

Darrion Thornburgh

darrion.thornburgh@vanderbilt.edu · <https://darrion.net>

Education

Ph.D. in Mathematics – Vanderbilt University	August 2024 — May 2029 (expected) Nashville, TN
M.A. in Mathematics – Vanderbilt University	August 2024 — December 2026 (expected) Nashville, TN
B.A. in Mathematics and Computer Science – Bard College Thesis: <i>Symmetry and Structures of APN functions and Sidon sets.</i>	August 2020 — May 2024 Annandale-on-Hudson, NY

Publications and Preprints

- [8] **A new upper bound for Sidon sets in $\mathbb{F}_2^{4k+3}$.** Darrion Thornburgh. *Preprint*. [arXiv:2609.27731](#). September 2026.
- [7] **Resolving a conjecture on quadratic APN functions and a new quadratic (n, n) -function associated to crooked functions.** Claude Carlet and Darrion Thornburgh. *Preprint*. [arXiv:2608.23888](#). August 2026.
- [6] **Determining those Boolean functions whose restrictions to affine spaces are plateaued.** Claude Carlet and Darrion Thornburgh. *Preprint*. [IACR 2026/386](#). February 2026.
- [5] **On lower bounds for the distances between APN functions.** Maria Mihaila and Darrion Thornburgh. *Cryptography and Communications*. [DOI](#). June 2026.
- [4] **On generalizing cryptographic results to Sidon sets in $\mathbb{F}_2^n$.** Darrion Thornburgh. *Preprint*. [arXiv:2501.11184](#). January 2025.
- [3] **Uniform exclude distributions of Sidon sets.** Darrion Thornburgh. *Preprint*. [arXiv:2407.11783](#). July 2024.
- [2] **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. *Forum of Mathematics, Sigma*. [DOI](#). November 2025.
- [1] **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*. [DOI](#). May 2023.

Teaching Experience

Lecturer — Vanderbilt University Mathematics Department	August 2026 — Present
Teaching Assistant — Vanderbilt University Mathematics Department	August 2025 — May 2026
Mathematics Tutor — Vanderbilt University Tutoring Services	August 2024 — May 2025
Mathematics Tutor — Bard College Learning Commons	August 2021 — May 2024
Computer Science Tutor — Bard College Learning Commons	August 2021 — December 2023

Honors and Awards

- M. Susan Richman Senior Project Prize in Mathematics**, Bard College, May 2024.
- William J. Lockwood Prize**, Bard College, May 2024.
- Kenneth Bush '36 Memorial Scholar in Mathematics**, Bard College, 2023-2024.
- Distinguished Scientist Scholarship (DSS) Award**, Bard College, 2023-2024.
- Darnell Pierce Award**, Bard College, May 2023.
- Head Junior Marshal**, Bard College, May 2023.
- 1st Place in Simon's Rock Hackathon**, with Henry Chang, Josef Lazar, and Raphael Walker. 2021.

Invited Talks

- Finite Geometry, Combinatorics, Boolean Functions and their Links.** *k*-subspace maximal Sidon sets in $\mathbb{F}_2^n$. Magdeburg, Germany. September, 2026.
- The 11th International Workshop on Boolean Functions and their Applications (BFA).** *Resolving a conjecture on quadratic APN functions and a new quadratic (n, n) -function associated to crooked functions.* Sogndal, Norway. September, 2026.
- Eastern Sectional Meeting, AMS.** *New lower bounds on the k-point problem of 2-caps in $AG(n, 2)$.* Albany, NY. October 2024.

Contributed Talks

- 34th Cumberland Conference.** *Lower bounds on the distances between APN functions.* Auburn, AL. May 2026.
- The 10th International Workshop on Boolean Functions and their Applications (BFA).** *Lower bounds on the distances between APN functions.* Larnaca, Cyprus. Virtual presentation. September 2025.

50th Annual New York State Regional Graduate Mathematics Conference. *On generalizing cryptographic results to Sidon sets in $\mathbb{F}_2^n$.* Syracuse, NY. March 2024.

Hudson River Undergraduate Mathematics Conference. *Uniform exclude distributions and APN functions.* Keene, NH. April 2024.

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

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

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

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

Seminar Talks and Posters

Vanderbilt Graduate Student Seminar. *Determining those Boolean functions whose restrictions to affine spaces are plateaued.* Nashville, TN. March 2025.

Vanderbilt Graduate Student Seminar. *An introduction to Boolean functions, vectorial Boolean functions, and Fourier analysis over $\mathbb{F}_2^n$.* Nashville, TN. September 2025.

Vanderbilt Graph Theory and Combinatorics Seminar. *Constructing strongly regular graphs from Sidon sets in finite Boolean groups.* Nashville, TN. September 2025.

AMS Graduate Student Chapter Seminar at Ohio University. *A classification of k -covers in $\mathbb{F}_2^n$ in terms of strongly regular graphs.* Virtual. April 2025.

Bard College Spectra Math Club Seminar. *A classification of k -covers in $\mathbb{F}_2^n$ in terms of strongly regular graphs.* Virtual. April 2025.

Vanderbilt Graduate Student Seminar. *A classification of k -covers in $\mathbb{F}_2^n$ in terms of strongly regular graphs.* Nashville, TN. March 2025.

Bard College Senior Project Poster Session. *Symmetry and Structures of APN Functions and Sidon sets.* Annandale-on-Hudson, NY. May 2024.

BSRI Poster Session. *The curve graph of the 5-punctured sphere.* Annandale-on-Hudson, NY. October 2023.

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

MAA MathFest Poster Session. With Sami Aurin. *The curve graph of the 5-punctured sphere.* Tampa, FL. August 2023.

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

BSRI Poster Session. With Felicia Flores. *2-Caps in the game of EvenQuads.* Annandale-on-Hudson, NY. September 2022.

Bard College Mathematics Seminar. With Felicia Flores. *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)

Last updated: October 15, 2026