

# 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](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