Aidan Backus

Curriculum vitae

Danielson, CT, USA
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Employment

2025–2028 **Postdoctoral Fellow**, *University of Toronto*, Department of Mathematics

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

2016 **General education**, *San Joaquin Delta College*

Research interests

Geometric measure theory, and its connections to degenerate PDE, geometric topology, and logic

Harmonic analysis on fractals

BV and L^∞ variational calculus

Accepted publications

2025 **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*

2024 **Minimal laminations and level sets of 1-harmonic functions**, *Backus, A.*, arXiv:2311.01541, *Journal of Geometric Analysis*, vol 34, no 309

Research preprints

2025 **Reconstructing currents from their projections**, *Backus, A.*, arXiv:2503.07573, submitted

2025 **The max flow/min cut theorem for currents and laminations**, *Backus, A.*, arXiv:2501.00974, submitted

2025 **The canonical lamination calibrated by a cohomology class**, *Backus, A.*, arXiv:2412.00255, submitted

2024 **The Lipschitz extension problem with prescribed local Lipschitz constants and eikonal mappings**, *Backus, A. and Ng, Z.*, arXiv:2403.07702, submitted

Expository preprints 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

2025 **The canonical lamination calibrated by a cohomology class**, *Topics in Differential Geometry*, Brown University

2025 **The fractal uncertainty principle**, *Online Early Career Morning Session*, Washington University, St. Louis

2024 **The fractal uncertainty principle via Dolgopyat's method in higher dimensions**, *Special Session on Harmonic Analysis, Geometric Measure Theory, and Fractals*, Joint Mathematics Meetings, San Francisco

2023 **The p-Laplacian and the max flow min cut principle in Teichmüller theory**, *Topics in Differential Geometry*, Brown University

Seminar presentations

2025 **The canonical lamination calibrated by a cohomology class**, *Virtual Seminar on Geometry and Topology*, KAIST and KIAS

2025 **Functions of least gradient and area-minimizing laminations**, *Analysis seminar*, University of Toronto

2025 **Functions of least gradient and area-minimizing laminations**, *Geometric analysis seminar*, University of Chicago

2024 **The fractal uncertainty principle via Dolgopyat's method in higher dimensions**, *Harmonic Analysis People's Presentations on YouTube*

2024 **The fractal uncertainty principle**, *SIGMA Seminar*, University of Connecticut

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

Spring 2024 **Calculus II**, *Lecturer*, Brown University

Summer 2023 **Set theory**, *Teaching assistant*, Brown University Pre-College Program

Spring 2022 **Calculus II**, *Teaching assistant*, Brown University

Fall 2021 **Calculus I**, *Teaching assistant*, Brown University

Fall 2019 **Complex analysis**, *Teaching assistant*, UC Berkeley

Mentorship

Spring 2025 **Banach spaces**, *Directed reading course*, Brown university

Fall 2024 **Gödel's incompleteness theorems**, *Directed reading course*, Brown University

Fall 2021 **Models of traffic flow**, *Directed reading course*, Brown University

Service to profession

2025–2026 **Applied Mathematics Seminar**, *Organizer*, Fields Institute

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

2022–2024 **AMS Graduate Student Chapter**, *Secretary-Treasurer*, Brown University
I was 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

Grants and funding

2022 **NSF Graduate Student Research Fellowship**, $137,000

Relevant skills

Programming, Languages: Python, Lua, MATLAB, C, Rust