

Huy Tuan Pham: Curriculum Vitae

htpham@caltech.edu || <https://huytuanpham.github.io/>

Department of Mathematics, California Institute for Technology,
Pasadena, CA 91125, USA.

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

ACADEMIC POSITIONS	Visiting Member, Institute for Advanced Study 2026- Professor of Mathematics, California Institute of Technology 2026- Assistant Professor of Mathematics and Rosenberg Scholar, California Institute of Technology 2025- Research Fellow, Clay Mathematics Institute 2023-2028 Member, School of Mathematics, Institute for Advanced Study 2024-2025 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.
-----------	---

SELECTED AWARDS AND DISTINCTIONS	NSF Career Award 2026 Sloan Research Fellowship 2026 Dénes König Prize 2024 ICBS Frontiers of Science Award 2024 Clay Research Fellowship 2023-2028 Stanford Science Fellowship 2023-2024 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

PUBLISHED
PAPERS

1. H. T. Pham, *A Sharp Version of Talagrand's Selector Process Conjecture and an Application to Rounding Fractional Covers*, Proceedings of the 57th Annual ACM Symposium on Theory of Computing (STOC) (2025).
2. J. Park and H. T. Pham, *On a conjecture of Talagrand on selector processes and a consequence on positive empirical processes*, Ann. Math. (2024).
3. J. Park and H. T. Pham, *A proof of the Kahn–Kalai conjecture*, J. Amer. Math. Soc. (2024). Extended abstract appeared in 63rd Annual IEEE Symposium on Foundations of Computer Science (FOCS) (2022).
4. D. Conlon, J. Fox and H. T. Pham, *Homogeneous structures in subset sums and non-averaging sets*, accepted at Commun. Am. Math. Soc.
5. H. T. Pham and D. Zakharov, *Sharp bound for the Erdős–Straus non-averaging set problem*, Geom. Funct. Anal. (2025).
6. V. Jain and H. T. Pham, *Optimal thresholds for Latin squares, Steiner triple systems, and edge colorings*, ACM-SIAM Symposium on Discrete Algorithms (SODA) (2024).
7. J. Balogh, A. Bernshteyn, M. Delcourt, A. Ferber and H. T. Pham, *Sunflowers in Set Systems with Small VC-Dimension*, accepted at Combinatorica (2025).
8. R. Nenadov and H. T. Pham, *Short proof of the hypergraph container theorem*, Combin. Probab. Comput (2025).
9. N. Cook, A. Dembo and H. T. Pham, *Regularity method and large deviations principles for the Erdős–Rényi hypergraph*, Duke Math. J. (2024).
10. J. Fox, H. T. Pham and Y. Zhao, *Tower-type bounds for Roth's theorem with popular differences*, J. Eur. Math. Soc. (2022).

11. J. Fox, R. Nenadov and H. T. Pham, *The largest subgraph without a forbidden induced subgraph*, accepted at Combinatorica.
12. D. Conlon, J. Fox, X. He, D. Mubayi, H. T. Pham, A. Suk and J. Verstraete, *A question of Erdős and Graham on Egyptian fractions*, Discrete Analysis (2025).
13. J. Fox, S. Luo and H. T. Pham, *On random irregular subgraphs*, Random Struct. Algorithms (2024).
14. J. Fox, S. Luo, H. T. Pham and Y. Zhou, *Small subsets with large sumset: Beyond the Cauchy–Davenport bound*, Combin. Probab. Comput. (2024).
15. J. Fox and H. T. Pham, *Popular progression differences in vector spaces*, Int. Math. Res. Not. (2021).
16. J. Fox, H. T. Pham and Y. Zhao, *Common and Sidorenko linear equations*, Q. J. Math. (2021).
17. J. Fox and H. T. Pham, *Popular progression differences in vector spaces II*, Discrete Anal. (2019).
18. V. Jain, H. T. Pham and T.-D. Vuong, *Dimension reduction for maximum matchings and the Fastest Mixing Markov Chain*, Comptes Rendus. Mathématique (2023).
19. D. Conlon, J. Fox, H. T. Pham and Y. Zhao, *Set-coloring Ramsey numbers and error-correcting codes near the zero-rate threshold*, IEEE Trans. Inf. Theory (2023).
20. 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).
21. J. He, H. T. Pham and M. W. Xu, *Mixing time of fractional random walk on finite fields*, Electron. J. Probab. (2022).
22. D. Conlon, J. Fox and H. T. Pham, *The upper logarithmic density of monochromatic subset sums*, Mathematika (2022).
23. H. T. Pham and M. W. Xu, *Irreducibility of random polynomials of bounded degree*, Discrete Anal. (2021).
24. H. T. Pham^{*1} and P.-M. Nguyen*, *A rigorous framework for the mean field limit of multilayer neural networks*, Mathematical Statistics and Learning (2023).
25. V. Jain, H. T. Pham, M. Sawhney and D. Zakharov, *An explicit economical additive basis*, Combin. Probab. Comput (2025).
26. V. Jain, H. T. Pham and T.-D. Vuong, *Spectral independence, coupling, and the spectral gap of the Glauber dynamics*, Inf. Process. Lett. (2022).
27. 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*, ACM-SIAM Symposium on Discrete Algorithms (SODA) (2024).
28. 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*, 64th Annual IEEE Symposium on Foundations of Computer Science (FOCS) (2023).

^{1*}: Author ordering is randomized

29. 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).
30. 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).
31. 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 (top 1.8% of submissions).
32. 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. T. Kaufman and H. T. Pham, *Stronger Agreement Expansion with Implications to Matroids and Grassmannians*.
 2. S. Liu and H. T. Pham, *Locally Testable Codes from Grassmann Posets*.
 3. N. Alon and H. T. Pham, *Random Cayley graphs and random sumsets*.
 4. D. Conlon, J. Fox, H. T. Pham and L. Yepremyan, *On the clique number of random Cayley graphs and related topics*, submitted to Invent. Math.
 5. D. Conlon, J. Fox and H. T. Pham, *Subset sums, completeness and colorings*, in revision at J. Eur. Math. Soc. (JEMS).
 6. B. Huang, A. Montanari and H. T. Pham, *Sampling from Spherical Spin Glasses in Total Variation via Algorithmic Stochastic Localization*, in revision at Commun. Am. Math. Soc.
 7. R. Nenadov and H. T. Pham, *Spread blow-up lemma with an application to perturbed random graphs*, submitted to Random Struct. Algorithms.
 8. H. T. Pham, A. Sah, M. Sawhney and M. Simkin, *A toolkit for robust thresholds*, in revision at Adv. Comb.
 9. M. Bucić, J. Fox and H. T. Pham, *Equivalence between Erdős-Hajnal and polynomial Rödl and Nikiforov conjectures*, in revision at Bull. Lond. Math. Soc.
 10. J. Fox and H. T. Pham, *A multipartite analogue of Dilworth's theorem*, in revision at Order.
 11. D. Dong, N. Mani, H. T. Pham and J. Tidor, *On monochromatic solutions to linear equations over the integers*.
 12. V. Jain, H. T. Pham and T.-D. Vuong, *On the sampling Lovász Local Lemma for atomic constraint satisfaction problems*.
-

PREPRINTS

1. A. Ghosal, R. Goenka, A. Grebennikov, P. Keevash, M. Kwan and H. T. Pham, *No- $(k+1)$ -in-line problem for $k \geq 3$.*
2. H. T. Pham and L. Sauermann, *On Graham's rearrangement conjecture.*
3. H. T. Pham, *Sharp enumeration of sets with small doubling.*
4. N. Alon and H. T. Pham, *A robust Freiman-Ruzsa lemma and sharp asymptotics for the independence number of sparse random Cayley graphs.*
5. J. Fox and H. T. Pham, *On Ruzsa's conjecture in groups with bounded exponent.*
6. D. Conlon, J. Fox, H. T. Pham and L. Yepremyan, *Independence in random graph models.*
7. D. Conlon, J. Fox and H. T. Pham, *Subset sums avoiding perfect powers.*
8. J. Fox and H. T. Pham, *Popular monochromatic progression differences.*
9. P.-M. Nguyen* and H. T. Pham*, *A note on the global convergence of multilayer neural networks in the mean field regime.*

TEACHING

Instructor

- Math 121B (Combinatorial analysis) - Winter 2026 (Caltech)
- Math 191A (Modern topics in Combinatorics) - Fall 2025 (Caltech)
- Math 108 (Introduction to Combinatorics) - Spring 2023 (Stanford).

Teaching Assistant

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

INVITED TALKS

Mini-courses

Innovations and Challenges in Extremal Combinatorics - National University of Singapore July 2026
 IBS Winter school-Synergies of Extremal & Probabilistic Combinatorics January 2025
 VIASM Minicourse-Synergies of Extremal & Probabilistic Combinatorics August 2024

Plenary talks and Public lectures

New Zealand Mathematics Research Institute, New Zealand January 2026
 Young Mathematician Lecture Series, National University of Singapore August 2025
 Simons Symposium, New Frontiers in Combinatorics and Computer Science August 2025
 Plenary talk at the ICBS 2025 July 2025
 University of Chicago Chern-Weil Symposium May 2025
 Plenary talk at the 2nd Brazilian School of Combinatorics March 2025
 Plenary talk at the SIAM Conference on Discrete Mathematics July 2024
 König prize lecture at the SIAM Conference on Discrete Mathematics July 2024
 ICBS Frontiers of Science Award talk July 2024

Invited talks and colloquia

Oberwolfach Workshop in Combinatorics, Probability and Computing	September 2025
Banff Finite Geometry and Ramsey Theory Workshop	September 2025
ACM Symposium on Theory of Computing (STOC) 2025	June 2025
Berkeley Probability Seminar	April 2025
IAS Computer Science/Discrete Mathematics Seminar II, 1& 2	February 2025
Princeton Theory Lunch	February 2025
Princeton Discrete Mathematics Seminar	February 2025
Rutgers Combinatorics Seminar	February 2025
ICMS Workshop on Additive Combinatorics	July 2024
Stanford Mathematics Colloquium	May 2024
IAS Computer Science/Discrete Mathematics Seminar II	May 2024
IAS Computer Science/Discrete Mathematics Seminar I	May 2024
ICMS UK-Vietnam mathematics joint meeting	December 2023
IEEE Symposium on Foundations of Computer Science (FOCS) 2023	November 2023
ICERM, Asymptotic Limits of Discrete Random Structures	September 2023
Simons Institute Structural Results Workshop	July 2023
NUS combinatorics & graph theory seminar	March 2023
Atlanta Combinatorics Colloquium	March 2023
Duke Probability Seminar	March 2023
CMU ACO Seminar	February 2023
Northwestern Mathematics Colloquium	January 2023
Brown University Probability Seminar	December 2022
MIT Combinatorics Seminar	December 2022
UC Berkeley Mathematics Colloquium	December 2022
Caltech Mathematics Colloquium	November 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	September 2016

PROFESSIONAL SERVICE

-
- Co-organize the conference Frontiers in Combinatorics and Theoretical Computer Science at Caltech in August 2026.
 - Co-organize the Clay Workshop on Frontiers in extremal and probabilistic combinatorics at the Clay Annual conference 2024.
 - Co-organize the Minisymposium on extremal and probabilistic combinatorics at the SIAM Conference on Discrete Mathematics 2024, the Minisymposium on additive combinatorics at the SIAM Conference on Discrete Mathematics 2022.
 - Co-organize the Combinatorics seminar at Caltech.
 - Review for: Advances in Mathematics; Transactions of the AMS; Bulletin of the LMS; Combinatorica; Journal of Combinatorial Theory Series A & B; Discrete Analysis; Combinatorics, Probability and Computing; Random Structures and Algorithms; Annals of Probability; Annals of Applied Probability; Probability Theory and Related Fields; Electronic Journal of Probability; Bernoulli; SIAM Journal on Discrete Mathematics; European Journal of Combinatorics; Electronic Journal of Combinatorics; Journal of Combinatorics; Graphs and Combinatorics; Australasian Journal of Combinatorics; Journal of Machine Learning Research; ACM Transactions on Algorithms; ACM Symposium on Theory of Computing (STOC); IEEE Symposium on Foundations of Computer Science (FOCS); ACM-SIAM Symposium on Discrete Algorithms (SODA); International Colloquium on Automata, Languages, and Programming (ICALP).