# Joseph Feneuil

French citizen, married, one child.

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**Main research themes:** harmonic analysis, elliptic partial differential equations, geometric measure theory.
**Other research themes:** potential analysis, geometric analysis, probability.

## Professional Experience

**2024-** : Assistant Professor "Maître de conférences" at the Université Paris-Saclay (France).

**2022-2023** : MSI Fellow at the Australian National University, Canberra (Australia).

**2021-2022** : Postdoctoral Fellow at Pisa (Italy), funded by the grant ERC VAREG "Variational approach to the regularity of the free boundaries", supervised by Bozhidar Velichkov.

**2021** : Postdoctoral Fellow with the Simons Foundation Localization of Waves Collaboration, at Université de Paris-Saclay (France), supervised by Guy David.

**2018-2020** : Non Tenure Track Assistant Professor, Temple University, Philadelphia, USA.

**2015-2018** : Dunham Jackson Assistant Professor, University of Minnesota, Minneapolis, USA. Mentor: Svitlana Mayboroda.

**2012-2015** : Graduate student "Allocataire moniteur normalien" in Grenoble, France. Supervisor: Emmanuel Russ. I obtained a grant from the French government, as an alumni of ENS de Cachan Brittany branch (now ENS de Rennes) to pursue a Ph.D.

## Scholarship

**2012-2015** : Ph.D. under the supervision of Emmanuel Russ at Université Joseph Fourier, Grenoble (France). The memoir is entitled *Harmonic analysis on graphs and Lie groups: Quadratic functionals, Riesz transforms and Besov spaces.*

**2012** : Master degree in mathematics (speciality PDE) at Université Lyon 1.

**2009** : Degree in mathematics at University Rennes 1.

# Publications

**AI disclaimer.** Starting 2025, AI models have been used for the local reformulation of sentences in submitted preprints. Since Fall 2026, they have also been used to assist with proofreading and to review my own manuscripts (with the aim of anticipating and addressing potential criticisms, given that reviewers increasingly make use of AI-assisted tools).

Up to November 2026 (when the present CV was compiled), AI models have never been used for mathematical developments or for generating content. This includes, but is not limited to, developing or testing mathematical ideas, structuring or organizing the article, formulating or proving elementary lemmas, generating pictures or diagrams.

## In press or accepted

[1] In spaces with a slow diffusion, the Riesz transform is unbounded on $L^p$, $p \in (2, \infty)$, *J. Geom. Anal.* **36**, No. 2, Paper No. 61, 32 p., 2026.

[2] Carleson perturbations of locally Lipschitz elliptic operators, *Proc. Am. Math. Soc.* **154**, No. 6, 2519-2534, 2026.

[3] An alternative proof of the $L^p$-regularity problem for Dahlberg-Kenig-Pipher operators on $\mathbb{R}^n_+$, *Math. Z.* **311**, article no. 41, 19p, 2025.

[4] A Green function characterization of uniformly rectifiable sets of any dimension (with L. Li), *Adv. Math* **430**, ArticleID 109220, 45p, 2023.

[5] Green functions and smooth distances (with L. Li and S. Mayboroda), *Math. Ann* **389**, no. 3, 2637–2727, 2024.

[6] The regularity problem in domains with lower dimensional boundaries (with Z. Dai and S. Mayboroda), *J. Funct. Anal.* **284**, no. 11, ArticleID 109903, 72p, 2023.

[7] Carleson perturbations in the regularity problem (with Z. Dai and S. Mayboroda), *Rev. Mat. Iberoam.* **39**, no. 6, 2119-2170, 2023.

[8] A change of variable for Dahlberg-Kenig-Pipher operators, *Proc. Amer. Math. Soc.* **150**, no. 8, 3565–3579, 2022.

[9] Green function estimates on complements of low-dimensional uniformly rectifiable sets (with G. David and S. Mayboroda), *Math. Ann.* **385**, no. 3-4, 1797–1821, 2023.

[10] Generalized Carleson perturbations of elliptic operators and applications (with B. Poggi), *Trans. Amer. Math. Soc.* **375**, no. 11, 7553–7599, 2022.

[11] Green function with pole at infinity applied to the study of the elliptic measure, *Anal. PDE* **16**, no. 2, 545–570, 2023.

[12] Absolute continuity of the harmonic measure on low dimensional rectifiable sets, *J. Geom. Anal.* **32** , no. 10, Paper No. 247, 36p, 2022.

[13] Elliptic theory in domains with boundaries of mixed dimension (with G. David and S. Mayboroda), *Astérisque* **442**, 2023.

[14] The Dirichlet problem in domains with lower dimensional boundaries (with S. Mayboroda and Z. Zihui), *Rev. Mat. Iberoam.* **37**, no. 3, 821–910, 2021.

[15] A new elliptic measure in lower dimensional sets (with G. David and S. Mayboroda), *Acta Math. Sinica, special issue in honor of Carlos Kenig's 65th birthday*, **35**, no 6, 876–902, 2019.

[16] Dahlberg's theorem in higher co-dimension (with G. David and S. Mayboroda), *J. Funct. Anal.* **276**, no 9, 2731–2820, 2019.

[17] Elliptic theory for sets with higher co-dimensional boundaries (with G. David and S. Mayboroda). *Mem. Amer. Math. Soc.* **273**, no 1346, 2021.

[18] Algebra properties for Besov spaces on unimodular Lie groups. *Colloq. Math.* **154**, 205–240, 2018.

[19] About the $L^2$-analyticity of Markov operators on graphs. *Proc. Amer. Math. Soc.* **146**, 1793–1805, 2018.

[20] Harmonic measure on sets of codimension larger than one (with G. David and S. Mayboroda), *C. R. Math. Acad. Sci. Paris* **355**, no. 4, 406–410, 2017.

[21] Riesz transform for $1 \leq p \leq 2$ without Gaussian heat kernel bound (with L. Chen, T. Coulhon, and E. Russ), *J. Geom. Anal.*, **27**, no 2, 1489–1514, 2017.

[22] Hardy and BMO spaces on graphs, application to Riesz transform, *Pot. Anal.*, **45**, no 1, 1–54, 2016.

[23] Littlewood-Paley functionals on graphs, *Math. Nachr.* **288**, no 11-12, 1254–1285, 2015.

Preprints

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[24] Stability of the $L^p$ Poisson-Neumann problem under small perturbations of the coefficients and the domain (with L. Li), 55p, `https://arxiv.org/abs/2610.39544`.

[25] Reverse inequalities for super-Riesz transforms on graphs with a slow diffusion, 33p, `https://arxiv.org/abs/2606.05475`.

[26] Stability of $L^p$ Dirichlet problem under small bi-Lipschitz transformations of domains (with L. Li and J. Zhuge) , 42p, `https://arxiv.org/abs/2602.08115`.

[27] The $L^p$ Poisson-Neumann problem and its relation to the Neumann problem (with L. Li) , 49p, `https://arxiv.org/abs/2406.16735`.

# Teaching

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**Since 01/2024. Maître de conférences (Assistant/Associate professor) at Paris Saclay University, France.**

My yearly teaching load is fixed at "192 workshop equivalent hours" (with the rule that 1h of workshop counts as 1h and 1h of lecture count as 1.5h). I supervised workshop at the undergraduate level (*Holomorphic functions*, *Differential Equations*, *Fourier Analysis*, *Topology*), and did lectures at the undergraduate level (*Fourier Analysis*, in large amphitheaters, with the responsability of workshops associated to the lectures) and Master level (*Functional Analysis*).

**2022-2023. MSI Fellow at the Australian National University, Australia.**

I taught *Functional Analysis* for 2 semesters and a research introduction Master level course *Regularity theory for elliptic operators*. The Functional Analysis course had 48h of lectures and 12h of workshops, and the Master course 35h of lectures.

**2018-2020. Assistant professor at Temple University, USA.**

I taught *Calculus II*, *Multivariable calculus*, *Differential Equations*, and *linear Algebra* - four undergraduate courses - in classrooms of about 30 students.

My teaching load was 3 courses (∼140h) per year, plus mandatory office hours.

**2015-2018. Assistant professor at the University of Minnesota, USA.**

I taught *Calculus I* in large amphitheaters (70 to 200 students), and was responsible for the workshops associated to my lectures. I also taught *Introduction to PDEs* and *Mathematical Modeling* - two undergraduate courses - in classrooms of about 30 students.

My teaching load was 3 courses (∼140h) per year, plus mandatory office hours.

**2012-20215. Instructor in the departement "Réseaux et Télécommunications" at Université Joseph Fourier (IUT), Grenoble, France.**

I taught mathematics (basis analysis and notions of Fourier series) to first year students. I had only one class, the courses were a mix of lectures and workshop, and the total amount of teaching hours was 64 hours per year.

## Conference and Seminar presentations

Since 2022

**10/2026.** Conference ANAIS (*Analysis and Interactions*, Université de Bordeaux, France.

**06/2026.** Conference on *Analysis of PDEs and Calculus of Variations with Applications*, University of Essex, Colchester, UK.

**03/2026.** Seminar at the Université Côte d'Azur, Nice, France.

**03/2026.** Seminar at the Universitat Autònoma di Barcelona, Catalonia.

**11/2025.** Seminar at the University of Edinburgh, UK.

**10/2025.** Workshop at Université Paris-Saclay, Orsay, France.

**06/2025.** Colloquium at West Lake University, Hangzhou, China.

**06/2025.** Seminar at the Morningside Center of Mathematics Chinese Academy of Sciences, Beijing, China.

**04/2025.** Conference on *Harmonic Analysis and Turbulence*, Université de Bordeaux, France.

**01/2025.** Presentation on behalf of the *Harmonic Analysis* team for the HCERES committee, Université Paris-Saclay, France.

**11/2024.** Applied Analysis Seminar, Université de Marseille, France.

**10/2024.** Analysis Seminar, University of St Andrews, UK.

**05/2024.** *49th Annual Spring Lecture Series*, University of Arkansas, USA.

**04/2023.** Analysis Seminar, University of Edinburgh, UK.

**12/2022.** Annual meeting of the AustMS (Australian Mathematical Society), Sydney, Australia.
**09/2022.** Analysis and Geometry Seminar, Australian National University, Canberra, Australia.
**05/2022.** CBMS conference *Analysis, Geometry, and PDEs in a Lower-Dimensional World*, Florida State University, Tallahassee, USA.
**03/2022.** Analysis and Probability Seminar, Université de Clermont-Ferrand, France.
**02/2022.** Analysis Seminar, Université de Lille, France.
**01/2022.** Workshop on *Geometric measure theory and Harmonic analysis*, Hausdorff Institute of Mathematics, Bonn, Germany.

## Award and funding

**2025-2026** : Délégation CNRS (half teaching for the year).

## Supervision

### Master Project

- Like Ma, at the Australian National University during the year 2022-2023. Like Ma worked on the use of BV estimates in optimal transport.
- Léô Mandô, at the Paris-Saclay University in Spring 2024. Léô Mandô worked on the Poisson-Dirichlet problem in domains with rough boundaries.

### Ph.D. Supervision

- Zanbing Dai was a graduate student at the University of Minneapolis under the supervision of Svitlana Mayboroda. I unofficially mentored him from Autumn 2019 to his graduation in June 2023. Zanbing Dai worked on the Dirichlet-regularity problem in domains with low dimensional boundaries.
- Léo Mandô, since Autumn 2024. Léo Mandô is working on boundary values problems in domains with rough boundaries, and is expected to defend his Ph.D. in 2027.

## Other research activities

- **Participation to the project:** ANR *Harmonic Analysis at its Boundaries* (French founded group project). The responsible of the project was Pascal Auscher between 2012 and 2017.
- **Participation to the project:** Simons Collaboration on localization of Waves (`https://cse.umn.edu/wave`). The head of the project is Svitlana Mayboroda, and I participated as a collaborator since 2020. .
- **Reviews for** (Non-Exhaustive list): Advances in mathematics, Analysis & PDE, Annales Scientifiques de l'ENS, Communications in PDE, Duke Mathematics Journal, Journal of Functional Analysis, Journal of Geometric Analysis, Mathematische Annalen, Nonlinear Analysis, Proceedings of the AMS, Transactions of the AMS, ... I also regularly write reviews for MathSciNet.