Huy Tuan Pham: Curriculum Vitae

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Department of Mathematics, Stanford University.
Building 380, Stanford, CA 94305, USA.

RESEARCH INTERESTS	Probabilistic and extremal combinatorics, additive combinatorics and number theory, probability theory, theoretical computer science, statistical learning

ACADEMIC POSITIONS	**Research Fellow,** Clay Mathematics Institute	2023-2028
	Stanford Science Fellow, Stanford University	2023-2024

EDUCATION	**Stanford University**, Stanford, CA, USA	2019-2023
	PhD in Mathematics. Advisor: Jacob Fox	
	University of Cambridge, Cambridge, UK	2018-2019
	MASt in Mathematics with Distinction. **Rank 1 of Part III**	
	Stanford University, Stanford, CA, USA	2014-2018
	MS in Statistics	
	BS in Mathematics (Honors) with a Minor in Computer Science. GPA: 4.14/4.3	

SELECTED AWARDS AND DISTINCTIONS	**Clay Research Fellowship**	2023-2028
	Simons Fellowship	2023
	Two Sigma Fellowship	2021-2023

Citadel Ph.D. Summit Award — 2022
– Awarded $25000 for best poster presentation on research.

Pure Mathematics Prize - University of Cambridge — 2019
– Awarded to best student in Pure Mathematics at Part III of the Mathematical Tripos.

Leslie Walshaw Prize, Examination Prize, Senior Scholarship - Trinity College, University of Cambridge — 2019
– Awarded for exam performance at Part III of the Mathematical Tripos.

Honorable Mention - Morgan Prize — 2018
– Awarded for outstanding research in mathematics.

Kennedy Thesis Prize in the Natural Sciences - Stanford University — 2018
– Awarded to the best senior honors thesis in each of the following areas of study: humanities, social sciences, natural sciences, and engineering and applied sciences.

The Firestone Medal for Excellence in Undergraduate Research - Stanford University — 2018
– Awarded to the top ten percent of all honors theses in the social sciences, natural sciences, and engineering and applied sciences.

J. E Wallace Sterling Award for Scholastic Achievement - Stanford University 2018
– Awarded to the top 25 graduating students of the School of Humanities and Sciences.

Deans' Award for Academic Achievement - Stanford University — 2017

– Awarded to between five and ten extraordinary undergraduate students, based on excellent academic achievements and independent research.

Honourable Mention (Top 80) - Putnam Competition   2017, 2016, 2015, 2014
Gold Medal - International Mathematical Olympiad (IMO)   2014, 2013
Highest Score - Vietnam Mathematical Olympiad & Team Selection Test 2014, 2013

PUBLISHED PAPERS

1. J. Park and H. T. Pham, *A proof of the Kahn–Kalai conjecture*, J. Amer. Math. Soc (2023). Conference version appeared in 63rd Annual IEEE Symposium on Foundations of Computer Science (FOCS) (2022).

2. N. Cook, A. Dembo and H. T. Pham, *Regularity method and large deviations principles for the Erdős–Rényi hypergraph*, Duke Math. J. (2023).

3. J. Fox, H. T. Pham and Y. Zhao, *Tower-type bounds for Roth's theorem with popular differences*, J. Eur. Math. Soc. (2022).

4. J. He, H. T. Pham and M. W. Xu, *Universality for low degree factors of random polynomials over finite fields*, Int. Math. Res. Not. (2022).

5. J. He, H. T. Pham and M. W. Xu, *Mixing time of fractional random walk on finite fields*, Electron. J. Probab. **27** (2022), article no. 133, 1–15.

6. D. Conlon, J. Fox and H. T. Pham, *The upper logarithmic density of monochromatic subset sums*, Mathematika (2022).

7. J. Fox and H. T. Pham, *Popular progression differences in vector spaces*, Int. Math. Res. Not. **7** (2021), 5261–5289.

8. H. T. Pham and M. W. Xu, *Irreducibility of random polynomials of bounded degree*, Discrete Anal. 2021:7 (2021), 16pp.

9. J. Fox, H. T. Pham and Y. Zhao, *Common and Sidorenko linear equations*, Q. J. Math. **72** (2021), 1223–1234.

10. J. Fox and H. T. Pham, *Popular progression differences in vector spaces II*, Discrete Anal. 2019:16 (2019), 39pp.

11. N. Anari, V. Jain, F. Koehler, H. T. Pham and T.-D. Vuong, *Entropic Independence: Optimal mixing of down-up random walks*, 54th ACM Symposium on Theory of Computing (STOC) (2022).

12. V. Jain, H. T. Pham and T.-D. Vuong, *Spectral independence, coupling, and the spectral gap of the Glauber dynamics*, Inf. Process. Lett. **177** (2022).

13. V. Jain, H. T. Pham and T.-D. Vuong, *Towards the sampling Lovász Local Lemma*, 62nd Annual IEEE Symposium on Foundations of Computer Science (FOCS) (2021).

14. V. Jain, H. T. Pham and T.-D. Vuong, *Dimension reduction for maximum matchings and the Fastest Mixing Markov Chain*, C. R. Math. (2022).

15. M. Michelen, V. Jain, H. T. Pham and T. D. Vuong, Optimal mixing of the down-up walk on independent sets of a given size, to appear in FOCS 2023.

16. H. T. Pham*[1] and P.-M. Nguyen*, *A rigorous framework for the mean field limit of multilayer neural networks*, Mathematical Statistics and Learning (2022), to appear.

17. H. T. Pham* and P.-M. Nguyen*, *Global convergence of three-layer neural networks in the mean field regime*, International Conference on Learning Representations (ICLR) (2021). Oral presentation (1.8% of submissions).

18. H. T. Pham* and P.-M. Nguyen*, *Limiting fluctuation and trajectorial stability of multilayer neural networks with mean field training*, Conference on Neural Information Processing Systems (NeuRIPS) (2021).

SUBMITTED PAPERS

1. J. Park and H. T. Pham, *On a conjecture of Talagrand on selector processes and a consequence on positive empirical processes.*

2. D. Conlon, J. Fox and H. T. Pham, *Subset sums, completeness and colorings.*

3. J. Fox, S. Luo and H. T. Pham, *On random irregular subgraphs.*

4. V. Jain, H. T. Pham and T.-D. Vuong, *On the sampling Lovász Local Lemma for atomic constraint satisfaction problems.*

5. J. Fox, S. Luo, H. T. Pham and Y. Zhou, *Small subsets with large sumset: Beyond the Cauchy–Davenport bound.*

6. H. T. Pham, A. Sah, M. Sawhney and M. Simkin, *A Toolkit for Robust Thresholds.*

7. V. Jain and H. T. Pham, *Optimal thresholds for Latin squares, Steiner triple systems, and edge colorings.*

8. N. Anari, V. Jain, F. Koehler, H. T. Pham and T. D. Vuong, Universality of Spectral Independence with Applications to Fast Mixing in Spin Glasses, submitted.

PREPRINTS

1. D. Conlon, J. Fox and H. T. Pham, *Homogeneous structures in subset sums and non-averaging sets.*

2. D. Conlon, J. Fox, D. Koukoulopoulos, H. T. Pham and T. Tao, *Subset sums avoiding perfect powers.*

3. H. T. Pham, *Sunflowers in set systems with bounded VC dimension.*

4. D. Conlon, J. Fox, H. T. Pham and L. Yepremyan, *On the clique number of random Cayley graphs.*

5. J. Fox and H. T. Pham, *A multipartite analogue of Dilworth's theorem.*

6. J. Fox and H. T. Pham, *Popular monochromatic progression differences.*

7. P.-M. Nguyen* and H. T. Pham*, *A note on the global convergence of multilayer neural networks in the mean field regime.*

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[1]*: Author ordering is randomized

Invited Talks	ICERM workshop on Asymptotic Limits of Discrete Random Structures 2023	September 2023
	Simons Institute Structural Results Workshop	July 2023
	NUS Combinatorics Seminar	March 2023
	Atlanta Combinatorics Colloquium	March 2023
	Duke Probability Seminar	March 2023
	CMU ACO Seminar	February 2023
	Northwestern Colloquium	January 2023
	Brown University Probability Seminar	December 2022
	MIT Combinatorics Seminar	December 2022
	Berkeley Colloquium	December 2022
	Caltech Colloquium	December 2022
	Ohio State University Combinatorics Seminar	November 2022
	University of Illinois at Chicago Combinatorics and Probability	November 2022
	University of Illinois at Chicago Colloquium	November 2022
	University of Chicago Combinatorics and TCS Seminar	November 2022
	IEEE Symposium on Foundations of Computer Science (FOCS) 2022	November 2022
	UC Berkeley Probability Seminar	October 2022
	AMS Special Session on Extremal Graph Theory, Utah	October 2022
	Online Asymptotic Geometric Analysis Seminar	October 2022
	University of Washington Theory Seminar	October 2022
	Banff Extremal Combinatorics and Geometry Workshop	August 2022
	UC Santa Barbara summer school on spectral independence	August 2022
	SIAM Conference on Discrete Mathematics	June 2022
	LA Probability Forum	June 2022
	UC San Diego Theory Seminar	June 2022
	UC Los Angeles Discrete Mathematics Seminar	May 2022
	Workshop on Combinatorial and Additive Number Theory 2022	May 2022
	Stanford University Probability Seminar	May 2022
	Korea-Taiwan-Vietnam Joint Seminar in Combinatorics and Analysis	May 2022
	UC Berkeley Theory Lunch	May 2022
	Percolation Today	May 2022
	Oberwolfach Workshop in Combinatorics, Probability and Computing	April 2022
	Stanford University Combinatorics Seminar	April 2022
	IEEE Symposium on Foundations of Computer Science (FOCS) 2021	February 2022
	Conference on Neural Information Processing Systems (NeurIPS) 2021	December 2021
	Simons Institute Mean-field neural networks reading group	November 2021
	University of Mississippi Number Theory Seminar	September 2021
	Additive Combinatorics Webinar	June 2021
	International Conference on Learning Representations (ICLR) 2021	May 2021
	One World Theoretical Machine Learning Seminar	July 2020
	Stanford University Combinatorics Seminar	October 2017
	Pseudorandomness, Simons Institute for the Theory of Computing	April 2017
	Vietnam Workshop on Graph Theory and Discrete Geometry, Vietnam Institute for Advanced Study in Mathematics	September 2016

PROFESSIONAL
SERVICE

− Review for: Advances in Mathematics; Combinatorica; Annals of Probability; Probability Theory and Related Fields; Journal of Combinatorial Theory Series A; Combinatorics, Probability and Computing; Random Structures and Algorithms; Bernoulli; European Journal of Combinatorics; Electronic Journal of Combinatorics; Journal of Combinatorics; Australasian Journal of Combinatorics; Journal of Machine Learning Research; ACM Transactions on Algorithms; IEEE Symposium on Foundations of Computer Science (FOCS); ACM-SIAM Symposium on Discrete Algorithms (SODA); International Colloquium on Automata, Languages, and Programming (ICALP).
− Co-organize the Minisymposium on additive combinatorics at the SIAM Conference on Discrete Mathematics 2022.

TEACHING
EXPERIENCE

− Teaching Assistant for: Math 104 (Applied Linear Algebra) - Fall 2019, Math 138 (Stochastic Processes and Applications) - Spring 2020, Math 61DM (Modern Mathematics: Discrete Methods) - Fall 2020, Math 107 (Introduction to Graph Theory) - Winter 2021, Math 108 (Introduction to Combinatorics) - Summer 2021.
− Instructor for: Math 108 (Introduction to Combinatorics) - Spring 2023.