

# Jaume de Dios Pont

## Curriculum Vitae

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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–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

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

#### Lower bounds for sampling

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

#### Uniformity for polynomial curves

- o Rutgers University Analysis Seminar (Oct '23)
- o University of Rochester Combinatorics Seminar (May '23)
- o University of Minnesota PDE Seminar (Sep '22)
- o Bilbao Analysis and PDE Seminar (BCAM) (Mar '22)
- o UAB Analysis Seminar (Universitat Autònoma de Barcelona) (Mar '22)
- o 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)

## 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 – **Hausdorff Institute of Mathematics, Bonn, NTNU visit.**  
Nov '23
- May '23 – **Seattle, WA, Microsoft Research Internship.**  
Sep '23
- Oct '22 **Palo Alto, California, Stanford University.**
- Sep '22 **UMN, Minneapolis, University of Minneapolis.**
- Jun '22 – **ICMS, Edinburgh, Fourier Analysis @200.**  
Jul '22
- Jan '22 – **Hausdorff Institute of Mathematics, Bonn, Interactions between Geometric measure theory, Singular integrals, and PDE.**  
Mar '22
- Aug '21 **Hausdorff Mathematical Institute, Bonn, Harmonic Analysis and Analytic Number Theory, Dual trimester program.**
- May '21 – **Hausdorff Mathematical Institute, Bonn, Harmonic Analysis and Analytic Number Theory, Dual trimester program.**  
Jun '21
- Feb '26 – **Cambridge, UK, Isaac Newton Institute - Geometric Spectral theory and Applications.**  
Mar '26

## Teaching Experience

### ETH Zurich (Main Instructor)

- Formalizing Mathematics in Lean Spring 2025

### ETH Zurich (Teaching Assistant)

- Differential Geometry Spring 2024

### UCLA (Teaching Assistant)

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| ○ Math 131A (Real Analysis) Fall 2020; Spring 2022 | ○ Math 33B (Linear Algebra II) Spring 2021     |
| ○ Math 134 (ODE I) Fall 2021                       | ○ Math 32A (Calculus I) Fall 2020; Winter 2021 |
| ○ Math 135 (ODE II / PDE) Fall 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
- $\text{\LaTeX}$

## 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.