

Aidan Backus

Curriculum vitae

Brown University, Department of Mathematics
Providence, RI

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Education

- 2020–2025 **Ph. D. Mathematics**, *Brown University*
- Advisor: Georgios Daskalopoulos
 - Dissertation: Calibration of laminations as the limit of convex duality for the p -Laplacian
- 2016–2020 **B. A. Mathematics**, *University of California, Berkeley*, with High Honors
- Advisor: Maciej Zworski
 - Honors' thesis: The Breit-Wigner series and distribution of resonances

Research interests

Geometric measure theory, with applications to degenerate PDE, geometric topology, and descriptive set theory

Harmonic analysis on fractals

BV and L^∞ variational calculus

Research papers

- 2024 **An ∞ -Laplacian for differential forms, and calibrated laminations**, *Backus, A.*, arXiv:2404.02215, submitted
- 2024 **Lipschitz maps with prescribed local Lipschitz constants**, *Backus, A. and Ze-An, N.*, arXiv:2403.07702, submitted
- 2023 **Minimal laminations and level sets of 1-harmonic functions**, *Backus, A.*, arXiv:2311.01541, submitted
- 2023 **The fractal uncertainty principle via Dolgopyat's method in higher dimensions**, *Backus, A., Leng, J., and Tao, Z.*, arXiv:2302.11708, submitted

Expository papers and undergraduate research

- 2023 **Regularity of sets of least perimeter in Riemannian manifolds**, *Backus, A.*, arXiv:2306.09603
- 2020 **The Breit-Wigner series for noncompactly supported potentials on the line**, *Backus, A.*, arXiv:2005.13765
- 2019 **An algorithm for computing root multiplicities in Kac-Moody algebras**, *Backus, A., Connick, P., and Lin, J.*, arXiv:1912.04540

Conference presentations

- 2024 **The fractal uncertainty principle via Dolgopyat's method in higher dimensions**, *Special Session on Harmonic Analysis, Geometry, Measure Theory, and Fractals*, Joint Mathematics Meetings
- 2023 **The p -Laplacian and the max flow min cut principle in Teichmüller theory**, *Topics in Differential Geometry*, Brown University

Seminar presentations

- 2024 **Optimal Lipschitz extension problem**, *Graduate Lecture Series for Analysis and PDE*, Brown University
- 2023 **Limiting behavior of the p -Laplacian, max flow min cut, and laminations**, *PDE and Differential Geometry Seminar*, University of Connecticut

Teaching experience

- Spring 2024 **Calculus 2**, *Lecturer*, Brown University
- Spring 2022 **Calculus 2**, *Teaching assistant*, Brown University
- Fall 2021 **Calculus 1**, *Teaching assistant*, Brown University
- Fall 2019 **Complex analysis**, *Teaching assistant*, UC Berkeley

Service to profession

- 2022–present **AMS Graduate Student Chapter**, *Secretary-Treasurer*, Brown University
I am a co-organizer of the New England Graduate Student Conference in Mathematics held at Brown University every year.
- 2017–2020 **Mathematics Undergraduate Student Association**, *Curator*, UC Berkeley