

Kyle Luh

CONTACT INFORMATION	University of Colorado Boulder Department of Mathematics 2300 Colorado Avenue Boulder, CO 80309 (303) 492-5143	kyle.luh@colorado.edu Homepage: https://sites.google.com/view/kluh/home
RESEARCH INTERESTS	Probability Theory, Random Matrix Theory, Concentration of Measure, Randomized Algorithms, and applications of the above to Theoretical Computer Science, Statistics, Data Science and Machine Learning.	
Current Position	University of Colorado Boulder Assistant Professor in the Department of Mathematics - 8/2020-present	
EMPLOYMENT & EDUCATION	Harvard University Postdoctoral Fellow at the Center of Mathematical Sciences and Applications - 9/2017-5/2020 Yale University Ph.D. in Mathematics - 5/2017 <ul style="list-style-type: none">• Advisor: Van Vu M.S. in Mathematics, June 2015 M.S. in Physics, May 2012 Harvey Mudd College B.A. in Mathematics and Physics, May 2011 <ul style="list-style-type: none">• Graduated with distinction• Honors in mathematics	
PUBLICATIONS & PRE-PRINTS	<ol style="list-style-type: none">1. A. Campbell, K. Luh, V. Margarint, <i>Rate of Convergence in Multiple SLE using Random Matrix Theory</i> (submitted)2. A. Campbell, K. Luh, S. O'Rourke, <i>Extreme Eigenvalues of Random Laplacian Matrices</i> (submitted)3. K. Luh, R. Vogel, A. Yu, <i>Eigenvalue Gaps of Random Perturbations of Large Matrices</i> (submitted)4. K. Kawaguchi, Z. Deng, K. Luh, J. Huang, <i>Robustness implies generalization via data-dependent generalization bounds</i> Proceedings of the 39th International Conference on Machine Learning, PMLR 162:10866-10894, 20225. K. Luh, D. Xiang, <i>A nonuniform Littlewood-Offord inequality for all norms</i>, Discrete Mathematics 344.6 (2021):1123666. V. Jain, I. Jana, K. Luh, S. O'Rourke, <i>Circular Law for Random BLock Band Matrices with Genuinely Sublinear Bandwidth</i> Journal of Mathematical Physics 62.8 (2021): 0833067. K. Luh, S. O'Rourke <i>Eigenvectors and Controllability of non-Hermitian Random Matrices and Directed Graphs</i>, Electronic Journal of Probability, 26 (2021): 1-43	

8. A. Ferber, G. McKinley, *Resilience of the Rank of Random Matrices*, *Combinatorics, Probability and Computing* 30.2 (2021): 163-174
9. Z. Lei, K. Luh, P. Venkat, F. Zhang, *A Fast Spectral Algorithm for Mean Estimation with Sub-Gaussian Rates*, *Conference on Learning Theory* (2020) pp. 2598-2612
10. K. Luh, S. Meehan, H. Nguyen, *Random Matrices over Finite Fields: Methods and Results*, *Journal of the London Mathematical Society* 103.4 (2021): 1209-1252
11. A. Ferber, V. Jain, K. Luh, and W. Samotij, *On the Counting Problem in Inverse Littlewood-Offord Theory*, *Journal of the London Mathematical Society* 103.4 (2021): 1333-1362
12. S. Chakraborty, K. Luh, J. Roland, *How Fast do Quantum Walks Mix?*, *Physical Review Letters*, 134.5 (2020): 050501
13. S. Chakraborty, K. Luh, J. Roland, *On Analog Quantum Algorithms for the Mixing of Markov Chains*, *Physical Review A* 102.2 (2020): 022423
14. R. Kyng, K. Luh, Z. Song, *Four Deviations Suffice for Rank 1 Matrices*, *Advances in Mathematics* 375 (2020): 107366
15. P. Lopatto, K. Luh, *Tail Bounds on Eigenvalue Gaps in Sparse Random Matrices* (submitted)
16. K. Luh, S. O'Rourke, *Eigenvector Delocalization for non-Hermitian Random Matrices and Applications*. *Random Structures & Algorithms* (2020)
17. K. Luh, V. Vu, *Sparse Random Matrices have Simple Spectrum*, *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques*, Vol. 56, No. 4. Institut Henri Poincaré (2020)
18. J. Blasiok, P. Lopatto, K. Luh, J. Marcinek, *Restricted Isometry Property of Subsampled Orthonormal Systems*, *Proceedings of 60th Annual IEEE Symposium on Foundations of Computer Science, FOCS* (2019)
19. A. Ferber, G. Kronenberg, K. Luh, *Optimal Threshold for a Random Graph to be 2-Universal*, *Transactions of the American Mathematical Society* (2019)
20. K. Luh *Complex Random Matrices have no Real Eigenvalues*. *Random Matrices: Theory and Applications*, 7(01), 1750014
21. A. Ferber, K. Luh, O. Nguyen, *Embedding Large Graphs into a Random Graph*, *Bulletin of the London Mathematical Society*, 49(5), 784-797
22. A. Ferber, K. Luh, D. Montealegre, O. Nguyen, *Packing Loose Hamilton Cycles*, *Combinatorics, Probability and Computing*, 26(6), 839-849
23. K. Luh and V. Vu, *Dictionary Learning with Random Samples: Optimal Recovery*, *IEEE Transactions on Information Theory*, 62(3):1516-1527, 2016.
24. K. Luh and V. Vu *Random matrices: l_1 concentration and dictionary learning with few samples*, *Proceedings of the 56th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, pages 1409-1425, 2015.
25. K. Luh and N. Pippenger, *Large-Deviation Bounds for Sampling without Replacement*, *The American Mathematical Monthly* 121.5 (2014): 449-454.
26. Y. van Gennip, K. Luh et al., *Community detection using spectral clustering on sparse geosocial data*, *SIAM Journal on Applied Mathematics* 73.1 (2013): 67-83.
27. E. Ding, J. N. Kutz, and K. Luh, *Stability analysis of cavity solitons governed by the cubic-quintic Ginzburg-Landau equation*, *Journal of Physics B: Atomic, Molecular and Optical Physics* 44.6 (2011): 065401.

TEACHING EXPERIENCE	Spring	2023	Theoretical Foundations of Data Science (CU Boulder)
	Fall	2022	Introduction to Complex Analysis (CU Boulder)
	Fall	2022	Combinatorics (CU Boulder)
	Spring	2022	Introduction to Stochastic Processes (CU Boulder)
	Spring	2021	Introduction to Mathematical Statistics (CU Boulder)
	Fall	2020	Introduction to Probability (CU Boulder)
	Spring	2019	High Dimensional Probability (Harvard)
	Spring	2017	Single Variable Calculus II (Yale)
	Fall	2015	Single Variable Calculus II (Yale)
	Spring	2015	Multivariable Calculus (Yale)
	Fall	2014	Directed Reading Mentor (Topics in Probability)
	Spring	2014	Multivariable Calculus (Yale)
	Spring	2013	Teaching Assistant, Discrete Mathematics (Yale)
	Spring	2012	Teaching Assistant, Fundamentals of Physics (Yale)
	Fall	2011	Teaching Assistant, General Physics Laboratory (Yale)
	GRANTS AND AWARDS	2023	Dean's Innovation Grant
2021		Ralph E. Powe Junior Faculty Enhancement Award	
2017		NSF Mathematical Sciences Postdoctoral Research Fellowship	
2017		Certificate of College Teaching Preparation	
2016		Prize Teaching Fellowship Yale University (Only 5 awarded that year amongst 1,200 graduate instructors)	
2015		AAAS/Science Program for Excellence in Science	
2014	Prize Teaching Fellowship Yale University (Only 8 awarded amongst 1,200 graduate instruc- tors)		
INVITED PRESENTATIONS	CU Boulder Applied Mathematics Colloquium (1/2023)		
	CU Boulder Undergraduate Math Club (11/2020)		
	Joint Mathematics Meetings: Special Session on Random Matrices (1/2020)		
	MIT Probability Seminar (11/2019)		
	UC Irvine Probability Seminar (10/2019)		
	Joint Vietnam/USA Mathematical Meeting (6/2019)		
	MIT Combinatorics Seminar (5/2018)		
	University of Colorado Probability Seminar (5/2018)		
	Harvard CMSA seminar (4/2018)		
	Ohio State Combinatorics Seminar (12/2017)		
	Rutgers Combinatorics Seminar (4/2017)		
	Search Theory Seminar at Rényi Institute of Mathematics, Budapest (8/2016)		
	Harvard Chaining Methods and their Applications to Computer Science (6/2016)		
Columbia Foundations of Data Science Seminar Series (10/2015)			
Harvard Random Matrix and Probability Theory Seminar (9/2015)			
Yale Probability and Combinatorics Seminar (3/2015)			
SERVICE	<ul style="list-style-type: none"> • Chair of Diversity Committee (Fall 2022) • Member of Graduate Committee (CU Boulder) • Senior Thesis Reader for Harvard's School of Engineering and Applied Sciences • Referee for several journals • Co-organized Directed Reading Program in Yale Math Department • Mentored two Undergraduates in Directed Reading Program • Lectured at Yale Summer Undergraduate Research Program 		