

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

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

Selected fellowships and awards

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| <i>Discrete Mathematics</i> Outstanding 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](https://arxiv.org/abs/2406.12418).
- M. Christoph, A. Martinsson, R. Steiner, and Y. Wigderson, Resolution of the Kohayakawa-Kreuter conjecture, 2024. Preprint available at [arXiv:2402.03045](https://arxiv.org/abs/2402.03045).
- A. Girão, Z. Hunter, and Y. Wigderson, Blowups of triangle-free graphs, 2024. Preprint available at [arXiv:2408.12913](https://arxiv.org/abs/2408.12913).
- I. Haviv, S. Mattheus, A. Milojević, and Y. Wigderson, Larger nearly orthogonal sets over finite fields, 2024. Preprint available at [arXiv:2404.01057](https://arxiv.org/abs/2404.01057).

- 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

- 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.
- M. Kwan and Y. Wigderson, The inertia bound is far from tight, *Bull. Lond. Math. Soc.* (2024), to appear. Preprint available at arXiv:2312.04925.
- 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.
- 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

ETH Zürich lead instructor

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| Ramsey theory | Spring 2024 |
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Stanford University teaching assistant

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| Math 101 (Math Discovery Lab) | Winter 2022 |
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| Math 61DM (Modern Mathematics: Discrete Methods) | Fall 2021 |
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| Math 61DM (Modern Mathematics: Discrete Methods) | Fall 2019 |
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Stanford University course assistant

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| Math 205B (Real Analysis) | Winter 2020 |
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| Math 163/Classics 136 (The Greek Invention of Mathematics) | Fall 2017 |
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| Math 104 (Applied Matrix Theory) | Winter 2017 |
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| Math 175 (Elementary Functional Analysis) | Fall 2016 |
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Stanford University Directed Reading Program

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| Mentored nine undergraduate reading projects over several years | 2017–2022 |
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| Financial officer of the program | 2018–2022 |
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Canada/USA Mathcamp

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| Academic Coordinator | 2020 |
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| Graduate student instructor | 2017, 2022 |
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| Undergraduate counselor | 2013, 2015, 2016 |
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Other professional experience

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| 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 |
| Member of ten hiring committees for Canada/USA Mathcamp | 2016-present |
| Refereed over 50 papers for over 25 journals, including: | |
| <i>Advances in Mathematics; Annals of Mathematics; Israel Journal of Mathematics; Journal of the LMS; Transactions of the AMS</i> | |

Invited talks

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| Georgia Tech combinatorics seminar | 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 |