

HOI H. NGUYEN

Department of Mathematics
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Professional preparation

The Ohio State University, Ohio, USA 2013-
Assistant Professor
Research interest: Combinatorics, Probability.

Yale University, New Haven, CT 2012-2013.
Associate Research Scientist

University of Pennsylvania, Pennsylvania, USA 2010-2012
Lecturer of Mathematics

Rutgers University, New Jersey, USA 2005-2010
Ph.D in Mathematics
Supervisor: Van Vu

Grants & Honors

von Neumann fellow, IAS, Princeton, NJ 2015-2016.

NSF research grant DMS 1600782 2016-2019.

NSF research grant DMS 1358648 (transferred from 1200898) 2012-2016.

Visiting positions

Vietnam Institute for Advanced Study in Mathematics July 2016-August 2016.

University of Marne La Vallee, Paris July 2013.

Publications

Random eigenfunctions on flat tori: universality for the number of intersections, with Mei-Chu Chang, Oanh Nguyen and Van Vu, preprint.

Eigenvectors of random matrices of symmetric entry distributions, with Sean Meehan, preprint.

Anti-concentration of inhomogeneous random walks, preprint.

Concentration of distances in Wigner matrices, to appear, Linear Algebra and its Applications.

Asymptotic Lyapunov exponents for large random matrices, to appear in Annals of Applied Probability.

Normal vector of a random hyperplane, with Van Vu, to appear in International Mathematics Re-

search Notices.

A general law of large permanent, with Jozsef Balogh, Discrete and Continuous Dynamical Systems (Series A), Vol. 37, no. 10, 2017.

Random matrices: tail bounds for gaps between eigenvalues, with Terence Tao and Van Vu, Probability Theory and Related Fields (2017) Vol. 167, 3, 777-816.

On the number of real roots of random polynomials, joint with Oanh Nguyen and Van Vu, Communications in Contemporary Mathematics (2016) Vol. 18, 4, 1550052.

Near invariance of the hypercube, joint with Scott Aaronson, Israel Journal of Mathematics (2016) 212, 385-417.

On a condition number of random polynomial systems, Mathematics of Computation (2016) 85, 737-757.

Real roots of random polynomials: expectation and repulsion, joint with Yen Do and Van Vu, Proceedings London Mathematical Society (2015), Vol. 111 (6), 1231-1260.

The elliptic law, joint with Sean O'Rourke, International Mathematics Research Notices (2015), Vol. 2015, 7620-7689.

On the concentration of random multilinear forms and the universality of random block matrices, joint with Sean O'Rourke, Probability Theory and Related Fields (2015), Vol. 162, 1, 97-154.

Random doubly stochastic matrices: the circular law, Annals of Probability, (2014), Vol. 42, No. 3, 1161-1196.

Random matrices: law of the determinant, joint with Van Vu, Annals of Probability, (2014), Vol. 42, No. 1, 146-167.

Small probability, inverse theorems, and applications, joint with Van Vu, on the occasion of Paul Erdos' 100th anniversary, Bolyai Society Mathematical Studies, Vol. 25 (2013).

On the singularity of random combinatorial matrices, SIAM J. Discrete Mathematics, 27 (2013), no. 1, 447-458.

Circular law for random discrete matrices of given row sum, joint with V.Vu, Journal of Combinatorics, Vol. 4, 1 (2013), 1-30.

A continuous variant of the inverse Littlewood-Offord problem for quadratic forms, Contribution to Discrete Mathematics, Vol. 7 (2012), No. 2.

A new approach to an old problem of Erdos and Moser, Journal of Combinatorial Theory, Series A 119 (2012) 977-993 .

On the least singular value of random symmetric matrices, Electron. J. Probab. 17 (2012), no. 53, 1-19 .

Inverse Littlewood-Offord problems and the singularity of random symmetric matrices, Duke Mathematics Journal Vol. 161, 4 (2012), 545-586.

A characterization of incomplete sequences in vector spaces, joint with Van Vu, Journal of Combinatorial Theory, Series A, 119 (2012), 33-41.

Optimal inverse Littlewood-Offord theorems, joint with Van Vu, Advances in Mathematics, Volume

226, 6, (2011), 5298-5319.

On distribution of three-term arithmetic progression in sparse subsets of \mathbf{F}_p^n , Combinatorics, Probability and Computing 20 (2011), 777-791.

On the Erdős square problem in sumset, joint with Van Vu, An Irregular Mind: Szemerédi is 70, Bolyai Society Mathematical Studies, (2010).

Additive structure in random sets, Integers, 9 (2009), 41-45.

Classification theorems for sumset modulo a prime, joint with Van Vu, Journal of Combinatorial Theory, Series A, 116 (2009), 936-959.

Subset sums modulo a prime, joint with Endre Szemerédi and Van Vu, Acta Arithmetica, 131, (2008), 303-316.

Invited Research Talks

Random Structure and Algorithm (Poland, cancelled) August 11-13, 2017.

Combinatorial and Additive Number Theory (CUNY, New York, cancelled) May 24-27, 2017.

Combinatorics and Probability seminar (Yale, New Haven, cancelled) April 27th, 2017.

CMU Discrete Mathematics seminar (CMU, Penn) April 13th, 2017.

AMS session on Combinatorics and Graph Theory (Indianapolis) April 1-2, 2017.

Probability seminar (University of Minnesota) March 3rd, 2017.

AMS session on Stochastic Matrices and their applications (Atlanta, Georgia) ... January 4, 2017.

Mini-course at University of Natural Science (Ho Chi Minh city, Vietnam) August, 2016.

Research seminar, VIASM (Ha Noi, Vietnam) July, 2016.

Symposium in random polynomials (San Antonio, Texas) May 25, 2016.

Conference on Geometric Functional Analysis (Alberta, Canada) May 16-20, 2016.

University of Maryland probability seminar April 6, 2016.

Rutgers Discrete Mathematics seminar (Rutgers University, New Jersey) February 22, 2016.

IAS Computer Science and Discrete Mathematics seminar (IAS, New Jersey) ... January 12, 2016.

Colloquium (University of Colorado at Boulder, Colorado) December 8, 2015.

MIT probability seminar November 16, 2015.

Columbia-NYU probability seminar October 9, 2015.

Additive Combinatorics (Marseille, France, cancelled) September 7-11, 2015.

Random Structures and Algorithms (contributed talk, CMU, Penn) July 28, 2015.

Random matrix session, 38th SPA2015 (Oxford, UK) July 13-17, 2015.
 Probability seminar (University of Wisconsin at Madison) April 23, 2015.
 Random matrix session, AMS meeting (East Lansing) March 14-15th, 2015.
 Combinatorics and Probability seminar (The Ohio State University) March 12th, 2015.
 Probability seminar (Duke University, North Carolina) February 5th, 2015.
 CMU Discrete Mathematics seminar (CMU, Penn) November 20th, 2014.
 Non-Hermitian Random Matrices: 50 years after Ginibre (Israel, cancelled), October 24, 2014.
 New Horizon in Additive Combinatorics (CRM, Montreal) October 10, 2014.
 SIAM Conference on Discrete Mathematics (Minneapolis, Minnesota) June 17, 2014.
 Probability seminar (University of California at San Diego) May 29th, 2014.
 Combinatorics seminar (University of California at San Diego) May 27th, 2014.
 Probability seminar (University of California at Davis) May 14th, 2014.
 Combinatorics seminar (University of Illinois, Chicago) February 25th, 2014.
 Combinatorics seminar, Welcome seminar, Introduction to Mathematics (The Ohio State University, Columbus) 2013, 2014.
 Analysis/Probability seminar (University of Michigan, Ann Arbor) April 24th, 2013.
 Rutgers Discrete Mathematics seminar (Rutgers University, New Jersey) April 9th, 2013.
 Conference on Extremal and Probabilistic Combinatorics (IPAM, California) . January 26th, 2013.
 Combinatorics and Probability seminar (Yale University, Connecticut) January 18th, 2013.
 Probability seminar (Purdue University, West Lafayette) November 27th, 2012.
 Advances in Random Matrix Theory, IMA (Minneapolis, Minnesota) June 18th, 2012.
 NSF/CBMS Conference, Small Deviation Probabilities: Theory and Applications (University of Alabama, Alabama) June 7th, 2012.
 Rutgers Discrete Mathematics seminar (Rutgers University, New Jersey) March 7th, 2012.
 Syracuse Colloquium (Syracuse University, New York) February 3rd, 2012.
 OSU Colloquium (Ohio State University, Ohio) December 22nd, 2011.
 CMU Discrete Mathematics seminar (CMU, Penn) September 15th, 2011.
 Conference on Combinatorial and Additive Number Theory (CUNY, New York) ... May 28, 2011.
 The 15th International Conference on Random Structures and Algorithms (Emory University, Atlanta) May 24, 2011.

Rutgers Discrete Mathematics seminar (Rutgers University, New Jersey) March, 2011.

UPenn Combinatorics and Probability seminar (University of Pennsylvania, PA) ... January, 2011.

SIAM Conference on Discrete Mathematics (Austin, Texas) June 14, 2010.

Harvard Random Matrix and Probability seminar (Harvard University) February, 2010.

UPenn Combinatorics and Probability seminar (University of Pennsylvania, PA) .. February, 2010.

IAS Computer Science and Discrete Mathematics seminar (IAS, New Jersey) ... January 25, 2010.

Conference on Analytical Methods in Combinatorics, Additive Number Theory and Computer Science (IPAM, California) December 01, 2009.

Rutgers Discrete Mathematics seminar (Rutgers University, New Jersey). November 12, 2009.

Integers Conference (University of West Georgia, Georgia) October 16, 2009.

Conference on Combinatorial and Additive Number Theory (CUNY, New York) ... May 28, 2009.

WaterMellon Workshop on Extremal Graph Theory (University of Waterloo) May 23, 2009.

Columbia Discrete Mathematics seminar (Columbia University, New York) April 7, 2009.

Princeton Discrete Mathematics seminar (Princeton University, New Jersey) February 5, 2009.

Conference on Combinatorial and Additive Number Theory (CUNY, New York) ... May 22, 2008.

Conference on Additive Combinatorics (IAS, New Jersey) December 10, 2007.

Conference on Combinatorial and Additive Number Theory (CUNY, New York) May, 2007.

Rutgers Discrete Mathematics seminar (Rutgers University, New Jersey) April, 2007.

Teaching Experience

Instructor for Topics in Probability Fall 2017.

Instructor for Probability, The Ohio State University Spring 2017.

Instructor for Foundations in Higher Mathematics, The Ohio State University Spring 2017.

Instructor for Honors Problem solving seminar, The Ohio State University ... Fall 2014, Fall 2016.

Instructor for Combinatorics, The Ohio State University Spring 2015.

Instructor for Multiple Calculus, The Ohio State University Fall 2014.

Instructor for Combinatorics and Graph Theory (graduate course), The Ohio State University Fall 2013, Fall 2016, Fall 2017.

Instructor for Additive Combinatorics (graduate course), Yale University Spring 2013.

Instructor for Introduction to Random Matrix Theory (graduate course), Yale University Fall 2012.

Instructor for Cryptography, University of Pennsylvania Spring 2012.

Instructor for Introduction to Probability, University of Pennsylvania Fall 2011.

Instructor for Ideas of Mathematics, University of Pennsylvania Spring 2011.

Putnam instructor, University of Pennsylvania Fall 2010.

Instructor for Calculus II, University of Pennsylvania Fall 2010.

Instructor for Discrete Mathematics, University of Pennsylvania Fall 2010.

Instructor for Calculus I, Rutgers University Summer 2009.

Synergistic Activities

1. At The Ohio State University

- Guide undergraduate students in their summer projects, including the Sampling Advanced Mathematics for Minority Students program.
- Give invited lectures at the Ross program 2017.
- Hold problem solving seminars to prepare undergraduate students for regional mathematics contest and for the Putnam.
- Co-organizer of the Young Mathematician Conference 2017.
- Co-organizing Combinatorics and Probability seminar; Departmental Hiring Committee (2014,2016)
- Design and teach graduate and undergraduate courses in Probability and Combinatorics and supervise graduate students in reading courses at The Ohio State University.
- Current Ph.D student: Sean Meehan.

2. Others

- NSF Panelist
- Reviewer for NSA Mathematical Science Program
- Journal Reviewer:
 - Acta Mathematica
 - Advances in Mathematics
 - AMS Proc. Of Symposia
 - Annales de Institut Henri Poincaré
 - Annals of Applied Probability
 - Annals of Probability
 - Bernoulli
 - Communications in Contemporary Mathematics
 - Electronic Communications in Probability
 - Electronic Journal of Probability
 - International Mathematics Research Notices
 - Journal of the American Mathematical Society
 - Journal of Combinatorics
 - Journal of Combinatorics Theory Series A

- Journal of Multivariate Analysis
- Journal of Theoretical Probability
- Probability Theory and Related Fields
- Random Matrices: Theory and Applications
- Random Structures and Algorithms
- SIAM Journal of Discrete Mathematics.