
2022 - 2023	**Algorithmics and Programming**, ENSAE, Paris.

Languages and Skills

Languages	French (mother tongue), English (fluent)
Programming Languages	**Proficient in:** Python, JAX, FLAX, PyTorch **Familiar with:** Keras, C, C++, OCaml
Database	**Familiar with:** SQL, Neo4j
Open source contribution	Python Library OTT-JAX for Optimal Transport Tools in JAX, `https://github.com/ott-jax/ott`
	Python Library for Neural Brenier's Polar Factorization Solver in JAX, `https://github.com/nvesseron/Neural-Polar-Factorization/`