

Ray Li

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POSITIONS

Santa Clara University, Assistant Professor of Computer Science 2023 -
UC Berkeley, NSF Postdoctoral Fellow, EECS 2022 - 2023
Host: Venkatesan Guruswami.

EDUCATION

Stanford University, PhD in COMPUTER SCIENCE. 2022
Advisors: Mary Wootters, Jacob Fox
Thesis: New combinatorial bounds for error correcting codes
Carnegie Mellon University, M.S., B.S. in MATHEMATICAL SCIENCES. 2017

AWARDS AND HONORS

NSF Mathematical Sciences Postdoctoral Research Fellowship 2022 - 2023
NSF Graduate Research Fellowship Program 2017 - 2022
Knaster McWilliams Scholarship (CMU full tuition merit scholarship) 2013 - 2017
Putnam N1 (Top 16) 2015
International Math Olympiad (IMO) Silver Medal 2013
International Olympiad in Informatics (IOI) team candidate (Top 8) 2012, 2013

TEACHING EXPERIENCE

3x Course Assistant at STANFORD UNIVERSITY 2019 - 2022
(upper division) The Modern Algorithmic Toolbox
(graduate) Computational Complexity
(graduate) Randomized Algorithms and Probabilistic Analysis
Teaching Assistant at CARNEGIE MELLON UNIVERSITY 2015
(lower division) Concepts of Mathematics
7x Instructor at IDEAMATH (Middle and High school) 2012 - 2022
Total 300+ classroom hours. Includes two online programs.
2x Instructor at MATH OLYMPIAD PROGRAM (High school) 2017, 2018
[Selected teaching materials available.](#)

UNDERGRADUATE/M.S. STUDENTS SUPERVISED

- Francisco Pernice (Stanford), Summer 2021. *CRA Outstanding Undergraduate Researcher Runner-Up*.
- Jabari Hastings (Stanford), Summer 2020. *Winner of Stanford CURIS “Outstanding Poster Award”, 2020*.
- Amy Kanne (Stanford), Summer 2020. *Winner of the Math Department’s Undergraduate Research Award, 2021*.

PROFESSIONAL SERVICE

- Conference Reviewer: STOC, FOCS, SODA, ITCS, RANDOM, ISIT, ICALP, ESA, CPM, ITW
- Journal Reviewer: J. ACM, SICOMP, ACM TALG, IEEE Trans. Info. Th., Algorithmica, J. Comb. Th. A, Electron. J. Comb., J. Graph Theory, IEEE Trans. Mol. Biol. Multi-Scale Commun., Fibonacci Quart., J. Number Theory
- Stanford CS PhD Admissions Committee
- Stanford CS Summer Undergraduate Research (CURIS) Mentor x2.
- Stanford CS Theory Retreat Organizer x2
- Stanford CS Theory First Year PhD Reading Group Organizer
- Stanford CS PhD Admitted Student buddy x2
- Stanford CS PhD Admissions Student Application Support Program
- Stanford CS Undergraduate Mentor
- Stanford Undergraduate Research Competition Judge
- Stanford Undergraduate Research Association Mentor
- National Science Bowl Question Writer
- Math Olympiad Problem Setter (USA IMO Team Selection [2017](#) x2, [2018](#), [2022](#), USA Junior Math Olympiad [2018](#))

CONFERENCE PUBLICATIONS

Note: In theoretical computer science, refereed conferences are the primary publication venues, and in math, journals are the primary publication venue. For both, the convention is that authors’ names are listed alphabetically.

- C19 A. Abboud, M. Dalirrooyfard, **R. Li**, and V. Vassilevska Williams, On Diameter Approximation in Directed Graphs, *ESA*, 2023.
- C18 N. Baspin, V. Guruswami, A. Krishna, and **R. Li**, Improved rate-distance trade-offs for quantum codes with restricted connectivity, *QEC*, 2023.
- C17 X. He and **R. Li**, Approximating binary longest common subsequence in almost-linear time, *STOC*, to appear, 2023.

- C16 F. Pernice, R. Li, and M. Wootters, Efficient Near-Optimal Codes for General Repeat Channels, Proceedings of the 2022 IEEE International Symposium on Information Theory (ISIT), 3097–3102, 2022.
- C15 R. Li and M. Wootters, Improved batch code lower bounds, Proceedings of the 2022 IEEE International Symposium on Information Theory (ISIT), 1596–1599, 2022.
- C14 V. Guruswami, X. He, and R. Li, The zero rate threshold for adversarial bit deletions is less than $1/2$, Proceedings of the 62nd IEEE Annual Symposium on Foundations of Computer Science (FOCS), 727–738, 2021.
- C13 M. Dalirrooyfard, R. Li, and V. Vassilevska Williams, Hardness of Approximate Diameter: Now for Undirected Graphs, Proceedings of the 62nd IEEE Annual Symposium on Foundations of Computer Science (FOCS), 1021–1032, 2021.
- C12 Z. Guo, R. Li, C. Shangguan, I. Tamo, and M. Wootters, Improved List-Decodability of Reed–Solomon Codes via Tree Packings, Proceedings of the 62nd IEEE Annual Symposium on Foundations of Computer Science (FOCS), 708–719, 2021.
- C11 J. Hastings, A. Kanne, R. Li, and M. Wootters, Wedge-Lifted codes, Proceedings of the 2021 IEEE International Symposium on Information Theory (ISIT), 2990–2995, 2021.
- C10 R. Li, Settling SETH vs. Approximate Sparse Directed Unweighted Diameter (up to (NU)NSETH), Proceedings of the 53rd Annual ACM Symposium on Theory of Computing (STOC), 1684–1696, 2021.
- C9 V. Guruswami, R. Li, M. Mosheiff, N. Resch, S. Silas, and M. Wootters, Bounds for list-decoding and list-recovery of random linear codes, Proceedings of the 24th International Conference on Randomization and Computation (RANDOM), 9:1–9:21, 2020.
- C8 J. Brakensiek, R. Li, and B. Spang, Coded trace reconstruction in a constant number of traces, Proceedings of the 61st IEEE Annual Symposium on Foundations of Computer Science (FOCS), 482–493, 2020.
- C7 R. Li, P. Liang, and S. Mussmann, A tight analysis of greedy yields subexponential time approximation for uniform decision tree, Proceedings of the 30th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 102–121, 2020.
- C6 C. Carlson, A. Kolla, R. Li, N. Mani, B. Sudakov, and L. Trevisan, Lower bounds for max-cut in H-free graphs via semidefinite programming, Proceedings of the 14th Latin American Symposium on Theoretical Informatics (LATIN), 479–490, 2020.
- C5 R. Li and M. Wootters, Lifted multiplicity codes and the disjoint repair group property, Proceedings of the 23rd International Conference on Randomization and Computation (RANDOM), 38:1–38:18, 2019.
- C4 R. Li and M. Wootters, Improved list-decodability of random linear binary codes, Proceedings of the 22nd International Conference on Randomization and Computation (RANDOM) 67, 50:1–50:19, 2018.
- C3 V. Guruswami and R. Li, Coding against deletions in oblivious and online models, Proceedings of the 28th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 625–643, 2018.

- C2 V. Guruswami and R. Li, Efficiently decodable codes for the binary deletion channel, Proceedings of the 21st International Workshop on Randomization and Computation (**RANDOM**), 47:1–47:13, 2017.
- C1 V. Guruswami and R. Li, Efficiently decodable insertion/deletion codes for high-noise and high-rate regimes, Proceedings of the 2016 IEEE International Symposium on Information Theory (**ISIT**), 620–624, 2016.

JOURNAL PUBLICATIONS

- J10 V. Guruswami, R. Li, M. Mosheiff, N. Resch, S. Silas, and M. Wootters, Bounds for list-decoding and list-recovery of random linear codes, *IEEE Transactions on Information Theory* **68**, 923–939, 2021., Conference version in **RANDOM** 2020.
- J9 C. Carlson, A. Kolla, R. Li, N. Mani, B. Sudakov, and L. Trevisan, Lower bounds for max-cut in H-free graphs via semidefinite programming, *SIAM Journal on Discrete Mathematics* **35**, 1557–1568, 2021., Conference version in **LATIN** 2020.
- J8 R. Li and M. Wootters, Lifted multiplicity codes and the disjoint repair group property, *IEEE Transactions on Information Theory* **67**, 716–725, 2021., Conference version in **RANDOM** 2019.
- J7 R. Li and M. Wootters, Improved list-decodability of random linear binary codes, *IEEE Transactions on Information Theory* **67**, 1522–1536, 2021., Conference version in **RANDOM** 2018.
- J6 X. He and R. Li, Hat guessing numbers of degenerate graphs, *Electronic Journal of Combinatorics* **27**, 2020.
- J5 J. Fox and R. Li, On edge-ordered Ramsey numbers, *Random Structures and Algorithms* **57**, 1174–1204, 2020.
- J4 V. Guruswami and R. Li, Coding against deletions in oblivious and online models, *IEEE Transactions on Information Theory* **66**, 2352–2374, 2020., Conference version in **SODA** 2018.
- J3 J. Fox and R. Li, On Ramsey numbers of hedgehogs, *Combinatorics, Probability, and Computing* **29**, 101–112, 2019.
- J2 V. Guruswami and R. Li, Polynomial time decodable codes for the binary deletion channel, *IEEE Transactions on Information Theory* **65**, 2171–2178, 2019., Conference version in **RANDOM** 2017.
- J1 R. Li and S. J. Miller, Central limit theorems for gaps of Generalized Zeckendorf Decompositions, *Fibonacci Quarterly* **57**, 213–230, 2019., Conference version in Proceedings of the 17th International Fibonacci Conference.

TALKS

- T37 Approximating Binary Longest Common Subsequence in Almost-Linear Time, **STOC** 2023, June 2023.
- T36 Deletion codes: Fundamental limits, Constructions, and Applications, Texas A&M Computer Science, February 2023.

- T35 Deletion codes: Fundamental limits, Constructions, and Applications, Rice University Computer Science Colloquium, January 2023.
- T34 Deletion codes: Fundamental limits, Constructions, and Applications, Santa Clara University Math&CS Colloquium, January 2023.
- T33 Fine Grained Complexity and Approximating the Diameter of a Graph, Stanford Faculty Lunch, March 2022.
- T32 Hardness of approximate Diameter: now for undirected graphs, FOCS 2022, February 2022.
- T31 The zero-rate threshold of adversarial bit-deletions is less than $1/2$, FOCS 2022, February 2022.
- T30 The zero-rate threshold of adversarial bit-deletions is less than $1/2$, Rutgers Theory Seminar, January 2022.
- T29 Two stories in coding theory, Talks at TTIC, January 2022.
- T28 The zero-rate threshold of adversarial bit-deletions is less than $1/2$, University of Washington Theory Seminar, October 2021.
- T27 Approximating Graph Diameter: Algorithms, Hardness, and Hardness of Hardness, USC Theory Lunch, October 2021.
- T26 Approximating Graph Diameter: Algorithms, Hardness, and Hardness of Hardness, UCSD Theory Seminar, October 2021.
- T25 The zero-rate threshold of adversarial bit-deletions is less than $1/2$, Michigan-Purdue Theory Seminar, September 2021.
- T24 What is... an error correcting code, What is... a seminar?, September 2021.
- T23 Settling SETH vs. Approximate Sparse Directed Unweighted Diameter (up to $(\text{NU})\text{NSETH}$), STOC, June 2021.
- T22 Settling SETH vs. Approximate Sparse Directed Unweighted Diameter (up to $(\text{NU})\text{NSETH}$), Sydney Algorithms and Computing Theory Seminar, May 2021.
- T21 Improve list-decoding of Reed Solomon codes via tree-packings, University of Delaware, Discrete Mathematics/Algebra Seminar, February 2021.
- T20 Improve list-decoding of Reed Solomon codes via tree-packings, UChicago/TTIC Coding Theory reading group, January 2021.
- T19 Coded trace reconstruction in a constant number of traces, FOCS, November 2020.
- T18 Settling SETH vs. Approximate Sparse Directed Unweighted Diameter (up to $(\text{NU})\text{NSETH}$), Stanford Theory Lunch, November 2020.
- T17 Fine grained hardness of approximation, Stanford Computer Science Theory Qualifying Exam, March 2020.
- T16 Coded trace reconstruction in a constant number of traces, Stanford theory lunch, January 2020.

- T15 A tight analysis of greedy yield subexponential time approximation on uniform decision tree, Symposium on Discrete Algorithms (SODA), January 2020.
- T14 Coded trace reconstruction in a constant number of traces, TOCA-SV, November 2019.
- T13 Lifted multiplicity codes and the disjoint repair group property, Stanford theory lunch, August 2019.
- T12 Edge-ordered Ramsey numbers, Random structures and algorithms, Zurich, July 2019.
- T11 Edge-ordered Ramsey numbers, Stanford combinatorics seminar, April 2019.
- T10 Beating a $O(\log n)$ approximation on an active learning problem, Stanford theory lunch, January 2019.
- T9 Improved list decodability of random linear binary codes, RANDOM, Princeton, August 2018.
- T8 Randomness in math and computer science, Math Olympiad Summer Program (MOP), June 2018.
- T7 Random linear binary codes have smaller list sizes than uniformly random binary codes, CMU theory lunch, March 2018.
- T6 Random linear binary codes have smaller list sizes than uniformly random binary codes, Stanford theory lunch, March 2018.
- T5 Coding against deletions in oblivious and online models, Symposium on Discrete Algorithms (SODA), New Orleans, January 2018.
- T4 Efficiently decodable codes for the binary deletion channel, RANDOM, Berkeley, August 2017.
- T3 A collection of central limit type results in Generalized Zeckendorf Decompositions, Young Mathematicians Conference (YMC), Columbus, August 2016.
- T2 Efficiently decodable insertion/deletion codes for high-noise and high-rate regimes, International Symposium on Information Theory (ISIT), Barcelona, July 2016.
- T1 Convergence rates in generalized Zeckendorf decomposition problems, Workshop on Combinatorial and Additive Number Theory (CANT), May 2016.

ADDITIONAL WORK EXPERIENCE

- SUMMER 2015 Assistant Trading Intern at JANE STREET CAPITAL LLC, New York, NY
- 2014 - 2015 CTO at EXP11 INC., Pittsburgh, PA