

Zeyu Guo

Research Fellow

Department of Computer Science
The University of Texas at Austin
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Education

- 2014.6–2017.6 **Doctor of Science**, *Computing and Mathematical Sciences Department, California Institute of Technology.*
PhD thesis: *\mathcal{P} -schemes and Deterministic Polynomial Factoring over Finite Fields*
Advisor: Chris Umans
- 2010.9–2014.6 **Master of Science**, *Computing and Mathematical Sciences Department, California Institute of Technology.*
Master's thesis: *Randomness-Efficient Curve Sampling*
Advisor: Chris Umans
- 2006.9–2010.6 **Bachelor of Science**, *School of Computer Science, Fudan University.*

Research Interests

Pseudorandomness, Coding Theory, Algebraically Complexity Theory, Algebraic Methods in Theoretical Computer Science

Research Experience

- 2021.9–present **Research Fellow**, *Department of Computer Science, UT Austin.*
Advisor: David Zuckerman
- 2019.9–2021.8 **Postdoctoral Researcher**, *Department of Computer Science, University of Haifa.*
Advisor: Noga Ron-Zewi
- 2017.9–2019.7 **Postdoctoral Researcher**, *Department of Computer Science and Engineering, Indian Institute of Technology Kanpur.*
Advisor: Nitin Saxena
- 2010.9–2017.6 **Research Assistant**, *California Institute of Technology.*
Advisor: Chris Umans
- 2013.8–2013.9 **Visiting student**, *Max Planck Institute for Computer Science.*
- 2012.8–2012.9 **Visiting student**, *Max Planck Institute for Computer Science.*
- 2008.9–2009.1 **Exchange Student**, *The University of Hong Kong.*
Advisor: Francis Y. L. Chin
- 2007.3–2008.9 **Research Assistant**, *Fudan University.*
Advisor: Hong Zhu

Teaching Experience

2014 Spring **Head Teaching Assistant**, *Introduction to Algorithms, Caltech CS38*.

2013 Spring **Teaching Assistant**, *Complexity Theory, Caltech CS151*.

2012 Winter **Teaching Assistant**, *Computer Algorithms, Caltech CS138*.

Publications

- **Zeyu Guo**, Ray Li, Chong Shangguan, Itzhak Tamo, and Mary Wootters. Improved List-Decodability and List-Recoverability of Reed–Solomon Codes via Tree Packings. In *Proceedings of the 62nd Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 708–719, 2021.
- **Zeyu Guo**. Variety-Evasive Subspace Families. In *Proceedings of the 36th Computational Complexity Conference (CCC)*, pages 20:1–20:33, 2021.
- **Zeyu Guo** and Noga Ron-Zewi. Efficient List-Decoding with Constant Alphabet and List Sizes. In *Proceedings of the 53rd Annual ACM SIGACT Symposium on Theory of Computing (STOC)*, pages 1502–1515, 2021. Journal version in *IEEE Transactions on Information Theory* 68(3): 1663–1682, 2022.
- **Zeyu Guo**. Factoring Polynomials over Finite Fields with Linear Galois Groups: An Additive Combinatorics Approach. In *Proceedings of the 45th International Symposium on Mathematical Foundations of Computer Science (MFCS)*, pages 42:1–42:14, 2020.
- **Zeyu Guo** and Rohit Gurjar. Improved Explicit Hitting-Sets for ROABPs. In *Proceedings of the 24th International Workshop on Randomization and Computation (RANDOM)*, pages 4:1–4:16, 2020.
- **Zeyu Guo**. Deterministic Polynomial Factoring over Finite Fields: A Uniform Approach via \mathcal{P} -Schemes. *Journal of Symbolic Computation* 96: 22–67, 2020.
- **Zeyu Guo**, Mrinal Kumar, Ramprasad Saptharishi, and Noam Solomon. Derandomization from Algebraic Hardness: Treading the Borders. In *Proceedings of the 60th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 147–157, 2019. Journal version in *SIAM Journal on Computing* 51(2): 315–335, 2022.
- **Zeyu Guo**, Nitin Saxena, and Amit Sinhababu. Algebraic Dependencies and PSPACE Algorithms in Approximative Complexity. In *Proceedings of the 33rd Computational Complexity Conference (CCC)*, pages 10:1–10:21, 2018. Journal version in *Theory of Computing* 16(15): 1–30, 2019.
- **Zeyu Guo**, Anand Kumar Narayanan, and Chris Umans. Algebraic Problems Equivalent to Beating Exponent $3/2$ for Polynomial Factorization over Finite Fields. In *Proceedings of the 41st International Symposium on Mathematical Foundations of Computer Science (MFCS)*, pages 47:1–47:14, 2016.
- **Zeyu Guo** and He Sun. Gossip vs. Markov Chains, and Randomness-Efficient Rumor Spreading. In *Proceedings of the 26th ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 411–430, 2015.
- **Zeyu Guo**. Randomness-Efficient Curve Samplers, In *Proceedings of the 17th International Workshop on Randomization and Computation (RANDOM)*, pages 575–590, 2013.

- Francis Y. L. Chin, **Zeyu Guo**, and He Sun. Minimum Manhattan Network is NP-Complete, In *Proceedings of the 25th Annual Symposium on Computational Geometry (SCG)*, pages 393–402, 2009. Journal version in *Discrete and Computational Geometry* 45(4): 701–722, 2011.
- **Zeyu Guo**, He Sun, and Hong Zhu. Greedy Construction of 2-Approximation Minimum Manhattan Network, In *Proceedings of the 19th International Symposium on Algorithms and Computation (ISAAC)*, LNCS 5369, pages 4–15, 2008. Journal version in *International Journal of Computational Geometry and Applications* 21(3): 331–350, 2011.
- **Zeyu Guo**, He Sun, and Hong Zhu. A Fast 2-Approximation Algorithm for the Minimum Manhattan Network Problem, In *Proceedings of the 4th International Conference on Algorithmic Aspects in Information and Management (AAIM)*, LNCS 5034, pages 212–223, 2008.

Manuscripts

- **Zeyu Guo**. Deterministic Polynomial Factoring over Finite Fields with Restricted Galois Groups. URL: <https://zeyuguo.bitbucket.io/papers/galois.pdf>

Presentations

- 2022.2 *The 62nd Annual IEEE Symposium on Foundations of Computer Science*, virtual conference.
- 2021.11 *The 4th Annual Meeting of the SIAM Texas-Louisiana Section, Minisymposium of Algorithmic Algebra and Geometry*, UTRGV, South Padre Island, USA.
- 2021.7 *The 36th Computational Complexity Conference*, virtual conference.
- 2021.6 *The 53rd ACM Symposium on Theory of Computing*, virtual conference.
- 2020.12 Research Center for Mathematics and Interdisciplinary Sciences, Shandong University, Qingdao, China.
- 2020.11 *Technion Theory Lunch*, Technion, Haifa, Israel.
- 2020.8 *The 45th International Symposium on Mathematical Foundations of Computer Science*, virtual conference.
- 2020.8 *The 24th International Workshop on Randomization and Computation*, virtual conference.
- 2019.3 *Workshop on Algebraic Complexity Theory*, Tata Institute of Fundamental Research, Bengaluru, India.
- 2019.3 Indian Institute of Technology Bombay, Mumbai, India.
- 2019.1 *MPI-INF and MPI-MiS joint workshop on Theoretical Computer Science and Algebraic Geometry*, Max Planck Institute for Informatics, Saarbrücken, Germany.
- 2016.8 *The 41st International Symposium on Mathematical Foundations of Computer Science*, Krakow, Poland.

- 2015.7 *The 12th International Conference on Finite Fields and Their Applications*, Saratoga Springs, USA.
- 2015.1 *The 26th ACM-SIAM Symposium on Discrete Algorithms*, San Diego, USA.
- 2013.8 *China Theory Week*, Aarhus University, Denmark.
- 2012.8 Max Planck Institute for Informatics, Saarbrücken, Germany
- 2009.6 *The 25th Annual Symposium on Computational Geometry*, Aarhus University, Denmark.
- 2009.4 *The 2nd Annual Meeting of Asian Association for Algorithms and Computation*, Zhejiang University, China.
- 2008.6 *The 4th International Conference on Algorithmic Aspects in Information and Management*, Fudan University, China.
- 2008.4 *The 1st Annual Meeting of Asian Association for Algorithms and Computation*, The University of Hong Kong, China.

Selected Honors

- 2013 **Invited to participate in China Theory Week.**
Approximately 25-30 students are invited each year
- 2009 **President's Medal of Fudan University.**
Awarded to only two undergraduates in 2009 as the highest honor of Fudan University
- 2009 **Wangdao Scholar.**
Sponsored by Fudan Undergraduate Research Opportunities Program
- 2009 **National Scholarship.**
Awarded to the top one student in the class for the overall performance
- 2008 **Chun-Tsung Scholar.**
Sponsored by Chun-Tsung Undergraduate Research Endowment, which was established by Professor Tsung-Dao Lee
- 2005 **Bronze Medal**, National Olympiad in Informatics.

References

Chris Umans

Professor
California Institute of Technology
✉ umans@cs.caltech.edu

David Zuckerman

Professor
The University of Texas at Austin
✉ diz@cs.utexas.edu

Noga Ron-Zewi

Associate Professor
University of Haifa
✉ noga@cs.haifa.ac.il

Nitin Saxena

Professor
Indian Institute of Technology Kanpur
✉ nitin@cse.iitk.ac.in

Service to the community

- Referee for: SIAM Journal on Computing, Theory of Computing, Theoretical Computer Science, IEEE Transactions on Information Theory, COCOON 2013, STOC 2014, SODA 2018, FOCS 2019, COCOON 2019, ITCS 2020, STACS 2020, STOC 2020 (x3), CCC 2020 (x2), FOCS 2020, MFCS 2020, ITCS 2021, ISSAC 2021, RANDOM 2021, MFCS 2021, STOC 2022 (x2), ICALP 2022, CCC 2022

Computer Skills

Programming	C/C++, Pascal, Java
OS	Windows, Linux
Typography	L ^A T _E X
Mathematical software	SAGE, GAP, Mathematica, Matlab