

Alexander Cohen

Curriculum Vitae

Education

- 2021– **Math PhD student**, *MIT*, Cambridge MA, Advisor: Larry Guth.
- 2017–2021 **Dual BS/MS in Mathematics**, *Yale University*, New Haven, CT, *GPA – 3.9/4.0*.
- 2011–2017 **High school diploma**, *Hunter College High School*, New York, NY, *GPA – 3.9/4.0*.

Papers

Accepted

- 2022 **Partition and Analytic Rank are Equivalent over Large Fields**, with *Guy Moshkovitz*, to appear in *Duke Mathematics Journal*.
- 2022 **Uniqueness of excited states to $-\Delta u + u - u^3 = 0$ in three dimensions**, with *Zhenhao Li and Wilhelm Schlag*, to appear in *Analysis & PDE*.
- 2021 **Structure vs. randomness for bilinear maps**, with *Guy Moshkovitz*, to appear in *Discrete Analysis* and presented at *Symposium on Theory of Computing 2021*.
- 2020 **A Sylvester-Gallai result for concurrent lines in the complex plane**, *Discrete and Computational Geometry*.
- 2020 **A Sylvester-Gallai theorem for cubic curves**, with *Frank de Zeeuw*, to appear in *European Journal of Combinatorics*.
- 2020 **Poissonian correlation of higher order differences**, *Journal of Number Theory*.
- 2020 **Sinkhorn limits in finitely many steps**, with *Melvyn Nathanson*, *Linear Algebra and its Applications*.
- 2016 **Searching large hypothesis spaces by asking questions**, with *Brenden Lake*, *Proceedings of the 38th Annual Conference of the Cognitive Science Society*.

Preprints

- 2022 **Fractal uncertainty for discrete 2D Cantor sets**, submitted.
- 2023 **Every real-rooted exponential polynomial is the restriction of a Lee-Yang polynomial**, with *Lior Alon and Cynthia Vinzant*, arXiv.

Talks

Invited seminar talks

- 2022 **Fractal uncertainty for discrete 2D Cantor sets**, *Harmonic analysis afternoon*, *Institute for Advanced Study*.

- 2022 **A fractal uncertainty principle for discrete 2D Cantor sets**, *Harmonic Analysis and Differential Equations Seminar*, University of California, Berkeley.
- 2022 **Partition rank vs. analytic rank of tensors**, *MIT/Harvard Combinatorics Seminar*, MIT.
- 2022 **An optimal inverse theorem for polynomials over large fields**, *Number Theory Seminar*, CUNY Graduate Center.
Recording: <https://www.youtube.com/watch?v=ui90gBkLEqc>
- 2021 **Equivalence of 3-tensor ranks**, *Big Seminar*, Laboratory Of Combinatorial And Geometric Structures at MIPT.
Recording: <https://www.youtube.com/watch?v=MxbgwBSsHoU>
- 2019 **Sinkhorn limits in finitely many steps**, *Number Theory Student Seminar*, CUNY Graduate Center.
- 2019 **A Sylvester-Gallai result for concurrent lines in the complex plane**, *NYC Discrete Geometry Seminar*, NYU Courant.

Conference talks

- 2022 **Partition rank vs. analytic rank of tensors**, *Tensors: Quantum Information, Complexity and Combinatorics workshop*, Centre de recherches mathematiques thematic semester on *Symmetries: Algebras and Physics*, expected.
- 2022 **An optimal inverse theorem for polynomials**, *Joint Mathematics Meeting*, special session on undergraduate research.
- 2022 **A Sylvester-Gallai theorem for concurrent lines in the complex plane**, *AMS Spring Sectional Meeting*, special session on Discrete Geometry.
- 2021 **Structure vs. randomness for bilinear maps**, *Symposium on the Theory of Computing 2021*.
Recording: <https://www.youtube.com/watch?v=HaMuRzdkuFQ>
- 2020 **Partition rank vs. geometric rank of tensors**, *Young Mathematicians Conference*, The Ohio State University.
- 2020 **A Sylvester-Gallai result for concurrent lines in the complex plane**, *Combinatorial and Additive Number Theory conference*, CUNY.

Activities

- 2020,2021 **Yale Math 305 (Real Analysis) Undergraduate Learning Assistant.**
- 2019 **Yale Math 350 (Abstract Algebra) Undergraduate Learning Assistant.**
- 2019-2020 **Yale Math department peer mentor.**
- 2019 **Yale Math Student Advisory Committee**, *founding member.*
- 2019 **Yale Undergraduate Math Society**, *Board member, seminar organizer.*

Achievements

- 2022 Hertz Foundation Fellow, *National fellowship*
- 2022 NSF Graduate Research Fellowship Recipient, *National Award*

- 2022 Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student: Honorable Mention, *National award*
- 2021 DeForest prize for proficiency in pure and applied mathematics, *Yale University Departmental Prize*
- 2020 Anthony D. Stanley memorial prize for excellence in mathematics, *Yale University Departmental Prize*
- 2020 Barry M. Goldwater Scholarship, *National Scholarship*