

LEILANI PAI

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RESEARCH INTERESTS

My current research focuses on **random graphs** and hypergraphs. I am also broadly interested in the applications of **discrete mathematics**, as well as **mathematics education**.

EDUCATION

PhD in Mathematics

anticipated May 2023

University of Nebraska—Lincoln; Lincoln, NE
Advisor: Xavier Pérez Giménez

MS in Mathematics

May 2019

University of Nebraska—Lincoln; Lincoln, NE

BA in Mathematics

May 2017

University of Southern California; Los Angeles, CA
Minor in Computer Science

PUBLICATIONS

In discrete mathematics:

- Calum MacRury, Tomáš Masařík, **Leilani Pai**, and Xavier Pérez Giménez. The phase transition for discrepancy in random hypergraphs. *Under review*. 2021 (21 pages). arXiv:2102.07342

In STEM education:

- Kelsey Quaisley, Rachel Funk, **Leilani Pai**, Sally Ahrens, Wendy M. Smith, and Amanda Thomas. Impacting primary grades STEM teacher leadership identities. *Under review*.

RESEARCH EMPLOYMENT

- **Research Assistant** at the Center for Math, Computer, and Science Education at UNL
Summarized and coded interview data from STEM teacher leaders; worked in a team to analyze qualitative data and conduct literature searches related to teacher leadership; conducted interviews with computer science teachers working with elementary and middle school students and summarized the resulting data.
Summer 2021,
Winter 2022,
Summer 2022

TEACHING EXPERIENCE

As **Associate Convener** at UNL:

- MATH 102 – College Trigonometry Fall 2020 – Spring 2021
Coordinated between four and six sections of a trigonometry course, including managing instructor meetings and writing common exams in WeBWork.

As **Instructor of Record** at UNL:

All courses are based on student-centered, active learning pedagogies.

- MATH 203 – Contemporary Mathematics Spring 2019, Fall 2022
Math 203 is a general-education math course covering basic statistic, math modeling, voting theory, and applications of graph theory. In Fall 2022, this class was taught in a small section of students who were all members of the William H. Thompson Scholars Learning Community or TRIO scholars. Both groups are learning communities of students with documented financial need, first-generation students, and disabled students.
- MATH 203J – Contemporary Mathematics for Journalism Spring 2020, Fall 2022
Math 203J is catered specifically to students with an interest in journalism. The last six weeks of the Spring 2020 course were administered online.
- MATH 107 – Calculus II Spring 2022
This class was taught in a small section of students to encourage collaboration and active learning. Enrolled students were all members of the William H. Thompson Scholars Learning Community.
- MATH 302 – Math Modeling Fall 2021
Math 302 is a course for future elementary and middle school teachers.
- MATH 102 – College Trigonometry Fall 2020 – Spring 2021
In Fall 2020, this course was delivered in a “split-synchronous” hybrid format.
- MATH 103 – College Algebra and Trigonometry Fall 2019
- MATH 101 – College Algebra Fall 2018

As a **Teaching Assistant** at UNL:

- MATH 107(r) – Calculus II Recitation Fall 2017 – Summer 2018
Taught two (one in summer) sections of Calculus recitation, accompanying a lecture by a faculty member; graded exams and quizzes; and proctored evening exams.

Curriculum Development experience:

- MATH 203 – Contemporary Math Summer 2020
Created interactive videos for instructor use in online, flipped, and hybrid courses.

Other experience:

- **Second-year-and-beyond GTA Orientation Co-organizer** Fall 2022
Worked with a faculty member to organize presenters and session topics for the math department's new-semester orientation for graduate students teaching precalculus courses as instructors of record.
- **Trigonometry Content Specialist** Fall 2020
Organized and led meetings to discuss math- and trigonometry-specific content with undergraduate Learning Assistants
- **MRC Counselor** at UNL Fall semesters 2017-2022
Provided guidance and homework help to undergraduates in first-year mathematics courses at UNL who visited the Math Resource Center.
- **Course Producer** for CSCI 170 at USC Fall 2016 – Spring 2017
Held office hours, monitored an online discussion board, and assisted with exams for an introductory course in discrete mathematics for computer science students.

TALKS AND PRESENTATIONS

Conference and Invited Talks

AMS Special Session on Research from the Graduate Research Workshop in Combinatorics (GRWC)

- *Improper interval colorings of graph products*, 20 minutes January 2023
- Graduate Student Combinatorics Conference
- *Perfect matchings in random k -uniform hypergraphs*, 20 minutes March 2022
- Wayne State College Math Club
- *Games, graphs, and managing our expectations*, 50 minutes October 2020

Talks at UNL

UNL Discrete Math Seminar

- *Perfect matchings in random k -uniform hypergraphs, part 2*, 50 minutes September 2022
- *Group testing: now with more hypergraphs*, 50 minutes March 2022
- *Partial coloring for hypergraph discrepancy*, 50 minutes October 2021
- *Perfect matchings in random k -uniform hypergraphs*, 50 minutes March 2021
- *Random graphs for fun and profit*, 50 minutes February 2020
- *Quantum computing amateur hour!*, 50 minutes December 2019
- *A vertex Maker-Breaker game*, 50 minutes February 2019
- *Bounds on some size-Ramsey numbers*, 50 minutes September 2018

Matemáticas en español

- *Introducción a las martingalas*, 20 minutes October 2021
- *Hipergrafos dirigidos*, 20 minutes March 2021
- *Representando las redes con grafos aleatorios*, 20 minutes March 2020

UNL Graduate Student Seminar

- *Bounds on some size-Ramsey numbers*, 50 minutes August 2018

SERVICE AND OUTREACH

- Co-organizer of the **Grad Student Teaching Table** at UNL
Established and co-organized a discussion-based seminar for graduate students to explore ideas in teaching mathematics. Spring 2022 – present
- **Graduate Student Mentor**
Served as a peer mentor to a first-year graduate student at UNL. Fall 2019 – Spring 2022
- **Graduate Advisory Committee** Graduate Student Member Fall 2020 – Spring 2021
- **UNL AMS Graduate Student Chapter** Secretary/Treasurer Fall 2019 – Spring 2020
- **Great Plains Alliance** Supporting Student Spring 2020, Spring 2021
Served in a support role to graduate students speaking at other colleges and universities in the Great Plains.
- Volunteer at the **Nebraska Conference for Undergraduate Women in Mathematics** Spring semesters 2018 – 2022
NCUWM is an annual event designed to promote the success of women in mathematics graduate programs and math-related careers. About 275 students attend NCUWM each year.
- Volunteer at **Nebraska Math Day** Fall semesters 2017 – 2021
Nebraska Math Day is an annual event for Nebraska high school students. About 1000 students attend Math Day each year.

OTHER CONFERENCES ATTENDED

- **Graduate Research Workshop in Combinatorics**, University of Colorado Denver; Denver, CO July – August 2022
- **paraDIGMS Spring Conference**, Online April 2021
- **AMS Sectional Meeting**, Online October 2020
- **Nebraska Open Access Materials Online Workshop**, Online July 2020
- **Graduate Research Workshop in Combinatorics**, University of Kansas; Lawrence, KS June 2019
- **AMS Sectional Meeting**, University of Michigan; Ann Arbor, MI October 2018

AWARDS AND GRANTS

AMS Graduate Student Travel Grant January 2023
To fund travel to the 2023 Joint Mathematics Meetings

USC Presidential (National Merit) Scholarship Fall 2014 – Spring 2017

USC Resident Honors Program Fall 2013 – Spring 2017

USC Provost Fellowship Summer 2015
For undergraduate research: “Quantitative image processing of the Drosophila neuromuscular junction”

COMPUTER SKILLS

- Programming languages: C++, Python (some familiarity with Java, MATLAB)
- Markup languages: LaTeX, HTML/CSS
- Websites and software: Canvas, WeBWorK, Microsoft Office suite