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

- 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

- Graduated with distinction
- Honors in mathematics

PUBLICATIONS & PRE-PRINTS

1. K. Luh, D. Xiang, *A nonuniform Littlewood-Offord inequality for all norms* (submitted)
2. V. Jain, I. Jana, K. Luh, S. O'Rourke, *Circular Law for Random BLock Band Matrices with Genuinely Sublinear Bandwidth* (submitted)
3. K. Luh, S. O'Rourke *Eigenvectors and Controllability of non-Hermitian Random Matrices and Directed Graphs* (submitted)
4. A. Ferber, G. McKinley, *Resilience of the Rank of Random Matrices* (To appear in Combinatorics, Probability and Computing)
5. 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
6. K. Luh, S. Meehan, H. Nguyen, *Random Matrices over Finite Fields: Methods and Results*, (To appear in the Journal of the London Mathematical Society)
7. A. Ferber, V. Jain, K. Luh, and W. Samotij, *On the Counting Problem in Inverse Littlewood-Offord Theory*, (To appear in the Journal of the London Mathematical Society)

8. S. Chakraborty, K. Luh, J. Roland, *How Fast do Quantum Walks Mix?*, Physical Review Letters, 134.5 (2020): 050501
9. S. Chakraborty, K. Luh, J. Roland, *On Analog Quantum Algorithms for the Mixing of Markov Chains*, Physical Review A 102.2 (2020): 022423
10. R. Kyng, K. Luh, Z. Song, *Four Deviations Suffice for Rank 1 Matrices*, Advances in Mathematics 375 (2020): 107366
11. P. Lopatto, K. Luh, *Tail Bounds on Eigenvalue Gaps in Sparse Random Matrices* (submitted)
12. K. Luh, S. O'Rourke, *Eigenvector Delocalization for non-Hermitian Random Matrices and Applications.* Random Structures & Algorithms (2020)
13. 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)
14. J. Błasiok, 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)
15. A. Ferber, G. Kronenberg, K. Luh, *Optimal Threshold for a Random Graph to be 2-Universal*, Transactions of the American Mathematical Society (2019)
16. K. Luh *Complex Random Matrices have no Real Eigenvalues.* Random Matrices: Theory and Applications, 7(01), 1750014
17. A. Ferber, K. Luh, O. Nguyen, *Embedding Large Graphs into a Random Graph*, Bulletin of the London Mathematical Society, 49(5), 784-797
18. A. Ferber, K. Luh, D. Montealegre, O. Nguyen, *Packing Loose Hamilton Cycles,* Combinatorics, Probability and Computing, 26(6), 839-849
19. K. Luh and V. Vu, *Dictionary Learning with Random Samples: Optimal Recovery,* IEEE Transactions on Information Theory, 62(3):1516-1527, 2016.
20. K. Luh and V. Vu *Random matrices: l1 concentration and dictionary learning with few samples,* Proceedings of the 56th Annual IEEE Symposium on Foundations of Computer Science (FOCS), pages 1409-1425, 2015.
21. K. Luh and N. Pippenger, *Large-Deviation Bounds for Sampling without Replacement,* The American Mathematical Monthly 121.5 (2014): 449-454.
22. 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.
23. 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

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)

Honors and Awards

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 instructors)
2011	Meritorious Paper Mathematical Contest in Modeling
2010	National Undergraduate Fellowship Princeton University
2007-2010	Merit Scholarship Harvey Mudd College
2007-2010	Robert C. Byrd Scholar, Washington Scholar, National Merit Scholar

Invited Presentations

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)

Relevant Skills

- Native English and Mandarin speaker.
- Experienced in programming with C++, Java, Python, Mathematica, and Matlab.

Service

- Member of Graduate Committee (CU Boulder)
- Senior Thesis Reader for Harvard's School of Engineering and Applied Sciences
- Judge for S.T. Yau's Highschool Mathematics Contest
- 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