Jaume de Dios Pont

Curriculum Vitae

60 5th Avenue
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Employment

2025 – **NYU Center for Data Science**, *CDS Faculty Fellow*.

2023 – 2025 **ETH Zurich**, *Postdoctoral Researcher*, Mentor: Svitlana Mayboroda. Simons Collaboration on Localization of Waves.

May '23 – Sep '23 **Microsoft Research**, *Research Intern*, Physics of AGI group. Mentors: Jerry Li; Adil Salim.

2020 – 2022 **UCLA**, *Teaching Assistant*.

Education

2023 **PhD Mathematics**, *UCLA*.
Part I: Uniform Estimates for Operators Involving Polynomial Curves. Part II: Decoupling Estimates for Fractal and Product Sets. Supervised by T. Tao

2018 **MSc Mathematics**, *ETH Zurich*, (Grade: 5.76/6).
Thesis: Quantum Loewner Evolution (E. Powell and W. Werner)

2017 **BSc Mathematics**, *Universitat Autònoma de Barcelona*, (#1 Rank, Grade: 9.71/10).
Thesis: Oscillatory integrals and the Kakeya Conjecture (J. Garnett; J. Verdera)

2017 **BSc Physics**, *Universitat Autònoma de Barcelona*, (#1 Rank, Grade: 9.62/10).
Thesis: KCM-related experiments (F.X. Alvarez; A. Lopeandia)

Postgraduate Awards and Scholarships

2022-2023 **Dissertation Year Fellowship**, *UCLA*.
Tuition and stipend for final year

2018-2020 **La Caixa Postgraduate Fellowship**, *Fundació La Caixa*.
Full tuition and stipend. Highest score in the STEM committee.

2017-2018 **Excellence Scholarship**, *ETH Zurich*.
Tuition; living costs; mentorship

Papers and Preprints

[1] **Sharp bounds on the failure of the hot spots conjecture**, ***de Dios Pont, J.***, *Alexander W. Hsu & Mitchell A. Taylor*, Preprint (2025), arXiv:2508.16321.

[2] **Convex sets can have interior hot spots**, ***de Dios Pont, J.***, Preprint (2024), arXiv:2412.06344.

[3] **Predicting quantum channels over general product distributions**, *Sitan Chen,* ***de Dios Pont, J.***, *Jun-Ting Hsieh, Hsin-Yuan Huang, Jane Lange & Jerry Li*, Preprint (2024), arXiv:2409.03684.

[4] **Periodicity and decidability of translational tilings by rational polygonal sets**, ***de Dios Pont, J.***, *Jan Grebik, Rachel Greenfeld & Jose Madrid*, Expositiones Mathematicae, arXiv:2408.02151.

[5] **A new proof of the convex hull of space curves with totally positive torsion**, ***de Dios Pont, J.***, *Paata Ivanisvili & Jose Madrid*, Michigan Mathematical Journal, arXiv:2201.12932.

[6] **Query lower bounds for log-concave sampling**, *Sinho Chewi,* ***de Dios Pont, J.***, *Jerry Li, Chen Lu & Shyam Narayanan*, JACM Vol.71 Issue 4 / FOCS 2023, arXiv:2304.02599.

[7] **Uniform Fourier Restriction Estimate for Simple Curves of Bounded Frequency**, ***de Dios Pont, J.****& Helge Jorgen Samuelsen*, Preprint (2023), arXiv:2303.11693.

[8] **Additive energies on discrete cubes**, ***de Dios Pont, J.***, *Rachel Greenfeld, Paata Ivanisvili & Jose Madrid*, Discrete Analysis, arXiv:2112.09352.

[9] **Decoupling for fractal subsets of the parabola**, *Alan Chang,* ***de Dios Pont, J.***, *Rachel Greenfeld, Asgar Jamneshan, Zane Kun Li & Jose Madrid*, Mathematische Zeitschrift, arXiv:2012.11458.

[10] **Role Detection in Bicycle-Sharing Networks Using Multilayer Stochastic Block Models**, *Jane Carlen,* ***de Dios Pont, J.***, *Cassidy Mentus, Shyr-Shea Chang, Stephanie Wang & Mason A. Porter*, Network Science, arXiv:1908.09440.

[11] **On classical inequalities for autocorrelations and autoconvolutions**, ***de Dios Pont, J.****& Jose Madrid*, Preprint (2021), arXiv:2106.13873.

[12] **On Sparsity in Overparametrised Shallow ReLU Networks**, *Joan Bruna &* ***de Dios Pont, J.***, Preprint (2020), arXiv:2006.10225.

[13] **A geometric lemma for complex polynomial curves in Fourier restriction theory**, ***de Dios Pont, J.***, Preprint (2020), arXiv:2003.14140.

Talks

Research talks

Spectral theory and the hot spots conjecture

- 2026 Simons Collaboration on Localization of Waves Annual Meeting (Feb '26)
- NYU CDS MaD Seminar (Feb '26)
- Joint Mathematics Meetings 2026 (Washington, D.C.) (Jan '26)
- Instituto de Ciencias Matemáticas (ICMAT) Seminar (Sep '25)
- ISM Discovery School — Interactions between Convex Geometry and Spectral Analysis (Montreal) (Jul '25)
- UK Spectral Theory Network Workshop (University of Reading) (Aug '25)
- Workshop on Spectral Geometry, PDEs and Mathematical Physics (FernUni Hagen) (Jul '25)
- Fourier Analysis and Beyond I (IMPA, Rio de Janeiro) (Jul '25)
- ETHZ Analysis Seminar (hosted by Yuansi Chen) (May '25)
- LSEC Seminar (Apr '25)
- University of Edinburgh Analysis Seminar (Mar '25)
- Lehigh University Mathematics Seminar (Mar '25)
- Institut Camille Jordan Analysis Seminar (Lyon) (Mar '25)
- Spectral Geometry in the Clouds (Mar '25)
- MPS Workshop on Computation in Mathematics (Flatiron Institute) (Feb '25)
- Simons Collaboration on Localization of Waves Annual Meeting — Poster Session (Flatiron Institute) (Feb '25)
- Virginia Tech Analysis Seminar (Feb '25)
- Seminari d'Anàlisi UB-UAB (Jan '25)
- ETHZ Analysis Seminar (Oct '24)
- Hausdorff Center for Mathematics Colloquium (Bonn) (Oct '24)
- 2024 Simons Collaboration on Localization of Waves Meeting (Oct '24)

Lower bounds for sampling

- CRM — Mathematical Foundations of Machine Learning (Barcelona) (Jan '26)
- Hausdorff Research Institute for Mathematics — Boolean Analysis in Computer Science (HIM, Bonn) (Oct '24)
- BIRS-IMAG Workshop (Granada) (Jun '24)
- UCLA Analysis Seminar (May '24)
- Hausdorff Research Institute for Mathematics — Synergies between Probability, Geometric Analysis and Stochastic Geometry (HIM, Bonn) (Jan '24)
- University of Rochester Computer Science Seminar (May '23)
- NYU Courant Analysis Seminar (Mar '23)
- Microsoft Research Theory Seminar (Dec '22)
- NYU MaD Group Meeting (Dec '22)

Uniformity for polynomial curves

- Rutgers University Analysis Seminar (Oct '23)
- University of Rochester Combinatorics Seminar (May '23)
- University of Minnesota PDE Seminar (Sep '22)
- Bilbao Analysis and PDE Seminar (BCAM) (Mar '22)
- UAB Analysis Seminar (Universitat Autònoma de Barcelona) (Mar '22)
- UK Virtual Harmonic Analysis Seminar (Fourier 2.0) (Oct '21)

Decoupling for Cantor sets

- Harmonic Analysis and Fractal Sets Conference (HAFS, Columbus OH) (Mar '23)
- Fourier Restriction Online 2021 (Mar '21)

Uniform boundedness for certain operators parametrized by polynomial curves

- UW Madison Analysis Seminar (Nov '22)
- Harmonic Analysis on Manifolds Summer School (UW Madison) (Aug '22)
- ETHZ Analysis Seminar (Mar '22)
- Probability and Analysis Webinar (PAW) (Aug '21)
- UC Davis Student-Run Analysis and PDE Seminar (Feb '21)
- Seminari d'Anàlisi UB-UAB (Nov '20)
- Online Analysis Research Seminar (OARS) (Dec '20)

A Function Space Perspective for Regularised and Overparametrised Shallow ReLU Networks

- NYU, MaD Group Meeting (Oct '20)

Recent progress on the hot spots conjecture

- Brown University (May '26)
- SMS Spring Meeting: Formalization and Proof Assistants (Brig) (Mar '26)
- COST mSPACE Kick-off Meeting (Milan) (Mar '26)

Expository talks

- **Generació de variables aleatòries**, Valentia Matemàtica Summer School (Jun '25)
- **Power-type cancellation for the simplex Hilbert transform**, Kopp Summer School Reading Group (Bonn) (Sep '23)
- **Decoupling: From partial differential equations to number theory**, Microsoft Research Theory Seminar (Jul '23)
- **Localization of eigenfunctions via an effective potential**, Kopp Summer School Reading Group (Bonn) (Oct '22)
- **On Rank Vs. Communication Complexity**, AIM Workshop: Analysis on the Hypercube with Applications to Quantum Computing (Jun '22)
- **Euclidean Forward-Reverse Brascamp-Lieb Inequalities**, Brascamp-Lieb Summer School Reading Group (Kopp, Germany) (Sep '21)
- **A proof of the sensitivity conjecture**, UCLA Participating Analysis Seminar (Reading Group) (Nov '21)
- **Decoupling and applications: from PDEs to Number Theory**, SIMBa Seminar (UB / BGSMATH) (Oct '20)

Talks are grouped by topic, even when the covered material changed between instances.

Research Visits (> 1 week)

Jul '25 **New York**, *Flatiron Institute*.

Oct '24 **Hausdorff Institute of Mathematics, Bonn**, *Boolean Analysis in Computer Science*.

Jan '24 **Hausdorff Institute of Mathematics, Bonn**, *Dual Trimester Program: Synergies between modern probability, geometric analysis and stochastic geometry*.

Oct '23 – Nov '23 **Hausdorff Institute of Mathematics, Bonn**, *NTNU visit*.

May '23 – Sep '23 **Seattle, WA**, *Microsoft Research Internship*.

Oct '22 **Palo Alto, California**, *Stanford University*.

Sep '22 **UMN, Minneapolis**, *University of Minneapolis*.

Jun '22 – Jul '22 **ICMS, Edinburgh**, *Fourier Analysis @200*.

Jan '22 – Mar '22 **Hausdorff Institute of Mathematics, Bonn**, *Interactions between Geometric measure theory, Singular integrals, and PDE*.

Aug '21 **Hausdorff Mathematical Institute, Bonn**, *Harmonic Analysis and Analytic Number Theory, Dual trimester program*.

May '21 – Jun '21 **Hausdorff Mathematical Institute, Bonn**, *Harmonic Analysis and Analytic Number Theory, Dual trimester program*.

Feb '26 – Mar '26 **Cambridge, UK**, *Isaac Newton Institute - Geometric Spectral theory and Applications*.

Teaching Experience

ETH Zurich (Main Instructor)

- **Formalizing Mathematics in Lean** Spring 2025

ETH Zurich (Teaching Assistant)

- **Differential Geometry** Spring 2024

UCLA (Teaching Assistant)

- **Math 131A (Real Analysis)** Fall 2020; Spring 2022
- **Math 134 (ODE I)** Fall 2021
- **Math 135 (ODE II / PDE)** Fall 2021
- **Math 33B (Linear Algebra II)** Spring 2021
- **Math 32A (Calculus I)** Fall 2020; Winter 2021
- **Math 32B (Calculus II)** Winter 2021

Reviewing

Reviewer for: Transactions of the AMS, Proceedings of the AMS, Mathematical Statistics and Learning, Discrete Mathematics, Journal of the London Mathematical Society, AMS Contemporary Mathematics.

Misc. Coding Skills

- Proficient in Python (incl. Jax, NumPy/SciPy/Matplotlib)
- Git/Version Control
- LaTeX

Undergraduate Research Experience

2017 **GNAM**, *Grup de Nanomaterials, UAB*.
Research on heat conduction beyond the Fourier equations at the nanoscale, with a focus on the KCM diffusion model.

2016 **ICFO**, *Summer Fellowship of the Institute of Photonic Sciences*.
Research fellow in the group of Antonio Acín (Quantum Information). Proved impossibility results on the creation of superpositions of unknown quantum states. Supervisor: Dr. Michał Oszmaniec.

2015 **The Dark Energy Survey Project**, *IFAE – Institute for High Energy Physics*.
Study of theoretical models regarding the harmonic spectrum of galaxy density distributions. Supervisor: Dr. Ramon Miquel.