

Raphaël Barboni

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Education

- Since 2018 **Research apprentice (Élève fonctionnaire stagiaire)**, *ÉNS Ulm*, Paris, France.
Department of Mathematics and their Applications (DMA)
- 2020–2021 **M.Sc. Mathematics for Machine Learning and Data Science (MVA)**, *ÉNS Paris-Saclay*, with honors.
- 1st Semester : Computational optimal transport, Stochastic Differential Equations, Numerical imaging, Dynamical systems and stochastic models in neuroscience, Medical image analysis,
 - 2nd Semester : Random matrix theory, Sparse representation theory, Geometry in the space of shapes, Inverse problems in imaging, PDEs for image analysis,
 - Master thesis** : “*Convergence properties of Gradient Descent in the training of Deep Residual Networks*” (supervised by G. Peyré and F-X. Vialard).
- 2019–2020 **First year of Master degree in mathematics**, *ÉNS Ulm*.
- 1st Semester : Stochastic processes and Markov chains, Elliptic PDEs, Dynamical systems and ergodic theory,
 - 2nd Semester : Stochastic calculus, Optimal transport and applications in kinetic theory,
 - Industrial workshop** : optimization with cardinality constraints for the daily adjustment of electricity production,
 - Workshop** : “*Spectral theory in quantum mechanics*” (E.Séré).
- 2018–2019 **Sorbonne Université’s Bachelor degree in mathematics**, *ÉNS Ulm*, with honors.
- Bachelor thesis**, “*Mean curvature flow, an introduction to geometrical flows*” (supervised by T. Ozuch),
 - Workshop** : “*Riemannian geometry in the space of shapes*” (J. Feydy).
- 2016–2018 **Scientific preparation for competitive exams**, *Lycée Henri IV*, Paris.
MPSI then MP*, optional courses in computer science

Skills

Computer

Programming Python, ML libraries (Pytorch, Scikit-learn, ...)
Operating System Linux

Languages

French Mother tongue
English, German Professional skills (B2)

Professional experiences

Research experiences

- 2021 **Research internship**, *CNRS - DMA*, Paris.
“*Convergence properties of Gradient Descent in the training of Deep Residual Networks*”,
under supervision of G. Peyré and F-X. Vialard.
- 2020 **Research internship**, *Center for Mathematical Modeling (CMM) - CNRS*, Santiago, Chile.
“*Hydrodynamical models for red tides phenomena in Quellón’s bay*”, under supervision of C. Conca.
Interrupted due to the Covid pandemic.

Teaching

- 2021–2022 **Teaching assistant**, *Lycée Henri IV*, Paris.
“Cycle Pluridisciplinaire d’Études Supérieure” (CPES), Bachelor level.
- 2018–2022 **Preparation for competitive exams**, *Lycée Henri IV*, Paris.
Questioning students on mathematical exercises (“colles”).

Community life

- 2019–2021 **Confer’ENS Ulm**.
Students’ forum, canvassing speakers, preparing interviews
- 2019 **Member of the ÉNS Students’ Office**.
Scheduling artistic events, organizing associative events

Hobbies

Track & Field I do Pole Vault, my personal best is 4.15m
Mountain sports Hiking, climbing, skiing and traveling
Guitar Spanish and South-american music