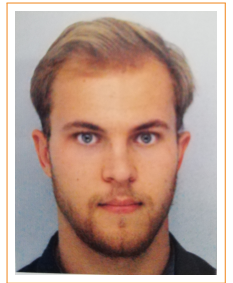


# Alexis de Villeroché

PhD Student, LAMA Chambéry,  
Dipartimento di Matematica Pisa

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Updated : 08/05/2026



PhD title : Optimal shapes for non-monotone cost functionals

research topics : Shape optimization; Spectral optimization; Calculus of variations; PDEs

numerics : Numerical optimization; Levelset method; Finite elements; Neural networks

## positions

2023 - 2026 (current) PhD student, LAMA Chambéry, Dipartimento di Matematica, Pisa (Cotutelle), with Dorin Bucur and Giuseppe Buttazzo

04/2025 Program participant, Geometric spectral theory and applications, Isaac Newton Institute, Cambridge (3 weeks)

11-12/2025 Visiting student, Universitatea Aurel Vlaicu din Arad, with Benjamin Bogosel (1 month)

## degrees

2023 **Diplôme de l'ENS de Lyon**, session 2023  
delivered by ENS de Lyon

2023 **Diplôme d'ingénieur de l'ENSTA Paris**, Specialization in Modelization and Simulation  
delivered by ENSTA Paris

2023 **Master 2**, Master in Optimization  
delivered by Université Paris-Saclay

2022 **Master 2**, of Advanced Mathematics, Specialization in PDEs  
delivered by ENS de Lyon

## publications

2025 **Optimal domains for the Cheeger inequality**, (*preprint*), Dorin Bucur, Giuseppe Buttazzo, Alexis de Villeroché, arxiv: 2510.08032

2025 **Quantitative stability control of the full spectrum of the Dirichlet Laplacian by the second eigenvalue**, (*preprint*), Alexis de Villeroché (single author), arxiv: 2506.05870

## given talks

January 2026 **Optimality of the honeycomb structure in some shape optimization problems with inradius constraint in 2D**, (*invited talk*), Shape optimization, geometric inequalities and related topics, Napoli

November 2025 **Optimality of the honeycomb structure in some shape optimization problems**, Seminar of mathematics, Arad

November 2025 **Optimality of the hexagonal tiling for the torsional rigidity and the first eigenvalue with fixed inradius in 2D**, (*invited talk*), Rencontres ANR stoïques, Paris

September 2025 **Optimality for a generalised Cheeger inequality in 2D**, Phd and PostDoc Seminar, Chambéry

May 2024 **Introduction to shape optimization**, Phd and PostDoc Seminar, Chambéry

## competences

spoken languages French (native), English (C2, CAE 2020), Italian (beginner)

coding languages Freefem++, Python, PyTorch, Matlab, Latex