

CURRICULUM VITAE

Hsin-Po Wang 王新博

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Education

Ph.D. in Math	University of Illinois Urbana-Champaign, Illinois	2016–2021
B.Sc. in Math	National Taiwan University 國立臺灣大學, Taiwan	2011–2015

Employment

Assistant Professor Department of Electrical Engineering 電機工程學系 Graduate Institute of Communication Engineering 電信工程學研究所 National Taiwan University 國立臺灣大學, Taiwan	August 2024–
Apple Research Fellow Simons Institute for the Theory of Computing, California	January–May 2024
Postdoctoral Scholar Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, California	October 2022–December 2023
Postdoctoral Scholar Department of Electrical and Computer Engineering, University of California San Diego, California	October 2021–September 2022
Teaching Assistant Department of Mathematics, University of Illinois Urbana-Champaign, Illinois	September 2016–May 2023
Substitute Service 教育服務役	September 2015–August 2016

Awards and Honors

Irving Reiner Memorial Award in Algebra	2021
Research Assistant Fellowship	Spring 2020
Teacher ranked as excellent by their students	Fall 2019, Spring 2019, Spring 2018
#2 cumulative GPA upon graduation 理學院院長獎	2015
top 5% GPA 書卷獎	Fall 15, Spring 14, Spring 13, Fall 12, Spring 12, Fall 11
Prof. Cheng-Tang Hsiao Memorial Scholarship 蕭正堂紀念獎學金	2014
Prof. Ta-Kai Hu Memorial Scholarship 胡達開先生紀念獎學金	2013

Research Interests

My interest are in **information theory** and **coding theory**. Working on polar codes (wireless communication), group testing (with many downstream applications), regenerating codes (cloud storage), distributed matrix multiplication (cloud computation), DNA digital data storage (archival storage), exact distribution shaping (randomized algorithm), and pessimistic cardinality estimation (database optimization). I specialize in finding applications of **algebra**, **combinatorics**, **calculus**, **probability theory**, and other mathematical tools to said topics.

Journal Publications (new to old)

- [J7] H.-P. Wang, V. Guruswami. **Geno-Weaving: A Framework for Low-Complexity Capacity-Achieving DNA Data Storage.** *IEEE Journal on Selected Areas in Information Theory*. September 2025.
- [J6] H.-P. Wang and R. Gabrys and A. Vardy. **Tropical Group Testing.** *IEEE Transactions on Information Theory*. June 2023.
- [J5] H.-P. Wang, T.-C. Lin, A. Vardy, R. Gabrys. **Sub-4.7 Scaling Exponent of Polar Codes.** *IEEE Transactions on Information Theory*. March 2023.
- [J4] I. Duursma, H.-P. Wang. **Multilinear Algebra for Minimum Storage Regenerating Codes: A Generalization of Product-Matrix Construction.** *Applicable Algebra in Engineering, Communication and Computing*. October 2021.
- [J3] I. Duursma, X. Li, H.-P. Wang. **Multilinear Algebra for Distributed Storage.** *SIAM Journal on Applied Algebra and Geometry (SIAGA)*. September 2021.
- [J2] H.-P. Wang, I. Duursma. **Log-logarithmic Time Pruned Polar Coding.** *IEEE Transactions on Information Theory*. March 2021.
- [J1] H.-P. Wang, I. Duursma. **Polar Codes' Simplicity, Random Codes' Durability.** *IEEE Transactions on Information Theory*. March 2021.

Peer-Reviewed Conference Publications (new to old)

- [C12] V. Guruswami, H.-P. Wang. **Semirandom Planted Clique via 1-norm Isometry Property.** *Conference on Integer Programming and Combinatorial Optimization (IPCO)*. June 2025.
- [C11] V. Guruswami, H.-P. Wang. **Capacity-Achieving Gray Codes.** *International Conference on Randomization and Computation (RANDOM)*. August 2024.
- [C10] H.-P. Wang, C.-W. Chin. **On Counting Subsequences and Higher-Order Fibonacci Numbers.** *IEEE International Symposium on Information Theory (ISIT)*. July 2024.
- [C9] H.-P. Wang, V. Guruswami. **Successive Cancellation Sampling Decoder: An Attempt to Analyze List Decoding Theoretically.** *IEEE International Symposium on Information Theory (ISIT)*. July 2024.
- [C8] H.-P. Wang, V. Guruswami. **Isolate and then Identify: Rethinking Adaptive Group Testing.** *IEEE International Symposium on Information Theory (ISIT)*. July 2024.
- [C7] H.-P. Wang, R. Gabrys, V. Guruswami. **Quickly-Decodable Group Testing with Fewer Tests: Price-Scarlett's Nonadaptive Splitting with Explicit Scalars.** *IEEE International Symposium on Information Theory (ISIT)*. June 2023.

- [C6] H.-P. Wang, C.-W. Chin. **Density Devolution for Ordering Synthetic Channels**. *IEEE International Symposium on Information Theory (ISIT)*. June 2023.
- [C5] T.-C. Lin, H.-P. Wang. **Optimal Self-Dual Inequalities to Order Polarized BECs**. *IEEE International Symposium on Information Theory (ISIT)*. June 2023.
- [C4] H.-P. Wang, V. Guruswami. **How Many Matrices Should I Prepare to Polarize Channels Optimally Fast?** *IEEE International Symposium on Information Theory (ISIT)*. June 2023.
- [C3] H.-P. Wang, V.-F. Dragoi. **Fast Methods for Ranking Synthetic BECs**. *IEEE International Symposium on Information Theory (ISIT)*. June 2023.
- [C2] I. Duursma, R. Gabrys, V. Guruswami, T.-C. Lin, H.-P. Wang. **Accelerating Polarization via Alphabet Extension**. *International Conference on Randomization and Computation (RANDOM)*. September 2022.
- [C1] H.-P. Wang, R. Gabrys, A. Vardy. **PCR, Tropical Arithmetic, and Group Testing**. *IEEE International Symposium on Information Theory (ISIT)*. June 2022.

Invited Talks (new to old)

- [T9] **Sidorenko-Inspired Pessimistic Cardinality Estimation for Join Queries**. *The Interplay Between Distance Geometry, Combinatorics, and Coding Theory (BrinMRC workshop)*. November 2025, College Park, Maryland.
- [T8] **If Rand(0)%10 is Bad, How to Use TRNG Efficiently?**. *Asia Pacific Workshop on Data Science and Information Theory (APWDSIT)*. September 2025, Shenzhen, China.
- [T7] **An Information Theory of Query Optimization**. *New Mathematical Directions in Coding Theory (MFO workshop)*. September 2025, Oberwolfach, Germany.
- [T6] **Sculpting Rational Distributions Accurately and Efficiently**. *Guangzhou, Hong Kong and Taipei Joint Workshop on Artificial Intelligence, Communications and Information Theory (AICIT 2025)*. July 2025, Guangzhou, China.
- [T5] **How to Speak Tensor**. *International AMS-UMI Joint Meeting*. July 2024, Palermo, Italy.
- [T4] **Geno-Weaving: Low-Complexity Capacity-Achieving Data Storage on DNA**. *Coding Theory and Algorithms for DNA-based Data Storage (ISIT's Satellite Workshop)*. July 2024, Athens, Greece.
- [T3] **GenoWeave: Interleaving Polar Codes Across Strands for DNA Data Storage**. *Information Theory and Applications Workshop (ITA)*. February 2024, San Diego, California.
- [T2] **Channel Manipulation as a Coding Technique**. *Joint Mathematics Meetings (JMM)*. January 2024, San Francisco, California.
- [T1] **Moulin Codes**. *SIAM Conference on Applied Algebraic Geometry (AG21)*. August 2021, virtual.