

Jacob Denson

Research Interests

Harmonic Analysis,
Geometric Measure
Theory, and Nonlinear
Wave Equations

Contact Information

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Math Stack Overflow:

[jacob-denson](https://math.stackexchange.com/users/104444/jacob-denson)

Website:

<https://j djake.github.io/>

Education

2020-2025

PhD in Mathematics
at the University of
Wisconsin, Madison

Advisor:

Andreas Seeger

2017-2019

MSc in Mathematics
at the University of
British Columbia

Advisors:

Malabika Pramanik

Joshua Zahl

2013-2017

BSc in Computing
Science at the
University of Alberta.

Teaching Assistantships

2024

Multivariate Calculus

Linear Algebra

2023

Preparatory Algebra

Lecturer

Introduction to Discrete

Mathematics

2022

Elementary Matrix and

Linear Algebra

Introduction to Partial

Differential Equations

Introduction to Discrete

Mathematics

Publications

Multipliers of Spherical Harmonic Expansions

Jacob Denson

<https://arxiv.org/abs/2410.23505>

(Submitted For Publication)

Large Salem Sets Avoiding Nonlinear Configurations

Jacob Denson

<https://arxiv.org/abs/2110.09592>

(Submitted For Publication)

Cartesian Products Avoiding Patterns (Msc Thesis)

Jacob Denson

<https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0387448>

MSc Thesis, University of British Columbia (2019)

Large Sets Avoiding Rough Patterns

Jacob Denson, Malabika Pramanik, Joshua Zahl

https://doi.org/10.1007/978-3-030-61887-2_4

Harmonic Analysis and Applications (2021) pp. 59–75. *Springer International Publishing*

Proofs in Three Bits or Less (Expository Article)

Jacob Denson

<https://issuu.com/cms-studc/docs/margin-spring2018>

CMS Notes from the Margin (2018) pp. 1–3

Graduate Awards

2024 **The Excellence in Research Graduate Student Award**

Awarded to three mathematics graduate students each year for significant and substantial contributions to research mathematics, as part of their thesis work towards a Ph.D.

2023 **Henry Schaerf Mathematics Graduate Award**

Awarded to three mathematics graduate students each year who have demonstrated promise in their academic work.

2019 **February Fourier Talks Poster Presentation Award (2nd Place)**

Awarded to the top three posters presented at the February Fourier Talks poster session. The poster, entitled “Fractals Avoiding Fractal Configurations”, can be found at <https://j djake.github.io/notes>.

2018 **NSERC CGSM Master's Scholarship**

Awarded to 3000 students in Master's programs across all disciplines in the sciences and engineering across Canada, providing financial support to high-calibre scholars.

Teaching Assistantships (Continued)

2021

Algebra & Trigonometry
Calculus

2020

Calculus with Algebra &
Trigonometry

2019

Multivariate Calculus
Graph Theory

2018

Introduction to Discrete
Mathematics
Introduction to
Probability

2017

Calculus for Forestry
Students

Calculus for Business
Students

2015

Tangible Introduction to
Computer Science
Undergraduate TA

Service

2024

UW Madison Fall 2024
Directed Reading
Program Mentor

UW Madison Spring
2024 Directed Reading
Program Mentor

Mega Math Meet
Problem Committee
Member

Conference Presentations

2024-Now

Characterizations of Boundedness For Multipliers of Spherical Harmonics

Presented at:

- *The 2024 Ohio River Analysis Meeting.*
- *Poster at the 2024 Madison Lectures in Harmonics Analysis*
- *The AMS 2024 Spring Central Sectional Meeting*
- *The AMS 2024 Fall Western Sectional Meeting*
- *The CMS 2024 Winter Meeting*

2020-2021

Salem Sets Avoiding Patterns

Presented at:

- *The 2020 Ohio River Analysis Meeting.*
- *The University of Wisconsin Analysis Student Seminar.*
- *The 17th Prairie Analysis Seminar.*

2018-2019

Fractals Avoiding Fractal Sets

Presented at:

- *The 2018 Mid-Atlantic Analysis Meeting.*
- *The 2018 CMS Winter Meeting.*
- *The 2019 Geometric and Harmonic Analysis (GAHA) Conference.*
- *Poster at the 2019 February Fourier Talks. Awarded Prize for 2nd Best Poster out of 19 participants.*
- *Poster at the 2019 Madison Lectures in Fourier Analysis.*

Select Expository Talks

Talk Notes can be found at my website: <https://jake.github.io/notes>:

2024

On Trilinear Oscillatory Integral Inequalities and Related Topics (After Christ)

UW Madison 2022 Spring School: Multilinear Singular and Oscillatory Integrals with Applications

2023

Detangling Entangled Paraproducts (After Durcik)

Bonn 2023 Summer School: Analysis of Multiple Ergodic Averages

2023

The Lax Hörmander Parametrix for the Half-Wave Equation

UW Madison Graduate Analysis Seminar

2022

Anticoncentration and Polynomial Decompositions (After Kane)

UC Irvine 2022 Summer School: Learning Theory and Fourier Analysis

2022

Nodal Domains on Riemannian Manifolds via Diffusion Processes (After Steinerberger)

Bonn 2022 Summer School: Nodal Domains and Landscape Functions

2022

Logarithmic Improvements to L^p Bounds for Laplace-Beltrami Eigenfunctions on Hyperbolic Manifolds (After Sogge and Blair)

UW Madison 2022 Summer School: Harmonic Analysis on Manifolds

2021

Algorithmic Aspects of Brascamp Lieb Inequalities (After Garg, Gurvits, Oliveira, and Wigderson)

Bonn 2021 Summer School: Brascamp Lieb Inequalities

2019

Incidence Theorems over Field of Arbitrary Characteristic (after Kollár)

Math 616A Class: The Polynomial Method

2018

Hodge Theory: Harmonic Analysis in Topology

Math 529 Class: Differential Topology

2017

Proofs in Three Bits or Less

UBC Graduate Seminar

Publication List

Jacob Denson

Research Publications

- [1] Jacob Denson, Malabika Pramanik, and Joshua Zahl. “Large Sets Avoiding Rough Patterns”. In: *Harmonic Analysis and Applications* (2021), pp. 59–75. URL: https://doi.org/10.1007/978-3-030-61887-2_4.

Preprints Submitted For Publication

- [2] Jacob Denson. “Multipliers of Spherical Harmonic Expansions”. URL: <https://arxiv.org/abs/2410.23505>.
- [3] Jacob Denson. “Large Salem Sets Avoiding Nonlinear Configurations”. URL: <https://arxiv.org/abs/2110.09592>.

Thesis

- [4] Jacob Denson. “Cartesian Products Avoiding Patterns”. In: *MSc Thesis, University of British Columbia* (2019). URL: <https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/24/items/1.0387448>.

Expository Publications

- [5] Jacob Denson. “Proofs in Three Bits or Less (Expository Article)”. In: *CMS Notes from the Margin* (2018), pp. 1–3. URL: <https://issuu.com/cms-studc/docs/margin-spring2018>.