

# Cole Jeznach

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## Research interests

boundary value problems, geometric measure theory, quantitative unique continuation

## Appointments held

- 2025–present *NSF Mathematical Sciences Postdoctoral Research Fellow*, Departament de Matemàtiques, Universitat Autònoma de Barcelona  
2024–2025 *Postdoctoral researcher*, Departament de Matemàtiques, Universitat Autònoma de Barcelona

## Education

- 2024 PhD in Mathematics, ETH Zürich  
– Advisors: Max Engelstein and Svitlana Mayboroda  
– Topic: Quantitative rectifiability and harmonic measure for sets of high co-dimension  
2021 MS in Mathematics, University of Minnesota, Twin Cities  
2018 BS in Mathematics, Worcester Polytechnic Institute

## Grants, honors & awards

- 2025 *Mathematical Sciences Postdoctoral Research Fellowship*, NSF: Boundary Behavior of Elliptic-Harmonic Functions in Rough Domains  
2024 *Silver medal*, ETH Zürich  
2018 *Salisbury Prize*, Worcester Polytechnic Institute

## Publications & talks

### JOURNAL ARTICLES

- 2026 **Singular set estimates for solutions to elliptic equations in higher codimension**, with M. Engelstein and Y. Sire.  
*Proc. Lond. Math. Soc.*, 132(6).  
**On the number of nodal domains of homogeneous caloric polynomials**, with M. Badger.  
*Ann. H. Lebesgue*, 9.  
2024 **Non-local distance functions and geometric regularity**, with M. Engelstein and S. Mayboroda.  
*Adv. Math.*, 445.  
**Small constant uniform rectifiability**.  
*J. Geom. Anal.* 34(5).  
2023 **Cantor sets with absolutely continuous harmonic measure**, with G. David and Antoine Julia.  
*J. Éc. polytech. Math.*, 10.

## PREPRINTS

- 2025 **Unique continuation below the Lipschitz threshold.**  
<https://arxiv.org/pdf/2507.23614>
- 2026 **Optimal rates of decay at infinity for solutions to Schrödinger equations.** With B. Davey.  
<https://arxiv.org/pdf/2607.07639>

## TALKS

- 2026 **Unique continuation for elliptic operators with variable coefficients**, Université de Bordeaux Analysis seminar, Bordeaux France
- 2024 **Singular set estimates for degenerate elliptic equations**, UAB Analysis seminar, Bellaterra Spain  
**Low-dimensional Cantor sets with absolutely continuous harmonic measure**, Geometry of measures and free boundaries (in honor of Tatiana Toro), Seattle WA  
**Singular set estimates for degenerate elliptic equations**, Geometric Measure Theory and Applications, Cortona Italy
- 2023 **Low-dimensional Cantor sets with absolutely continuous harmonic measure**, MAA Mathfest, invited paper session in GMT, Harmonic Analysis, and PDE, Tampa FL  
**Low-dimensional Cantor sets with absolutely continuous harmonic measure**, Harmonic Analysis, PDEs, and GMT in Bilbao, Bilbao Spain  
**Low-dimensional Cantor sets with absolutely continuous harmonic measure**, University of Washington Rainwater seminar, Seattle WA  
**Small  $A_\infty$  results for elliptic measure outside low-dimensional sets**, AMS Spring Sectional, special session in Geometric methods for PDE, Cincinnati OH  
**Non-local distances and geometric regularity of measures**, JMM AMS special session in recent developments in Geometric Measure Theory, Boston MA
- 2022 **Small  $A_\infty$  results for elliptic measure outside low-dimensional sets**, PRIMA special session in harmonic functions and Laplace eigenfunctions, Vancouver Canada  
**Non-local distances and geometric regularity of measures**, UConn PDE Seminar, Storrs CT  
**Large-scale regularity theory for elliptic systems in stochastic homogenization**, 2022 Oberwolfach Arbeitsgemeinschaft in quantitative stochastic homogenization, Oberwolfach Germany  
**Non-local distances and geometric regularity of measures**, UAB Analysis seminar, Bellaterra Spain  
**Fundamental solutions of generalized Schrödinger operators**, HCM Bonn summer school in nodal domains (expository), Kopp Germany
- 2021 **Non-local distances and geometric regularity**, UMN PDE seminar, Minneapolis MN  
**Regularized distance kernels**, UMN Harmonic Analysis, GMT, PDE online seminar  
**Regularized distance kernels**, Kansas State University 17th Prairie Analysis Seminar

## Teaching Experience

- 2025-2026 **Teaching Assistant**, UAB/UB  
– Graduate harmonic analysis (Spring 2025, Spring 2026)
- 2023-2024 **Teaching Assistant**, ETH Zürich  
– Graduate elliptic PDEs (Fall 2023)  
– Seminar in harmonic measure (Spring 2024)
- 2020-2021 **Instructor**, University of Minnesota  
– Calculus I (Spring 2020)  
– Precalculus I (Fall 2022)  
– Calculus II (Spring 2021)
- 2021-2022 **Graduate TA Instructor**, University of Minnesota (Summer 2021, 2022)
- 2019–2021 **Teaching Assistant**, University of Minnesota  
– Calculus I (Spring 2019- Fall 2020)

- Introduction to real analysis (Fall 2019, Fall 2021)
- 2016-2018 **Peer learning assistant**, WPI
- Calculus I, Linear Algebra, Principles of Real Analysis

## Service

- 2026 **Co-organizer** of Intensive Research Program in free boundary problems, CRM/UAB October-December 2026
- 2026 **Co-organizer** of JMM AMS Special session on Harmonic Analysis and Elliptic PDE, January 2026, Washington DC
- 2022 **Student seminar organizer**
  - HIM program in interactions between GMT, singular integrals, and PDE (Spring Semester)
- 2019-2023 **Officer of UMN SIAM Chapter**, UMN
  - president during the 2022/23 academic year
- 2019-2021 **Directed reading program mentor**, UMN
  - mentored four undergraduate students in independent reading topics in functional analysis and fourier analysis