

Zachary M. Deiman

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Education

Ph.D. Mathematics

August 2021 – Present

University of Michigan, Ann Arbor, MI

B.S. Mathematics

September 2017 – May 2021

University of Minnesota, Minneapolis, MN

Minors in Computer Science and Astrophysics

Publications and Preprints

Publications

- K. Chen, Z. Deiman, R. Goh, S. Jankovic, and A. Scheel. *Strain and defects in oblique stripe growth. Multiscale Model. Simul.*, 19(3), 1236–1260 (2021).

Presentations

Constructing the Real Numbers

September 2022

Math Club, University of Michigan.

MREG Presentation: Parabolic PDEs

July 2022

Parabolic PDEs MREG (online), University of Michigan. Presented with Abhishek Adimurthi, Santiago Cordero-Misteli, Zhengjun (Jasper) Liang, Ning Tang, and Lizhe Wan.

Arcsine Solution to a Nonlocal Transport Equation

June 2022

Parabolic PDEs MREG (online), University of Michigan.

Introduction to Fractional Differential Equations

April 2022

Student Analysis Seminar, University of Michigan.

Fractional Derivatives

February 2022

Math Club, University of Michigan.

Distributional Derivatives of Discontinuous Functions

December 2020

DRP Final Project Event (online), University of Minnesota.

REU Panel

November 2020

Math Club (online), University of Minnesota.

Solutions and Asymptotics for the Phase-Diffusion Equation

November 2020

Undergraduate Mathematics Research Seminar (online), University of Minnesota.

Quenching in the Phase-Diffusion Equation

July 2020

Complex Systems REU (online), University of Minnesota. Presented with Kelly Chen.

Teaching

Graduate Student Instructor

University of Michigan

- Math 116: Calculus II
- Math 115: Calculus I

*Winter 2022, Fall 2022
Fall 2021*

Undergraduate Teaching Assistant

University of Minnesota

- Math 1031: College Algebra and Probability
- Math 1051: Precalculus I

*Spring 2021
Fall 2020*

Course Grader

University of Minnesota

- Math 5651: Basic Theory of Probability and Statistics
- Math 4242: Applied Linear Algebra
- Math 1271: Calculus I

*Fall 2019
Summer 2019
Summer 2018*

Mentorship

Peer Tutor

January 2018 – May 2021

SMART Learning Commons, University of Minnesota

- Met with undergraduate students one-on-one and in groups, both in-person and online, to assist them in mathematics, computer science, and physics courses.
- Fulfilled the College Reading & Learning Association's International Tutor Training Program Certification requirements for becoming a Certified Master Tutor.

Peer Tutor Mentor

September 2019 – May 2021

SMART Learning Commons, University of Minnesota

- Observed and mentored new Peer Tutors.
- Organized and presented 60-minute staff meetings for continuous Peer Tutor training.
- Provided tutoring information for students who required assistance in their courses.

Programs

Michigan Research Experience for Graduates (MREG)

Summer 2022

University of Michigan

- Participated in a research project studying various parabolic partial differential equations, organized by University of Michigan graduate students and led by Neel Patel.

Directed Reading Program (DRP)

Spring 2020, Fall 2020

University of Minnesota

- Met weekly with a graduate student to read a textbook and discuss a project on an advanced mathematics topic of mutual interest.
 - Functional analysis, mentored by Cole Jeznach, Fall 2020
 - Algebraic topology, mentored by Tobias Ramaswamy, Spring 2020

Research Experience for Undergraduates (REU)

Summer 2020

University of Minnesota

- Participated in a research project on analyzing a phase-diffusion equation as part of the University of Minnesota Complex Systems REU hosted by Arnd Scheel.
- Funded by the University of Minnesota's Undergraduate Research Opportunities Program (UROP) and the National Science Foundation.

Post-Secondary Enrollment Options (PSEO)

September 2016 – May 2017

University of Minnesota

- The PSEO program through the University of Minnesota allows high school students to enroll in University of Minnesota classes for both high school and college credit.

Awards and Scholarships

University of Minnesota Scholarships

- Iron Range Scholarship Fall 2017 – Spring 2021
- Ella Thorp Undergraduate Scholarship Fall 2020 – Spring 2021
- UROP Scholarship Summer 2020
- J. Ian Richards Scholarship Fall 2019 – Spring 2020

Other

- University of Minnesota Dean's List Fall 2016 – Spring 2021

Writing

Notes on Fractional Calculus

January 2022

- Summarizes chosen sections of *The Fractional Calculus: Theory and Applications of Differentiation and Integration to Arbitrary Order* by Keith B. Oldham and Jerome Spanier.
- Written for a Math Club talk at the University of Michigan.

Residual estimates for an anisotropic Swift-Hohenberg equation

May 2021

- Describes the derivation for an amplitude equation corresponding to an anisotropic Swift-Hohenberg equation, and establishes residual estimates for the approximation in uniformly local Sobolev spaces.
- Written for a senior writing project mentored by Arnd Scheel.

Complex Analysis

January 2021

- A write-up of various topics in complex analysis, emphasizing iconic examples and connections rather than abstract theory and proofs.
- Topics include: constructions of the complex numbers; complex arithmetic and algebra, sequences and series; complex differentiation, Cauchy-Riemann equations; Cauchy-Goursat theorem, Cauchy's integral formula and corollaries.

Quenching in the phase-diffusion equation

July 2020

- Discusses theoretical and numerical methods of solving a phase-diffusion equation derived from the Swift-Hohenberg equation, and analyzes wavenumber asymptotics for small and large wave speeds.
- Written with Kelly Chen for the University of Minnesota Complex Systems REU hosted by Arnd Scheel, adapted to a publication.

Algebraic Topology for Everyone

May 2020

- Summarizes Chapter 1 of *Algebraic Topology* by Allen Hatcher, written for both mathematical and non-mathematical audiences.
- Written as a final project for the University of Minnesota DRP.