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

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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

2024 **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*
Journal of Geometric Analysis

2023 **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