Darrion Thornburgh

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Education

B.A. in Mathematics and Computer Science – Bard College, NY. August 2020 — May 2024 (expected)
GPA: 3.59 (Cumulative), 3.83 (Math). Thesis: *Symmetry and Structures of APN functions and Sidon sets*.

Research and Internship Experience

Data Science Internship — DSC-WAV August 2023 — Present

- Created an R package which takes existing code from past DSC-WAV interns to be used by other programmers. This project was funded by the NSF. **Advisor:** Dr. Valerie Barr.

Topology REU Researcher — Georgia Tech Math REU (CUBE) May 2023 — July 2023

- Constructed explicit examples in the curve complex of the 5-punctured sphere, proving it is not 1-hyperbolic.
- Introduced the notion of the intersection graphs of curves and arcs on a surface to provide lower bounds on intersection numbers. This project was funded by the NSF. **Advisors:** Dr. Dan Margalit and Dr. Wade Bloomquist.

Affine Geometry Undergraduate Researcher — Bard Summer Research Institute (BSRI) June 2022 — July 2022

- Classified all Sidon sets, or 2-caps, in the affine geometry $\mathbb{F}_2^n$ up to size 9, with respect to affine isomorphism, and wrote computer calculations to provide an upper bound on the count of affine equivalence classes up to dimension 11.
- Defined the daisy property and used it to prove exactly when a Sidon set has an exclude point of a given multiplicity. **Advisor:** Dr. Lauren Rose.

Publications

[1] **Topological methods in zero-sum Ramsey theory.** Florian Frick, Jacob Lehmann Duke, Meenakshi McNamara, Hannah Park-Kaufmann, Steven Raanes, Steven Simon, Darrion Thornburgh, and Zoe Wellner. *Submitted to Forum of Mathematics, Sigma.* arXiv:2310.17065. November 2023.

[2] **How Many Cards Should You Lay Out in a Game of EvenQuads? A Detailed Study of 2-Caps in** $AG(n, 2)$**.** Julia Crager, Felicia Flores, Timothy E. Goldberg, Lauren L. Rose, Daniel Rose-Levine, Darrion Thornburgh, and Raphael Walker. *La Matematica*. May 2023.

Honors and Awards

Bard College: Kenneth Bush '36 Memorial Scholar in Mathematics, 2023-2024. Distinguished Scientist Scholarship (DSS) Award, 2023-2024. Darnell Pierce Award, May 2023. Head Junior Marshal, May 2023.

1st Place in Simon's Rock Hackathon 2021: *Visualizing Music with Generative AI*. In collaboration with Henry Chang, Josef Lazar, and Raphael Walker.

Teaching Experience & Engagement

Member, Association for Women in Mathematics Club & Chapter — Bard College August 2022 — Present

Mathematics Tutor — Bard College Learning Commons August 2021 — Present

- Served as a dedicated course tutor for Real Analysis, Vector Calculus, Linear Algebra, and Proofs & Fundamentals.
- Held one-on-one appointments and office hours for students enrolled in any course in mathematics.

Computer Science Tutor — Bard College Learning Commons August 2021 — December 2023

- Served as a dedicated course tutor for Object Oriented Programming.
- Held office hours for students enrolled in any course in computer science.

Presentations

Hudson River Undergraduate Mathematics Conference. Talk by Darrion Thornburgh. *Uniform exclude distributions and APN functions*. Keene, NH. April 2024. *Abstract accepted*.

Bard Summer Research Institute Poster Session. Poster by Sami Aurin and Darrion Thornburgh. *The curve graph of the 5-punctured sphere*. Annandale-on-Hudson, NY. October 2023.

Symposium for Undergraduate Mathematics Research Conference. Talk by Darrion Thornburgh. *On the hyperbolicity of the arc and curve graphs of surfaces*. New Paltz, NY. September 2023.

WIMIN Math Conference. Talk by Darrion Thornburgh. *On the hyperbolicity of the arc and curve graphs of surfaces*. Northampton, MA. September 2023.

Bard College Mathematics and Computer Science Seminar. Talk by Darrion Thornburgh. *On the hyperbolicity of the arc and curve graphs of surfaces*. Annandale-on-Hudson, NY. September 2023.

MAA MathFest. Poster by Sami Aurin and Darrion Thornburgh. *The curve graph of the 5-punctured sphere*. Tampa, FL. August 2023.

Georgia Tech Summer Research Poster Session. Poster by Sami Aurin and Darrion Thornburgh. *The curve graph of the 5-punctured sphere*. Atlanta, GA. July 2023.

Hudson River Undergraduate Mathematics Conference. Talk by Felicia Flores and Darrion Thornburgh. *2-Caps in the game of EvenQuads: The Daisy Property*. South Hadley, MA. April 2023.

Joint Mathematics Meetings. Talk by Felicia Flores and Darrion Thornburgh. *2-Caps in the game of EvenQuads: The Daisy Property*. Boston, MA. January 2023.

Bard Summer Research Institute Poster Session. Poster by Felicia Flores and Darrion Thornburgh. *2-Caps in the game of EvenQuads*. Annandale-on-Hudson, NY. September 2022.

Bard College Mathematics Seminar. Talk by Felicia Flores and Darrion Thornburgh. *2-Caps in the game of EvenQuads: The Daisy Property*. Annandale-on-Hudson, NY. September 2022.

Specialized Skills

Programming: Proficient in C, C++, Java, Python, JavaScript, MATLAB, R, Racket, Scheme, Bash, and SQL.
Languages: English (Native), Spanish (Intermediate-Novice), Korean (Novice)