

Nick Payne

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Education

Pennsylvania State University, State College PA
Ph.D in Mathematics

Fall 2023 -

Northeastern University, Boston MA
M.S. Applied Mathematics

2022 - 2023
GPA: 3.96/4.0

Northeastern University, Boston MA
B.S. Mathematics and Minors in Data Science & Mechanical Engineering

2017 - 2022
GPA: 3.87/4.0

Papers

Hausdorff Dimension of Closure of Cycles in d -Maps on the Circle.
Joint with Mrudul Thatte. arXiv:2208.11837

An Exploration of the Symmetry Groups of Certain Configurations of Points.
Joint with Luke Boyer. arXiv:2108.13565

Research

Independent Study

Summer 2022 - Summer 2023

Mentor: Xuwen Zhu

Area: Dynamics on the unit disk. Resulted in a paper proving the Hausdorff dimensionality of the closure of degree- m cycles on the unit circle (with Mrudul Thatte). Also explored the behavior of the length of cycles of higher degree on the unit disk.

Undergraduate Research Capstone

Spring 2022

Mentor: Xuwen Zhu

Area: Minimal surfaces. Resulted in an expository paper detailing some conditions that cause minimal surfaces not to be area minimizing.

Northeastern University Summer Math Research Program

Summer 2021

Mentors: Ian Dumais, Vance Blankers, Matej Penciak

Area: Configurations of points and lines. Resulted in a mostly expository paper that included a re-interpretation of a few small geometric results, and a proof-of-concept computer program used for the geometric realization of certain generalized cyclic configurations. with Luke Boyer

Talks

Penn State University Math Club

February 2025

Title: A Talk on Talks: How to give a successful (short) talk

AMS - PME Undergraduate Student Poster Session

January 2023

JMM, Boston MA

Poster Title: Hausdorff Dimension of Closure of Cycles in d-Maps on the Circle

AMS Contributed Paper Session on Dynamical Systems

January 2023

JMM, Boston MA

Title: Hausdorff Dimension of Closure of Cycles in d-Maps on the Circle

Undergraduate Research Presentations

May 2022

Northeastern University Math Department

Title: When are Minimal Surfaces (Not) Area Minimizing?

REU Final Presentations

June 2021

Northeastern University Summer Math Research Program

Title: An Exploration of the Symmetry Groups of Certain Configurations of Points with Luke Boyer

Academic Involvement

At Pennsylvania State University:

- Speaker of the Assembly *Summer 2025 -
Graduate & Professional Student Association*
- President, Graduate Student Association *Summer 2025 -
Mathematics Department*
- Member, Research Showcase Planning Committee *Spring 2025 -
Eberly College of Science*
- Co-Chair, Graduate Student Subcommittee *Fall 2024 -
Eberly College of Sciences Climate and Diversity Committee*
- Delegate, Eberly College of Sciences *Summer 2024 -
Graduate & Professional Student Association*
- Member, Advocacy and Diversity Committee *Summer 2024 - Spring 2025
Graduate & Professional Student Association*
- Treasurer, Graduate Student Association *Spring 2025
Mathematics Department*
- Secretary, Graduate Student Association *Summer 2024 - Fall 2024
Mathematics Department*
- Organizer:
 - Undergraduate Math Club Short Talks Competition *March 2025*

At Northeastern University:

- Co-organizer, Math Directed Reading Program *Spring 2023*
Mathematics Department
- Vice-President, Mathematics Engagement and Mentoring Association *Fall 2022*
Mathematics Department
- Member, Diversity and Inclusion Committee *Fall 2021 - Summer 2023*
Mathematics Department
- President, Math Club *Fall 2021 - Summer 2022*
Mathematics Department
- Organizer:
 - Undergraduate Math Course Information Session *November 2022, April 2023*
 - Graduate School Student Panel *April 2022*
 - Undergraduate Math Research Student Panel *January 2022*

Teaching

At Pennsylvania State University:

- Instructor, MATH 41: Trigonometry and Analytic Geometry *Fall 2024*

At Northeastern University:

- Teaching Assistant, MATH 4555: Complex Variables *Spring 2022 - Spring 2023*
- Grader, MATH 3150: Real Analysis *Fall 2022*
- Grader, MATH 2331: Linear Algebra *Spring 2021*
- Grader, MATH 2321: Calculus 3 for Science and Engineering *Fall 2020*
- Undergraduate Teaching Fellow, MATH 1365: Intro to Math Reasoning *Fall 2020*
- Peer Tutor, Math Department *Summer 2018 - Spring 2022*

Other:

- Substitute Teacher
Salem School District, Salem NH

Work Experience

Distribution Analytics Co-op

July 2021 - January 2022

John Hancock Insurance, Boston MA

Automated and improved processes to identify insurance applications process electronically, and developed several Tableau dashboards that allowed users to see profiles of specific insurance agents, with information such as client trends and sales potential.

Actuarial Analyst Co-op

July 2019 - December 2019

Homesite Insurance, Boston MA

Proposed, developed, and presented to senior management multiple rate level adjustments for various insurance products based on analysis of historical state performance, and automated and developed templates to increase efficiency performance metrics.

Honors/Awards

University Graduate Fellow *Spring 2024*
Pennsylvania State University

Verne M. Willaman Distinguished Graduate Fellowship in Science *Fall 2023*
Pennsylvania State University

Outstanding Departmental Service Graduate Award *April 2023*
Northeastern University

Alberto Galmarino Award *May 2022*
Northeastern University
Awarded by the Math Department for service to the department.

Other

Summer Program Instructor, Salem NH School District *Summer 2024*
Organized and led a FIRST Lego League summer camp open to 4th and 5th grade students.

Academic Volunteer, SquashBusters *Fall 2017 - Spring 2022*
Assisted local Boston MA high school students with academic work and college preparation.

Lead Mentor, FIRST Robotics Competition Team 6324 *Fall 2017 - Fall 2019*
Mentored strategy and electrical sub-teams for a high school robotics team based in Salem NH.

Programming/Markup Languages
R, Python, SQL, Mathematica, MATLAB, L^AT_EX