

Benjamin Baily

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RESEARCH INTERESTS

I study commutative algebra and algebraic geometry in positive characteristic.

EDUCATION

Ph.D. Mathematics

2022-Present

University of Michigan, Ann Arbor, MI

Thesis Advisor: Dr. Karen Smith

BA Mathematics

2018-2022

Williams College, Williamstown, MA

Thesis title: *Completions of Countable Excellent Rings in Equal Characteristic Zero*

Thesis advisor: Dr. Susan Loepp

PAPERS

2. [Completions of Countable Excellent Rings in Equal Characteristic Zero](#), with S. Loepp. To appear in *Journal of Algebra and its Applications*.
1. [The Bergman Game](#), with J. Dell, I. Durmić, H. Fleischmann, F. Jackson, I. Mijares, S. J. Miller, E. Pesikoff, L. Reifenberg, A. S. Reina, Y. Yang. Conference proceedings of the 20th International Conference on Fibonacci Numbers and Their Applications.

PREPRINTS AND ARTICLES IN PREPARATION

2. **Large Subsets Are Sumsets**, with J. Dell, S. Dever, A. Dionne, H. Fleischmann, F. Jackson, L. Goldmakher, G. Gross, S. J. Miller, E. Pesikoff, H. Pham, L. Reifenberg, and V. Venkatesh, draft available [here](#).
1. **Irreducibility over the Max-Min Semiring**, with J. Dell, H. Fleischmann, F. Jackson, S. J. Miller, E. Pesikoff, L. Reifenberg, preprint at arxiv.org/abs/2111.09786. Nov 2021.

TALKS AND PRESENTATIONS

6. “A Lower Bound on Graph Geometric Gonality” at the University of Kentucky, Algebra Seminar, April 2023.
5. “Large Sets are Sumsets” at *Combinatorial and Additive Number Theory*, New York Number Theory Seminar, Online, May 2022.
4. “Generalized Area Configurations in Thin Subsets of the Plane” at the *Joint Mathematicians Meeting, AMS Special Session on Undergraduate Research in Analysis and PDE’s*, Online, April 2022.
3. “A Stochastic Central Limit Theorem and Applications to Integer Decompositions” at the *Young Mathematicians Conference*, Online, August 2021. Click here to see the [slides](#).
2. “Complexity of the Zeckendorf Graph Game” at the *Young Mathematicians Conference*, Online, August 2021. [Click here to see the slides](#).
1. “Thresholds for the Existence of Similar Area Configurations” at the *Young Mathematicians Conference*, Pre-recorded, Aug 2021. youtube.com/watch?v=FAwRjQA6k6Q, [Slides here](#).

CONFERENCES

3. Combinatorics And Number Theory, New York Number Theory Seminar, Online, May 2022.
2. Joint Math Meetings, AMS, Online. April 2022.
1. Young Mathematicians Conference, The Ohio State University, Online. August 2021.

TEACHING AND MENTORING

Graduate Student Instructor

University of Michigan

Served as primary instructor for a section of the listed classes.

- **Math 115 (Calculus 1):** Fall 2022, Winter 2023, Fall 2024, Winter 2024, Summer 2024.

Directed Reading Program Mentor

University of Michigan

Met 1-on-1 weekly with an undergraduate student to cover an extracurricular topic.

- Fall 2022. Topic: Chip-firing Games on Graphs. Source: *Divisors and Sandpiles*, Corry and Perkinson.
- Winter 2024. Topic: Chip-firing Games on Graphs. Source: *Divisors and Sandpiles*, Corry and Perkinson.
- Summer 2024. Topic: Ring Theory. Source: *Abstract Algebra*, Dummit and Foote.

Tutor/Teaching Assistant

Williams College

- **Teaching Assistant** for Abstract Algebra. Spring 2022.
- **Peer Tutor** for Commutative Algebra. Fall 2021.
- **Teaching Assistant** for Real Analysis. Fall 2020.

AWARDS AND HONORS

- **The Rosenberg Prize in Mathematics, First Prize.** Joint with Olivia Straw. May 2022. Awarded by the Williams College Math Department to the outstanding senior math majors.
- **The Benedict Prize in Mathematics, First Prize.** Joint with Chenyang Sun. June 2020. Awarded by the Williams College Math Department to the outstanding sophomores in the math department.