Sam Spiro

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Education

2017–   **Ph.D. in Mathematics**, *UC San Diego (UCSD)*.
Adviser: Jacques Verstraëte

2013–2017 **B.S. in Mathematics and Computer Science**, *University of Miami*.

2016 (Fall) Budapest Semesters in Mathematics.

Research Interests

My main interests like in extremal and probabilistic combinatorics, with a particular focus on problems involving F-free graphs and hypergraphs. I have also worked in many other areas of discrete mathematics such as spectral graph theory, enumerative combinatorics, and elementary number theory.

List of Papers

1. **Continuously Increasing Subsequences of Random Multiset Permutations** (with Alexander Clifton, Bishal Deb, Yifeng Huang, and Semin Yoo).
   Submitted, 2021.

2. **On t-intersecting Hypergraphs with Minimum Positive Codegrees**.
   Submitted, 2021.

3. **Saturation Problems in Convex Geometric Hypergraphs** (with Jason O'Neill).
   Submitted, 2021.

4. **Maximal Independent Sets in Clique-free Graphs** (with Xiaoyu He and Jiaxi Nie).
   Submitted, 2021.

5. **Linear Bounds for Cycle-free Saturation Games** (with Sean English, Tomas Masarik, Grace McCourt, Erin Meger, and Michael S. Ross).
   Submitted, 2021.

6. **A Smoother Notion of Spread Hypergraphs**.
   Submitted, 2021.

7. **The Wiener Index of Signed Graphs**.
   Applied Mathematics and Computation (Accepted), 2020.

8. **Online Card Games**.
   Electronic Journal of Probability (Accepted), 2020.

9. **The Maximum Number of Appearances of a Word in a Grid** (with Gregory Patchell).
   The American Mathematical Monthly (Accepted), 2021.

10. **Relative Turán Numbers for Hypergraph Cycles** (with Jacques Verstraëte).
    Discrete Mathematics 344 (10), 112542, 2020.

11. **Guessing about Guessing: Practical Strategies for Card Guessing with Feedback** (with

Persi Diaconis and Ron Graham).
The American Mathematical Monthly (Accepted), 2021.

12. **Card Guessing with Partial Feedback** (with Persi Diaconis, Ron Graham, and Xiaoyu He).
Combinatorics, Probability and Computing, 1–20, 2021.

13. **Counting Hypergraphs with Large Girth** (with Jacques Verstraëte).
Journal of Graph Theory (Accepted), 2020.

14. **Relative Turán Problems for Uniform Hypergraphs** (with Jacques Verstraëte).
SIAM Journal on Discrete Mathematics 35 (3), 2170–2191, 2020.

15. **Forbidding $K_{2,t}$-traces in Triple Systems** (with Ruth Luo).
Electronic Journal of Combinatorics P2–4, 2021.

16. **An Averaging Process for Hypergraphs**.
Journal of Applied Probability (Accepted), 2020.

17. **Triangle-Free Subgraphs of Hypergraphs** (with Jiaxi Nie and Jacques Verstraëte).
Graphs and Combinatorics, 1–16, 2020.

18. **Ballot Permutations and Odd Order Permutations**.
Discrete Mathematics 343 (6), 111869, 2020.

19. **Subset Parking Functions**.
Journal of Integer Sequences 22(7), 2019.

20. **Slow Recurrences**.
Journal of Number Theory 218, 370–401, 2020.

21. **Counting Labeled Threshold Graphs with Eulerian Numbers**.
Australasian Journal of Combinatorics, 2020.

22. **Slow Fibonacci Walks** (with Fan Chung and Ron Graham).
Journal of Number Theory 210, 142–170, 2019.

23. **Random Graphs Induced by Catalan Pairs** (with Daniël Kroes).
Journal of Combinatorics (Accepted), 2020.

24. **Saturation Games for Odd Cycles**.
The Electronic Journal of Combinatorics P4–11, 2019.

25. **Polynomial Relations Between Matrices of Graphs**.
Journal of Graph Theory 90 (3), 288–303, 2018.

26. **Forbidden Families of Minimal Quadratic and Cubic Configurations** (with Attila Sali).
The Electronic Journal of Combinatorics 24(2), 2017.

Teaching Experience

TA Experience:

Spring 2019	Combinatorics. UCSD
Winter 2019	Complex Analysis. UCSD
Fall 2018	Partial Differential Equations. UCSD
Fall 2018	Graduate Linear Algebra. UCSD

| Spring 2018 | Game Theory. UCSD |
| Fall 2017 | Calculus III. UCSD |

Service

I have served as a referee or mathematical reviewer for more than 26 articles. I have also taken part in the following activities.

2021–	Association for Women in Mathematics mentor. UCSD
2020–	GradAMP mentor (helped undergraduates apply to graduate school). UCSD.
2018–	Co-organizer of the Graduate Student Combinatorics Conference 2022. UCSD.
2019–	Co-organizer of the Graduate Student Seminar. UCSD
2018–	Co-organizer of the Graduate Student Combinatorics Seminar. UCSD.
2017–	Co-organizer of Banach Barski (weekly graduate student social event). UCSD.
2018–	Member of the Graduate Student Council. UCSD.

Experiences

2021	AMS MRC program: Approaches to Inverse Problems using Combinatorics and Linear Algebra (participant and organizer of special section at JMM 2022).
2019	MSRI Graduate Summer School: The Polynomial Method.
2019	Graduate Research Workshop in Combinatorics.
2016	University of Chicago REU Program.

Honors and Awards

| 2019–2022 | NSF Graduate Research Fellowship. |
| 2016, 2017 | James McKnight Outstanding Mathematics Major (University of Miami). An award given to one math major each year. |

Talks

- Combinatorics Seminar, UC Riverside. October 2021.
- Graph Theory and Combinatorics Seminar, UIUC. September 2021.
- SIAM Conference on Discrete Mathematics. July 2021.
- CanaDAM. May 2021.
- Graduate Student Combinatorics Conference. April 2021.
- Combinatorics Seminar, UC Riverside. April 2021.
- Combinatorics Seminar, Iowa State University. November 2020.
- Combinatorics Seminar, University of Delaware. October 2020.
- Combinatorics Seminar, University of Nebraska Lincoln. September 2020.
- Graduate Student Seminar, University of Georgia. July 2020.
- Combinatorics Literature Seminar, UIUC. May 2020.
- Graduate Online Combinatorics Colloquium. April 2020.

- BSM 100/3 Reunion Conference. June 2018.
- Graduate Student Combinatorics Conference. April 2018.
- Joint Mathematics Meetings. January 2018.
- Research seminar, Embry-Riddle Aeronautical University. October 2017.
- 48th Southeastern International Conference on Combinatorics, Graph Theory and Computing. March 2017.
- Graduate Student Seminar, University of Miami. February 2017.