

Benjamin Baily

bbaily@umich.edu | University of Michigan Department of Mathematics

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

PREPRINTS AND PUBLICATIONS

6. [Classification of Minimal Singularity Thresholds](#). Preprint, 2025.
5. [F-Pure Thresholds of Equigenerated Ideals](#). Preprint, 2025.
4. [Irreducibility over the Max-Min Semiring](#), with J. Dell, H. L. Fleischmann, F. Jackson, S. J. Miller, E. Pesikoff, and L. Reifenberg. *Journal of Integer Sequences*, 2025.
3. [Strength, Partition Rank, and Algebraic Closure](#), with A. Lampert. Preprint, 2024.
2. [Completions of Countable Excellent Rings in Equal Characteristic Zero](#), with S. Loepp. In *Journal of Algebra and its Applications*, 2024.
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, and Y. Yang. Conference proceedings of the 20th International Conference on Fibonacci Numbers and Their Applications, 2022.

TALKS

7. Lightning talk: “Classification of Minimal Singularity Thresholds” at Commutative Algebra in the South, Georgia State University, April 2025.
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.
2. “Complexity of the Zeckendorf Graph Game” at the *Young Mathematicians Conference*, Online, August 2021.
1. “Thresholds for the Existence of Similar Area Configurations” at the *Young Mathematicians Conference*, [Pre-recorded](#), Aug 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.
- Fall 2024. Topic: Chip-firing Games on Graphs. Source: *Divisors and Sandpiles*, Corry and Perkinson.

AWARDS AND HONORS

- **Honored Instructor.** Fall 2022. Awarded by Michigan Housing to instructors that had a positive impact on a residential student's collegiate journey.
- **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.