



## Mary Wootters

Associate Professor of Computer Science and of Electrical Engineering

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### Bio

#### ACADEMIC APPOINTMENTS

- Associate Professor, Computer Science
- Associate Professor, Electrical Engineering
- Member, Institute for Computational and Mathematical Engineering (ICME)

#### LINKS

- Personal website: <http://sites.google.com/site/marywootters>

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### Teaching

#### COURSES

##### 2025-26

- Design and Analysis of Algorithms: CS 161 (Aut)
- Randomized Algorithms and Probabilistic Analysis: CME 309, CS 265 (Win)

##### 2024-25

- Algebraic Error Correcting Codes: CS 250, EE 387 (Win)
- Randomized Algorithms and Probabilistic Analysis: CME 309, CS 265 (Win)

##### 2023-24

- Dealing with Data: OSPISTAN 20 (Aut)

##### 2022-23

- Citizenship in the 21st Century: COLLEGE 102 (Win)
- Design and Analysis of Algorithms: CS 161 (Spr)
- Randomized Algorithms and Probabilistic Analysis: CME 309, CS 265 (Aut)

#### STANFORD ADVISEES

##### Doctoral Dissertation Reader (AC)

Shaun Datta, Kamilla Nazirkhanova

##### Postdoctoral Faculty Sponsor

Tushant Mittal

#### Doctoral Dissertation Advisor (AC)

Keller Blackwell, Dorsa Fathollahi

#### Orals Evaluator

Xiao Mao, Jack Zhou

#### Master's Program Advisor

Adi Badlani, Vineel Bhat, Ryan Catullo, Jason Chen, Samantha Estrada, Lisa Liu, Hlumelo Notshe, Vikram Sivashankar, Vicky Wu, Seiji Yang, Allen Yuan

#### Doctoral (Program)

Keller Blackwell, Kamilla Nazirkhanova

## Publications

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### PUBLICATIONS

- **Optimization by decoded quantum interferometry.** *Nature*  
Jordan, S. P., Shutty, N., Wootters, M., Zalcman, A., Schmidhuber, A., King, R., Isakov, S. V., Khattar, T., Babbush, R.  
2025; 646 (8086): 831-836
- **Robust Gray Codes Approaching the Optimal Rate** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Con, R., Fathollahi, D., Gabrys, R., Wootters, M., Yaakobi, E.  
2025; 71 (3): 1647-1665
- **List-Decoding Capacity Implies Capacity on the  $q$ -ary Symmetric Channel**  
Pernice, F., Sprumont, O., Wootters, M.  
edited by Koucky, M., Bansal, N.  
ASSOC COMPUTING MACHINERY.2025: 855-866
- **Repairing Reed-Solomon Codes Over Prime Fields via Exponential Sums** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Con, R., Shutty, N., Tamo, I., Wootters, M.  
2024; 70 (12): 8587-8594
- **IMPROVED LIST-DECODABILITY AND LIST-RECOVERABILITY OF REED-SOLOMON CODES VIA TREE PACKINGS** *SIAM JOURNAL ON COMPUTING*  
Guo, Z., Li, R., Shangguan Chong, Tamo, I., Wootters, M.  
2024; 53 (2): 389-430
- **Improved Construction of Robust Gray Codes**  
Fathollahi, D., Wootters, M., IEEE  
IEEE.2024: 37-42
- **When Do Low-Rate Concatenated Codes Approach The Gilbert-Varshamov Bound?**  
Doron, D., Mosheiff, J., Wootters, M.  
edited by Kumar, A., Ron-Zewi, N.  
SCHLOSS DAGSTUHL, LEIBNIZ CENTER INFORMATICS.2024
- **A Characterization of Optimal-Rate Linear Homomorphic Secret Sharing Schemes, and Applications**  
Blackwell, K., Wootters, M.  
edited by Guruswami  
SCHLOSS DAGSTUHL, LEIBNIZ CENTER INFORMATICS.2024
- **LOW-DENSITY PARITY-CHECK CODES ACHIEVE LIST-DECODING CAPACITY** *SIAM JOURNAL ON COMPUTING*  
Mosheiff, J., Resch, N., Ron-zewi, N., Silas, S., Wootters, M.  
2024; 53 (6): 38-73

- **Viderman's algorithm for quantum LDPC codes**  
Krishna, A., Navon, I., Wootters, M.  
edited by Woodruff, D. P.  
SIAM.2024: 2481-2507
- **Magnetic DNA random access memory with nanopore readouts and exponentially-scaled combinatorial addressing.** *Scientific reports*  
Lau, B., Chandak, S., Roy, S., Tatwawadi, K., Wootters, M., Weissman, T., Ji, H. P.  
2023; 13 (1): 8514
- **IMPROVED LIST DECODING OF FOLDED REED-SOLOMON AND MULTIPLICITY CODES** *SIAM JOURNAL ON COMPUTING*  
Kopparty, S., Ron-Zewi, N., Saraf, S., Wootters, M.  
2023; 52 (3): 794-840
- **Bounds for List-Decoding and List-Recovery of Random Linear Codes** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Guruswami, V., Li, R., Mosheiff, J., Resch, N., Silas, S., Wootters, M.  
2022; 68 (2): 923-939
- **Threshold Rates for Properties of Random Codes** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Guruswami, V., Moshieff, J., Resch, N., Silas, S., Wootters, M.  
2022; 68 (2): 905-922
- **Asynchronous Distributed Optimization with Stochastic Delays**  
Glasgow, M., Wootters, M.  
edited by Camps-Valls, G., Ruiz, F. J., Valera  
JMLR-JOURNAL MACHINE LEARNING RESEARCH.2022
- **Improved List-Decodability and List-Recoverability of Reed-Solomon Codes via Tree Packings**  
Guo, Z., Li, R., Shangguan, C., Tamo, I., Wootters, M., IEEE COMP SOC  
IEEE COMPUTER SOC.2022: 708-719
- **Linear-Time Erasure List-Decoding of Expander Codes** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Ron-Zewi, N., Wootters, M., Zemor, G.  
2021; 67 (9): 5827-5839
- **Improved List-Decodability of Random Linear Binary Codes**  
Li, R., Wootters, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2021: 1522-36
- **Embedded Index Coding**  
Porter, A., Wootters, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2021: 1461-77
- **Lifted Multiplicity Codes and the Disjoint Repair Group Property** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Li, R., Wootters, M.  
2021; 67 (2): 716-25
- **Superbridge and bridge indices for knots** *JOURNAL OF KNOT THEORY AND ITS RAMIFICATIONS*  
Adams, C., Agarwal, N., Allen, R., Khandhawit, T., Simons, A., Winarski, R., Wootters, M.  
2021; 30 (2)
- **Weighted Matrix Completion From Non-Random, Non-Uniform Sampling Patterns** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Foucart, S., Needell, D., Pathak, R., Plan, Y., Wootters, M.  
2021; 67 (2): 1264-90
- **Hermitian-lifted codes** *DESIGNS CODES AND CRYPTOGRAPHY*  
Lopez, H. H., Malmkog, B., Matthews, G. L., Pinero-Gonzalez, F., Wootters, M.  
2021
- **Illusion of large on-chip memory by networked computing chips for neural network inference** *NATURE ELECTRONICS*  
Radway, R. M., Bartolo, A., Jolly, P. C., Khan, Z. F., Le, B. Q., Tandon, P., Wu, T. F., Xin, Y., Vianello, E., Vivet, P., Nowak, E., Wong, H., Aly, et al

2021

- **Wedge-Lifted Codes**  
Hastings, J., Kanne, A., Li, R., Wootters, M., IEEE  
IEEE.2021: 2990-2995
- **Approximate Gradient Coding with Optimal Decoding**  
Glasgow, M., Wootters, M., IEEE  
IEEE.2021: 2280-2285
- **On Greedy Approaches to Hierarchical Aggregation**  
Porter, A., Wootters, M., IEEE  
IEEE.2021: 2649-2654
- **On Coding for an Abstracted Nanopore Channel for DNA Storage**  
Hulett, R., Chandak, S., Wootters, M., IEEE  
IEEE.2021: 2465-2470
- **LOCAL LIST RECOVERY OF HIGH-RATE TENSOR CODES AND APPLICATIONS** *SIAM JOURNAL ON COMPUTING*  
Hemenway, B., Ron-Zewi, N., Wootters, M.  
2020; 49 (4)
- **Linear-time Erasure List-decoding of Expander Codes**  
Ron-Zewi, N., Wootters, M., Zemor, G., IEEE  
IEEE.2020: 379-383
- **LDPC Codes Achieve List Decoding Capacity**  
Mosheiff, J., Resch, N., Ron-Zewi, N., Silas, S., Wootters, M., IEEE  
IEEE.2020: 458-469
- **Tight Limits on Nonlocality from Nontrivial Communication Complexity; a.k.a. Reliable Computation with Asymmetric Gate Noise**  
Shutty, N., Wootters, M., Hayden, P., IEEE  
IEEE.2020: 206-217
- **OVERCOMING HIGH NANOPORE BASECALLER ERROR RATES FOR DNA STORAGE VIA BASECALLER-DECODER INTEGRATION AND CONVOLUTIONAL CODES**  
Chandak, S., Neu, J., Tatwawadi, K., Mardia, J., Lau, B., Kubit, M., Hulett, R., Griffin, P., Wootters, M., Weissman, T., Ji, H., IEEE  
IEEE.2020: 8822–26
- **A Data-Compressive Wired-OR Readout for Massively Parallel Neural Recording**  
Muratore, D., Tandon, P., Wootters, M., Chichilnisky, E. J., Mitra, S., Murmann, B.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2019: 1128–40
- **On the Optimality of the Kautz-Singleton Construction in Probabilistic Group Testing**  
Inan, H. A., Kairouz, P., Wootters, M., Ozgur, A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2019: 5592–5603
- **Fast Blind MIMO Decoding Through Vertex Hopping** *IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS*  
Dean, T. R., Perlstein, J. R., Wootters, M., Goldsmith, A. J.  
2019; 18 (7): 3669–82
- **Repairing Multiple Failures for Scalar MDS Codes**  
Mardia, J., Bartan, B., Wootters, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2019: 2661–72
- **Blind Joint MIMO Channel Estimation and Decoding** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Dean, T. R., Wootters, M., Goldsmith, A. J.  
2019; 65 (4): 2507–24
- **Resistive RAM Endurance: Array-Level Characterization and Correction Techniques Targeting Deep Learning Applications** *IEEE TRANSACTIONS ON ELECTRON DEVICES*

Grossi, A., Vianello, E., Sabry, M. M., Barlas, M., Grenouillet, L., Coignus, J., Beigne, E., Wu, T., Le, B. Q., Wootters, M. K., Zambelli, C., Nowak, E., Mitra, et al

2019; 66 (3): 1281–88

- **A 43pJ/Cycle Non-Volatile Microcontroller with 4.7  $\mu$ s Shutdown/Wake-up Integrating 2.3-bit/Cell Resistive RAM and Resilience Techniques**

Wu, T. F., Le, B. Q., Radway, R., Bartolo, A., Hwang, W., Jeong, S., Li, H., Tandon, P., Vianello, E., Vivet, P., Nowak, E., Wootters, M. K., Wong, et al edited by Fujino, L. C., Anderson, J. H., Belostotski, L., Dunwell, D., Gaudet, Gulak, G., Haslett, J. W., Halupka, D., Smith, K. C.

IEEE.2019: 226-+

- **A Data-Compressive Wired-OR Readout for Massively Parallel Neural Recording**

Muratore, D. G., Tandon, P., Wootters, M., Chichilnisky, E. J., Mitra, S., Murmann, B., IEEE

IEEE.2019

- **Stochastic Gradient Coding for Flexible Straggler Mitigation in Distributed Learning**

Bitar, R., Wootters, M., El Rouayheb, S., IEEE

IEEE.2019: 394–98

- **Embedded Index Coding**

Porter, A., Wootters, M., IEEE

IEEE.2019: 354–58

- **Improved read/write cost tradeoff in DNA-based data storage using LDPC codes**

Chandak, S., Tatwawadi, K., Lau, B., Mardia, J., Kubit, M., Neu, J., Griffin, P., Wootters, M., Weissman, T., Ji, H., IEEE

IEEE.2019: 147–56

- **The N3XT Approach to Energy-Efficient Abundant-Data Computing *PROCEEDINGS OF THE IEEE***

Aly, M., Wu, T. F., Bartolo, A., Malviya, Y. H., Hwang, W., Hills, G., Markov, I., Wootters, M., Shulaker, M. M., Wong, H., Mitra, S.

2019; 107 (1): 19–48

- **Linear-time list recovery of high-rate expander codes**

Hemenway, B., Wootters, M.

ACADEMIC PRESS INC ELSEVIER SCIENCE.2018: 202–18

- **Fast Blind MIMO Decoding through Vertex Hopping**

Perlstein, J., Dean, T., Wootters, M., Goldsmith, A.

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- **Average-radius list-recoverability of random linear codes**

Rudra, A., Wootters, M., Assoc Comp Machinery

ASSOC COMPUTING MACHINERY.2018: 644–62

- **On the Optimality of the Kautz-Singleton Construction in Probabilistic Group Testing**

Inan, H. A., Kairouz, P., Wootters, M., Ozgur, A., IEEE

IEEE.2018: 188–95

- **On taking advantage of multiple requests in error correcting codes**

Ramakrishnan, P., Wootters, M., IEEE

IEEE.2018: 1340–44

- **Load-Balanced Fractional Repetition Codes**

Porter, A., Silas, S., Wootters, M., IEEE

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- **Improved decoding of Folded Reed-Solomon and Multiplicity Codes**

Kopparty, S., Ron-Zewi, N., Saraf, S., Wootters, M.

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IEEE COMPUTER SOC.2018: 212–23

- **Repairing Reed-Solomon Codes**  
Guruswami, V., Wootters, M.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2017: 5684–98
- **Exponential Decay of Reconstruction Error From Binary Measurements of Sparse Signals** *IEEE TRANSACTIONS ON INFORMATION THEORY*  
Baraniuk, R. G., Foucart, S., Needell, D., Plan, Y., Wootters, M.  
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- **De-biasing low-rank projection for matrix completion**  
Foucart, S., Needell, D., Plan, Y., Wootters, M.  
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SPIE-INT SOC OPTICAL ENGINEERING.2017
- **Repairing multiple failures for scalar MDS codes**  
Bartan, B., Wootters, M., IEEE  
IEEE.2017: 1145–52
- **Blind Joint MIMO Channel Estimation and Decoding**  
Dean, T., Wootters, M., Goldsmith, A., IEEE  
IEEE.2017
- **Limitations of Piggybacking Codes with Low Substriping**  
Hulett, R., Wootters, M., IEEE  
IEEE.2017: 1131–38
- **SPECIAL ISSUE: APPROX-RANDOM 2015 Foreword** *THEORY OF COMPUTING*  
Megow, N., Wootters, M.  
2016; 12
- **Local correctability of expander codes**  
Hemenway, B., Ostrovsky, R., Wootters, M.  
ACADEMIC PRESS INC ELSEVIER SCIENCE.2015: 178–90
- **Linear-Time List Recovery of High-Rate Expander Codes**  
Hemenway, B., Wootters, M.  
edited by Halldorsson, M. M., Iwama, K., Kobayashi, N., Speckmann, B.  
SPRINGER-VERLAG BERLIN.2015: 701–12
- **Configuration spaces of convex and embedded polygons in the plane** *GEOMETRIAE DEDICATA*  
Shimamoto, D., Wootters, M.  
2014; 172 (1): 121–34
- **1-Bit matrix completion** *INFORMATION AND INFERENCE-A JOURNAL OF THE IMA*  
Davenport, M. A., Plan, Y., van den Berg, E., Wootters, M.  
2014; 3 (3): 189–223
- **Optimal entanglement-assisted one-shot classical communication** *PHYSICAL REVIEW A*  
Hemenway, B., Miller, C. A., Shi, Y., Wootters, M.  
2013; 87 (6)
- **Lower Bounds for Quantized Matrix Completion**  
Wootters, M., Plan, Y., Davenport, M. A., van den Berg, E., IEEE  
IEEE.2013: 296-+
- **Local Correctability of Expander Codes**  
Hemenway, B., Ostrovsky, R., Wootters, M.  
edited by Fomin, F. V., Freivalds, R., Kwiatkowska, M., Peleg, D.  
SPRINGER-VERLAG BERLIN.2013: 540–51

- **REUSABLE LOW-ERROR COMPRESSIVE SAMPLING SCHEMES THROUGH PRIVACY**

Gilbert, A. C., Hemenway, B., Strauss, M. J., Woodruff, D. P., Wootters, M., IEEE  
IEEE.2012: 536–39