Brice HUANG

	bmhuang@mit.edu www.bricehuang.com
EDUCATION	
Jan 2020 - Jun 2025	Massachusetts Institute of Technology, Cambridge, MA. PH.D. CANDIDATE IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE. Advised by Cuy Bresler and Nike Sup
	Thesis: Statistical and Algorithmic Thresholds in Spin Glasses
Jan 2020 - Feb 2022	Massachusetts Institute of Technology, Cambridge, MA.
	Thesis: Computational Hardness in Random Optimization Problems from the Overlap Gap Property Ernst A. Guillemin Award for Best Master's Thesis
Sep 2015 – Jun 2019	Massachusetts Institute of Technology, Cambridge, MA. S.B. Mathematics and EECS. GPA 5.0/5.0.

SELECTED HONORS

Jul 2024	Best Student Paper. FOCS 2024.
Ост 2023	Google PhD Fellowship.
AUG 2020	Siebel Scholarship.
Apr 2019	NSF Graduate Fellowship.
Feb 2018	9th Place. 2017 Putnam Competition.
Mar 2015	2nd Place in Basic Research. Intel Science Talent Search.
Feb 2015	Gold Medal (7th). Romanian Master of Mathematics.

PUBLICATIONS AND PREPRINTS: PROBABILITY

- Strong Low Degree Hardness for Stable Local Optima in Spin Glasses B. Huang and M. Sellke, preprint 2025. arXiv:2501.06427.
- Weak Poincaré Inequalities, Simulated Annealing, and Sampling from Spherical Spin Glasses B. Huang, S. Mohanty, A. Rajaraman, and D. X. Wu. To appear in *STOC 2025*. arXiv:2411.09075.
- Capacity Threshold for the Ising Perceptron B. Huang, FOCS 2024. Best Student Paper. arXiv:2404.18902.
- Sampling from Spherical Spin Glasses in Total Variation via Algorithmic Stochastic Localization B. Huang, A. Montanari, and H. T. Pham, preprint 2024. arXiv:2404.15651.
- A Constructive Proof of the Spherical Parisi Formula B. Huang and M. Sellke, preprint 2023. arXiv:2311.15495.
- Strong Topological Trivialization of Multi-Species Spherical Spin Glasses B. Huang and M. Sellke, preprint 2023. To appear in *Annals of Probability*. arXiv:2308.09677.
- Optimization Algorithms for Multi-Species Spherical Spin Glasses B. Huang and M. Sellke, *Journal of Statistical Physics* 191 (2024), paper no. 29. arxiv:2308.09672.
- Algorithmic Threshold for Multi-Species Spherical Spin Glasses B. Huang and M. Sellke, preprint 2023. Under revision at *Proceedings of the London Mathematical Society.* arXiv:2303.12172.
- Tight Lipschitz Hardness for Optimizing Mean Field Spin Glasses B. Huang and M. Sellke, *Communications on Pure and Applied Mathematics* **78**(1) (2025), 60–119. arxiv:2110.07847. Conference version in *FOCS 2022*.
- The Algorithmic Phase Transition of Random *k*-SAT for Low Degree Polynomials G. Bresler and B. Huang, *FOCS 2021*. arXiv:2106.02129.
- Convergence of Maximum Bisection Ratio of Sparse Random Graphs B. Huang, *Electronic Communications in Probability* 23 (2018), paper no. 51. arXiv:1802.01619.

PUBLICATIONS AND PREPRINTS: STATISTICAL INFERENCE AND LEARNING

- Threshold for Detecting High Dimensional Geometry in Anisotropic Random Geometric Graphs M. Brennan, G. Bresler and B. Huang, *Random Structures & Algorithms* 64(1) (2024), 125–137. arXiv:2206.14896.
- When Does Adaptivity Help for Quantum State Learning? S. Chen, B. Huang, J. Li, A. Liu, and M. Sellke, *FOCS 2023*. arXiv:2206.05265.
- Tight Bounds for Quantum State Certification with Incoherent Measurements S. Chen, B. Huang, J. Li and A. Liu, *FOCS 2022.* arXiv:2204.07155.
- De Finetti-Style Results for Wishart Matrices: Combinatorial Structure and Phase Transitions M. Brennan, G. Bresler, and B. Huang, preprint 2021. arXiv:2103.14011.

PUBLICATIONS AND PREPRINTS: COMBINATORICS

- Improved Lower Bound for Frankl's Union-Closed Sets Conjecture R. Alweiss, B. Huang and M. Sellke, *Electronic Journal of Combinatorics* **31**(3) (2024), paper no. 35. arxiv:2211.11731.
- Cyclic Descents for General Skew Tableaux B. Huang, *Journal of Combinatorial Theory, Series A* **169** (2020). arXiv:1808.04918.
- On the Local Geometry of Graphs in Terms of Their Spectra B. Huang and M. Rahman, *European Journal of Combinatorics* **81** (2019), 378–393. arXiv:1807.06034.
- An Upper Bound on the Number of (132,213)-Avoiding Cyclic Permutations B. Huang, Discrete Mathematics 342(6) (2019), 1762–1771. arXiv:1808.08462.

INVITED TALKS

Feb 2025	Algorithmic Thresholds in Random Optimization Problems
	Yale University, Department of Statistics and Data Science
Feb 2025	Algorithmic Thresholds in Random Optimization Problems
	Georgia Tech, School of Computer Science
Jan 2025	Algorithmic Thresholds in Random Optimization Problems
	University of Pennsylvania, Department of Statistics and Data Science
Jan 2025	Algorithmic Thresholds in Random Optimization Problems
	University of Pennsylvania, Department of Mathematics
Jan 2025	Algorithmic Thresholds in Random Optimization Problems
	Stanford University, Department of Statistics
Jan 2025	Algorithmic Thresholds in Random Optimization Problems
	Carnegie Mellon University, Department of Mathematical Sciences
Jan 2025	Algorithmic Threshold for Random Perceptron Models
	Northwestern University Probability Seminar
Nov 2024	Algorithmic Threshold for Random Perceptron Models
	Duke Workshop in Operations Research and Data Science (WORDS)
Nov 2024	Capacity Threshold for the Ising Perceptron
	MIT Combinatorics Seminar
Nov 2024	Capacity Threshold for the Ising Perceptron
	Harvard Computer Science Group Meeting
Ост 2024	Capacity Threshold for the Ising Perceptron
	MIT Algorithms & Complexity Seminar
Sep 2024	Capacity Threshold for the Ising Perceptron
	Columbia Probability Seminar
Sep 2024	Algorithmic Threshold for Random Perceptron Models
	Cornell Probability Seminar
Sep 2024	Capacity Threshold for the Ising Perceptron
	Yale Statistics and Data Science Seminar

AUG 2024	Algorithmic Threshold for Random Perceptron Models
	BIRS Workshop on Frontiers of Statistical Mechanics and Theoretical Computer Science
MAY 2024	Capacity Threshold for the Ising Perceptron
	Workshop on Statistical Inference and Learning Dynamics, IDEAL Institute
MAY 2024	Capacity Threshold for the Ising Perceptron
	Math of Deep Learning Collaboration Meeting, UC San Diego
MAY 2024	Capacity Threshold for the Ising Perceptron
	MIT Probability Seminar
Apr 2024	A Constructive Proof of the Spherical Parisi Formula
	Harvard Internal Probability Seminar
Feb 2024	A Constructive Proof of the Spherical Parisi Formula
	BIRS Workshop in Computational Complexity of Statistical Inference
Ост 2023	Strong Topological Trivialization for Multi-Species Spherical Spin Glasses
	Harvard Probabilitas Seminar
Sep 2023	Strong Topological Trivialization for Multi-Species Spherical Spin Glasses
	University of Waterloo Probability Seminar
JUL 2023	Computational Thresholds for Stable Algorithms in Random Optimization Problems
	Santa Fe Institute Workshop on Connecting Physics, Geometry, and Algebraic Hardness
JUN 2023	Algorithmic Threshold for Multi-Species Spherical Spin Glasses
	FODSI/MIT Computational Complexity of Statistical Problems Workshop
JUN 2023	The Algorithmic Phase Transition of Random <i>k</i> -SAT for Low Degree Polynomials
	Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM)
Apr 2023	Algorithmic Threshold for Multi-Species Spherical Spin Glasses
	University of Wisconsin-Madison Probability Seminar
DEC 2022	Algorithmic Threshold for Multi-Species Spherical Spin Glasses
	Simons Institute Reunion on Computational Complexity of Statistical Inference
DEC 2022	Algorithmic Threshold for Multi-Species Spherical Spin Glasses
	Georgia Tech ARC Colloquium
Jan 2022	Algorithmic Barriers in Random Optimization Problems from the Overlap Gap Property
	FODSI Retreat
Sep 2021	The Algorithmic Phase Transition of Random <i>k</i> -SAT for Low Degree Polynomials
	Simons Institute Workshop on Rigorous Evidence for Information-Computation Tradeoffs

CONTRIBUTED AND CONFERENCE TALKS

Ост 2024	Capacity Threshold for the Ising Perceptron
	FOCS 2024
Aug 2024	Sampling from Spherical Spin Glasses in Total Variation via Algorithmic Stochastic Lo-
	calization
	JSM session on Advances in the Theory of Modern Sampling Algorithms
Aug 2023	Algorithmic Threshold for Multi-Species Spherical Spin Glasses
	Statistical Physics and Machine Learning Back Together Again, Cargèse Institute
Nov 2022	Tight Lipschitz Hardness for Optimizing Mean Field Spin Glasses
	FOCS 2022
Feb 2022	The Algorithmic Phase Transition of Random <i>k</i> -SAT for Low Degree Polynomials
	FOCS 2021
NOV 2021	The Algorithmic Phase Transition of Random <i>k</i> -SAT for Low Degree Polynomials
	Northeast Probability Seminar
Jan 2019	Cyclic Descents for General Skew Tableaux
	Joint Math Meetings

TEACHING

SPRING 2022	6.265 Discrete Probability and Stochastic Processes (MIT). TA.
SPRING 2019	6.046 Design and Analysis of Algorithms (MIT). TA.
Fall 2018	6.046 Design and Analysis of Algorithms (MIT). TA.

Service	
Jun 2024 -	SPUR+ Mentor , MIT DEPARTMENT OF MATHEMATICS, Cambridge, MA.
Aug 2024	Mentored a research project in the SPUR+ undergraduate research program.
SEP 2023 -	Mentor , MIT EECS GRADUATE APPLICATION ASSISTANCE PROGRAM, Cambridge, MA.
Dec 2023	Mentored students from underrepresented backgrounds through the process of applying for PhD programs.
SEP 2021 – Dec 2021	Reading Group Leader , SIMONS INSTITUTE FOR THE THEORY OF COMPUTING, Berkeley, CA. Organized reading group on the Overlap Gap Property at the Fall 2021 Simons Institute program on Computational Complexity of Statistical Inference.

Reviewing

Journals: Transactions of the AMS, Annals of Probability, Annals of Applied Probability, Communications in Mathematical Physics, Journal of Machine Learning Research, SIAM Journal on Computing, IEEE Transactions on Information Theory, Random Structures & Algorithms, SIAM Journal on Discrete Mathematics, Electronic Journal of Statistics, Electronic Journal of Combinatorics, Discrete Mathematics.

Conferences: STOC (2022, 2023, 2024, 2025), FOCS (2025), SODA (2023, 2024), COLT (2023, 2024), ITCS (2023), QIP (2024), ICALP (2024), AISTATS (2025)