Yuval Wigderson

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Research interests

Extremal combinatorics, Ramsey theory, algebraic and probabilistic techniques in combinatorics, extremal graph theory, and applications to theoretical computer science.

Affiliations

ETH Zürich   2023–present
    Junior Fellow at the Institute for Theoretical Studies
    Hosted by Benny Sudakov
Tel Aviv University   2022–2023
    Postdoctoral fellow
    Hosted by Michael Krivelevich, Wojciech Samotij, and Asaf Shapira
Stanford University   2016–2022
    PhD in Mathematics, advised by Jacob Fox
Princeton University   2012–2016
    A.B. in Mathematics, graduated *summa cum laude*

Selected fellowships and awards

Discrete Mathematics Oustanding Reviewer Award	2022
George Pólya Teaching Fellow Award	2022
NSF Graduate Research Fellowship	2017–2021
Hertz Fellowship Finalist	2017
Barry Goldwater Scholarship	2015–2016
NSF Center for Science of Information Research Fellowship	2015–2016
George B. Wood Legacy Junior Prize	2015
Middleton Miller '29 Prize	2016
Princeton's PACM Director's Fellowship	2014

Preprints

D. Bradač, B. Sudakov, and Y. Wigderson, Counting subgraphs in locally dense graphs, 2024. Preprint available at arXiv:2406.12418.

A. Girão, Z. Hunter, and Y. Wigderson, Blowups of triangle-free graphs, 2024. Preprint available at arXiv:2408.12913.

L. Gishboliner, A. Milojević, B. Sudakov, and Y. Wigderson, Canonical Ramsey numbers of sparse graphs, 2024. Preprint available at arXiv:2410.08644.

P. Morawski and Y. Wigderson, Oriented Ramsey numbers of graded digraphs, 2024. Preprint available at arXiv:2405.01069.

Y. Wigderson, Infinitely many minimally non-Ramsey size-linear graphs, 2024. Preprint available at arXiv:2409.05931.

E. Kuperwasser, W. Samotij, and Y. Wigderson, On the Kohayakawa–Kreuter conjecture, 2023. Preprint available at arXiv:2307.16611.

Publications

M. Christoph, A. Martinsson, R. Steiner, and Y. Wigderson, Resolution of the Kohayakawa–Kreuter conjecture, *Proc. Lond. Math. Soc.* (2024), to appear. Preprint available at arXiv:2402.03045.

J. Fox, X. He, and Y. Wigderson, Ramsey numbers of sparse digraphs, *Israel J. Math.* (2024), to appear. Preprint available at arXiv:2105.02383.

L. Gishboliner, A. Shapira, and Y. Wigderson, An efficient asymmetric removal lemma and its limitations, *Forum Math. Sigma* (2024), to appear. Preprint available at arXiv:2301.07693.

I. Haviv, S. Mattheus, A. Milojević, and Y. Wigderson, Larger nearly orthogonal sets over finite fields, *Discrete Math.* (2024), to appear. Preprint available at arXiv:2404.01057.

M. Kwan and Y. Wigderson, The inertia bound is far from tight, *Bull. Lond. Math. Soc.* **56** (2024), 3196–3208.

Y. Li, Y. Qiao, A. Wigderson, Y. Wigderson, and C. Zhang, On linear-algebraic notions of expansion, *Theory Comput.* (2024), to appear. Preprint available at arXiv:2212.13154.

Y. Wigderson, Ramsey numbers upon vertex deletion, *J. Graph Theory* **106** (2024), 663–675.

Y. Wigderson, Upper bounds on diagonal Ramsey numbers [after Campos, Griffiths, Morris, and Sahasrabudhe], *Astérisque* (2024), to appear. Preprint available at arXiv:2411.09321.

D. Conlon, J. Fox, and Y. Wigderson, Off-diagonal book Ramsey numbers, *Combin. Probab. Comput.* **32** (2023), 516–545.

D. Conlon, J. Fox, and Y. Wigderson, Three early problems on size Ramsey numbers, *Combinatorica* **43** (2023), 743–768.

J. Fox, X. He, and Y. Wigderson, Ramsey goodness of books revisited, *Adv. Comb.* (2023), Paper No. 4, 21pp.

J. Fox and Y. Wigderson, Minimum degree and the graph removal lemma, *J. Graph Theory* **102** (2023), 648–665.

J. Fox and Y. Wigderson, Ramsey multiplicity and the Turán coloring, *Adv. Comb.* (2023), Paper No. 2, 39pp.

Y. Li, Y. Qiao, A. Wigderson, Y. Wigderson, and C. Zhang, Connections between graphs and matrix spaces, *Israel J. Math.* **256** (2023), 513–580.

D. Conlon, J. Fox, and Y. Wigderson, Ramsey numbers of books and quasirandomness, *Combinatorica* **42** (2022), 309–363.

L. Sauermann and Y. Wigderson, Polynomials that vanish to high order on most of the hypercube, *J. Lond. Math. Soc. (2)* **106** (2022), 2379–2402.

J. Fox, S. Luo, and Y. Wigderson, Extremal and Ramsey results on graph blowups, *J. Comb.* **12** (2021), 1–15.

X. He and Y. Wigderson, Hedetniemi's conjecture is asymptotically false, *J. Combin. Theory Ser. B* **146** (2021), 485–494.

A. Wigderson and Y. Wigderson, The uncertainty principle: variations on a theme, *Bull. Amer. Math. Soc. (N.S.)* **58** (2021), 225–261.

Y. Wigderson, An improved lower bound on multicolor Ramsey numbers, *Proc. Amer. Math. Soc.* **149** (2021), 2371–2374.

J. Fox, X. He, and Y. Wigderson, Ramsey, paper, scissors, *Random Structures Algorithms* **57** (2020), 1157–1173.

J. Fox, Y. Wigderson, and Y. Zhao, A short proof of the canonical polynomial van der Waerden theorem, *C. R. Math. Acad. Sci. Paris* **358** (2020), 957–959.

X. He and Y. Wigderson, Multicolor Ramsey numbers via pseudorandom graphs, *Electron. J. Combin.* **27** (2020), Paper No. 1.32, 8pp.

Y. Wigderson, The Bar-Natan theory splits, *J. Knot Theory Ramifications* **25** (2016), 1650014, 19pp.

E. Abbe and Y. Wigderson, High-girth matrices and polarization, in *2015 IEEE International Symposium on Information Theory (ISIT)*, 2015, 2461–2465.

Teaching and mentorship

Park City Mathematics Institute
    Undergraduate Summer School on Extremal combinatorics   Summer 2025
ETH Zürich lead instructor
    Ramsey theory   Spring 2024
ETH Zürich MSc advisor
    Advised three Master's students on theses and semester projects   2023–present
Stanford University teaching assistant
    Math 101 (Math Discovery Lab)   Winter 2022
    Math 61DM (Modern Mathematics: Discrete Methods)   Fall 2021
    Math 61DM (Modern Mathematics: Discrete Methods)   Fall 2019

Stanford University course assistant

Math 163/Classics 136 (The Greek Invention of Mathematics)	Spring 2022
Math 205B (Real Analysis)	Winter 2020
Math 163/Classics 136 (The Greek Invention of Mathematics)	Fall 2017
Math 104 (Applied Matrix Theory)	Winter 2017
Math 175 (Elementary Functional Analysis)	Fall 2016

Stanford University Directed Reading Program

Mentored nine undergraduate reading projects over several years	2017–2022

Canada/USA Mathcamp

Academic Coordinator	2020
Graduate student instructor	2017, 2022
Undergraduate counselor	2013, 2015, 2016

Other professional experience

Program Committee member for STOC 2024	2023
Reviewer for Math Reviews	2021–present
Co-organizer of Stanford's Combinatorics Reading Seminar	2019–2022
Chaired two hiring committees for Canada/USA Mathcamp	2021–2023
Financial Officer for Stanford's Graduate Math Outreach Organization	2018–2022
Member of ten hiring committees for Canada/USA Mathcamp	2016–present

Refereed over 50 papers for over 25 journals, including:
Advances in Mathematics; Annals of Mathematics; Israel Journal of Mathematics; Journal of the LMS; Transactions of the AMS

Invited talks

Brazilian School of Combinatorics (**plenary speaker**)	2025
University of Bonn discrete mathematics seminar	2025
Heidelberg University TCS and discrete mathematics seminar	2024
UMass Amherst Mathematics colloquium	2024
IBS ECOPRO Workshop on developments in combinatorics	2024
Bourbaki seminar	2024
Georgia Tech combinatorics seminar	2024
Atlanta Lecture Series in Combinatorics XXIX	2024
Carnegie Mellon University ACO seminar	2024
Rutgers University discrete math seminar	2024
Princeton University discrete math seminar	2024
Simons Institute Workshop on Sublinear Graph Simplification	2024
Algebraic graph theory online seminar	2024
Tel Aviv University combinatorics seminar	2024
IST Austria combinatorics, geometry, and topology seminar	2023
ETH-ITS Fellows' Seminar	2023
TU Graz combinatorics seminar	2023

Oxford University combinatorial theory seminar	2023
Bar-Ilan University combinatorics seminar	2022
Technion combinatorics seminar	2022
CRM workshop on tensors, quantum information, complexity, and combinatorics	2022
Hebrew University combinatorics seminar	2022
Tel Aviv University combinatorics seminar	2022
National University of Singapore combinatorics and graph theory seminar	2022
2022 SIAM conference on Discrete Mathematics	2022
MIT-Harvard-MSR combinatorics seminar	2022
Stanford combinatorics seminar	2021
Moscow Conference on Combinatorics and Applications	2021
Hebrew University combinatorics seminar	2021
University of Massachusetts, Amherst discrete math seminar	2021
Moscow Institute of Physics and Technology geometry and combinatorics seminar	2021
Banach spaces webinar	2021
Princeton University discrete math seminar	2021
University of Wisconsin, Madison analysis seminar	2020
Stanford combinatorics seminar	2020
19th International Conference on Random Structures and Algorithms	2019
Princeton Science of Information Day	2015
IEEE International Symposium on Information Theory	2015