

Daniel Flores

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Research Interests

My main areas of research are analytic number theory, harmonic analysis, applications of the Hardy-Littlewood circle method, and arithmetic statistics. Additionally, I am interested in learning more about sieve theory, additive combinatorics, and exponential sum bounds.

Education

- **PhD in Mathematics**, Purdue University Fall 2019 - Present
Expected completion date: Spring 2025
Advisor: Trevor Wooley
 - **BS in Mathematics**, University of Houston Fall 2016 - Spring 2019
Advisor: Alan Haynes
 - **AS**, Lone Star College-North Harris Fall 2013 - Spring 2016
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Publications

Journal Articles

- (1) *A quantitative Hasse principle for weighted quartic forms*, *Mathematika*. 70 (2024), no. 1, Paper No. e12236, 24pp. <https://doi.org/10.1112/mtk.12236>
- (2) *Existence of K -multimagic squares and magic squares of k th powers with distinct entries*, *Bulletin of the Australian Mathematical Society*, pp. 1–8, 2025. doi:10.1017/S0004972724001345

Preprints

- (3) *A circle method approach to K -multimagic squares*, 2024. <https://arxiv.org/abs/2406.08161> (Submitted)
 - (4) *Bounds for the binary quartic Weyl sum*, 2024+. (In Progress)
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Awards & Fellowships

- **Purdue University:**
 - Ross-Lynn Research Scholar Dissertation Grant Fall 2024 - Spring 2025
 - Ross Fellowship Fall 2019 - Spring 2023
- **University of Houston:**
 - Charles P. Benner Scholarship Spring 2019

- Provost’s Undergraduate Research Scholarship Fall 2018 - Spring 2019
- Charles P. Benner Scholarship Fall 2017

Teaching & Tutoring Experience

- **Purdue University:**

- MA 34100 - Foundations of Analysis Grader dual assignment Fall 2023
- MA 55300 - Introduction To Abstract Algebra Grader assignment Fall 2022
- MA 55700 - Abstract Algebra I Grader assignment Fall 2022
- MA 26100 - Multivariate Calculus TA assignment Fall 2021
- MA 26100 - Multivariate Calculus TA assignment Fall 2020
- MA 16600 - Analytic Geometry And Calculus II TA assignment Fall 2019

- **University of Houston:**

- MATH 4366 - Numerical Linear Algebra Spring 2019
- MATH 3331 - Ordinary Differential Equations Fall 2018

- **Lone Star College:**

Mathematics Tutor Fall 2013 - Spring 2019
 Courses tutored:

- College Algebra.
- Precalculus.
- Calculus I, II, III.
- Ordinary Differential Equations.
- Linear Algebra.

Invited Talks

1. *Existence of K -multimagic squares and magic squares of k th powers with distinct entries*, Number Theory Seminar, University of Göttingen, Fall 2024.
2. *A circle method approach to K -multimagic squares*, Number Theory Seminar, Stanford University, Fall 2024.
3. *A circle method approach to K -multimagic squares*, Number Theory Seminar, University of California in Davis, Fall 2024.
4. *A quantitative Hasse principle for weighted quartic forms*, AMS Central Sectional meeting, University of Wisconsin-Milwaukee, Spring 2024.
5. *A Gentle Introduction to the Circle Method*, Purdue Graduate Student Analysis Seminar, Purdue University, Fall 2023.
6. *Classification of noisy images with a coupled inversion-classification neural network*. LA-TX Undergraduate Mathematics Conference, LSU, Fall 2018.

Submitted Talks

1. *A circle method approach to K -multimagic squares.* Canadian Number Theory Association XVI, University of Toronto, Summer 2024.
2. *A circle method approach to K -multimagic squares.* Combinatorial and Additive Number Theory 2024, CUNY, Spring 2024.
3. *A quantitative Hasse principle for weighted quartic forms.* Southern Regional Number Theory Conference, LSU, Spring 2024.
4. *A quantitative Hasse principle for weighted quartic forms.* Pittsburgh Links among Analysis and Number Theory, University of Pittsburgh and Carnegie Mellon University, Spring 2024.

Attended Conferences

1. **Number Theory in the Americas 2**, workshop on number theory, Casa Matemática Oaxaca, 2024.
2. **CNTA XVI**, Canadian Number Theory Association XVI, University of Toronto, 2024.
3. **AMS central sectional meeting**, University of Wisconsin-Milwaukee, 2024.
4. **CANT 2024**, Combinatorial and Additive Number Theory, CUNY, 2024.
5. **Southern Regional Number Theory Conference**, Conference on number theory, LSU, 2024.
6. **PLANTS**, Pittsburgh Links among Analysis and Number Theory, University of Pittsburgh and Carnegie Mellon University, 2024.
7. **MAGNTS**, Midwest Arithmetic Geometry and Number Theory Series, University of Michigan, 2023.
8. **RHB70**, Conference on analytic number theory and its interfaces to honour the 70th birthday of Roger Heath-Brown, University of Oxford, 2023.
9. **Journées Arithmétiques**, Conference on number theory, University of Lorraine, 2022.
10. **MAGNTS**, Midwest Arithmetic Geometry and Number Theory Series, University of Illinois Chicago, 2022.
11. **ELAZ 2022**, Conference on elementary and analytic number theory, Adam Mickiewicz University, 2022.
12. **UH Summer School on Dynamical Systems**, a workshop designed to introduce graduate students to the basics of dynamical systems and ergodic theory, 2018.

Seminars Attended

1. **Purdue Analytic Number theory and Harmonic Analysis**, weekly talks about recent research topics in analytic number theory and harmonic analysis, 2019-present.
2. **University of Houston Undergraduate Mathematics Colloquium**, weekly talks about topics in research mathematics aimed towards an undergraduate audience, 2016-2019.
3. **University of Houston Analysis Seminar**, weekly talks about recent research topics in analysis, 2016-2019.
4. **Deep learning using Tensorflow**, weekly talks covering the basics of deep learning to convolutional neural networks, and an introduction to the deep learning package Tensorflow, 2017.

Undergraduate Research Experience

- Provost Undergraduate Researcher, University of Houston. Spring 2019
 - Title: **Applying reinforcement learning to graph Ramsey games.**
 - Supervised by Alan Haynes.
- Undergraduate Researcher (REU), Emory University. Summer 2018
 - Title: **Combined reconstruction and classification with deep neural networks.**
 - Supervised by Lars Ruthotto. Funded by NSF, DMS-1751636

Outreach & Mentorship

- **Purdue University:**
 - AWM Math Mentor Program Fall 2024
Graduate Mentor to graduate mathematics students.
 - Mathematics Graduate Representative Fall 2022
Host various social gatherings throughout the year, and serve as a representative of the mathematics graduate students to voice suggestions and complaints directly to the Mathematics Department administration.
 - Mathematics Mentoring Program Fall 2022
Graduate Mentor to undergraduate mathematics students.
 - Summer Research Opportunities Program Summer 2022
Graduate Mentor to incoming graduate students.
- **University of Houston:**
 - Pi Mu Epsilon Meeting Organizer Spring 2017 - Spring 2019
- **Lone Star College-North Harris:**
 - Math Club Pi Day Organizer Spring 2014 - Spring 2016

Languages

Spoken: English (native), Spanish (native). **Code:** C#, C++, Matlab, Python 3, L^AT_EX.