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
 - O 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
 - O Advisor: Maciej Zworski
 - O 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 The canonical lamination calibrated by a cohomology class, *Backus, A.*, in preparation
- 2024 An ∞ -Laplacian for differential forms, and calibrated laminations, *Backus, A.*, arXiv:2404.02215, submitted
- The Lipschitz extension problem with prescribed local Lipschitz constants and eikonal mappings, *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, to appear in *Journal of Geometric Analysis*
- The fractal uncertainty principle via Dolgopyat's method in higher dimensions, Backus, A., Leng, J., and Tao, Z., arXiv:2302.11708, to appear in Analysis and Partial Differential Equations

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

- 2024–2025 Geometric Analysis Seminar, Organizer, Brown University
- 2022–2025 **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