Paxton Turner

Curriculum Vitae

Department of Statistics
Harvard University
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Academic position

2021–2023. **Postdoctoral fellow**, *Harvard University, Department of Statistics*,
Postdoc advisor: Zheng Tracy Ke.

Education

June 2021 **Ph.D. in Mathematics**, *Applied Mathematics Program,*
Massachusetts Institute of Technology (MIT).

- Thesis: *Combinatorial methods in statistics*
- Advisor: Philippe Rigollet

May 2015 **B.S. in Mathematics**, *Louisiana State University (LSU).*

Research Interests

High-dimensional statistics, machine learning, algorithms, discrete mathematics

Selected honors and awards

2017 Levinson Fellowship – Department of Mathematics, MIT

2015 Betti and Robert Giles Senior Mathematics Award – Department of Mathematics, LSU

2014 Barry M. Goldwater Scholarship Recipient

2011–2015 LSU Chancellor's Alumni Scholarship (full tuition, room and board)

Selected publications

- Paxton Turner, Jingbo Liu, and Philippe Rigollet. A Statistical Perspective on Coreset Density Estimation. *Proc. of 24th International Conference on Artificial Intelligence and Statistics*. (AISTATS 2021).
- Paxton Turner, Raghu Meka, and Philippe Rigollet. Balancing Gaussian Vectors in High Dimension. *Proc. of 33rd Conference on Learning Theory* (COLT 2020).
- Paxton Turner, Jingbo Liu, and Philippe Rigollet. Efficient Interpolation of Density Estimators. *24th International Conference on Artificial Intelligence and Statistics*. (AISTATS 2021).
- Sinho Chewi, Patrik Gerber, Philippe Rigollet, and Paxton Turner†. Gaussian Discrepancy: a Probabilistic Relaxation of Vector Balancing. *Discrete Applied Mathematics*. 2022.

Preprints

- Tony Cai, Zheng Tracy Ke, and Paxton Turner†. Testing High-dimensional Multinomials with Applications to Text Analysis. arxiv.org/abs/2301.01381. In submission.
- Jiashun Jin, Zheng Tracy Ke, Paxton Turner, and Anru Zhang†. Phase Transition for Detecting a Small Community in a Large Network. In submission.
- Aaron Potechin, Paxton Turner, Prayaag Venkat, and Alex Wein†. Near-Optimal Fitting of Ellipsoids to Random Points. arxiv.org/abs/2208.09493. In submission.

† indicates alphabetical ordering. Titles in blue are hyperlinks to the corresponding paper.

- Younhun Kim, Elchanan Mossel, Govind Ramnarayan, and Paxton Turner†. Efficient Reconstruction of Stochastic Pedigrees. arxiv.org/abs/2005.03810. 2020.

Additional publications

- Paxton Turner and Yuhuai Wu†. Ehrhart Theory and Discrete Equidecomposablility of Polygons. *Discrete and Computational Geometry*. 2020.
- Megan Leoni, Gregg Musiker, Seth Neel, and Paxton Turner†. Aztec Castles and the dP3 Quiver. *Journal of Physics A: Mathematical and Theoretical*. 2014.

Presentations

Nov. 2022 **Discrete Models and Methods: from Multinomial Testing to Data Compression**, *Stat 300 Seminar*, Harvard University.

Oct. 2022 **Testing Variability of Multinomial Data with Applications to Text Analysis**, *Stanford Statistics Seminar*.

Aug. 2022 **Detection of Heterogeneous Documents in a Corpus**, *SNAB 2022*, New York University.

June 2022 **Detecting a Small Community in a Large Network**, *SIAM Discrete Math*, Carnegie Mellon University.

Oct. 2021 **A Statistical Perspective on Coresets**, *Stat 300 Seminar*, Harvard University.

April 2021 **A Statistical Perspective on Coreset Density Estimation**, *AISTATS 2021 (virtual)*.

April 2021 **Efficient Interpolation of Density Estimators** , *AISTATS 2021 (virtual)*.

Dec. 2020 **A Statistical Perspective on Coresets**, *YINS Seminar*, Yale University (virtual).

July 2020 **Balancing Gaussian Vectors in High Dimensions**, *COLT 2020 (virtual)*.

Teaching and mentorship

Fall 2020 **Teaching Assistant**, *Fundamental of Statistics (online)*, MIT Math Department.

Summer 2020 **Teaching Assistant**, *Fundamentals of Statistics (online)*, MIT edX Micromasters.

Spring 2019 **Teaching Assistant**, *Introduction to Probability and Statistics*, MIT Math Department.

Summer, Fall 2018 **Teaching Staff**, *Fundamentals of Statistics (online)*, MIT edX Micromasters.

Spring 2018 **Grader**, *Introduction to Stochastic Processes*, MIT Math Department.

Fall 2017 **Grader**, *Extremal Graph Theory and Additive Combinatorics*, MIT Math Department.

Summer 2017 **Mentor**, *Summer Program for Undergraduate Research (SPUR)*, Student: Alonso Espinosa Dominguez. Project: "On Kakeya-type problems for hyperplanes in $\mathbb{R}^d$".

January 2017 **Mentor**, *MIT Directed Reading Program*, Student: Jessy Lin. Text: *The Probabilistic method* by Noga Alon and Joel Spencer.

Service

Reviewer, *Neurips 2022 (top reviewer), FOCS 2022, AISTATS 2022, ICLR 2022, Neurips 2021 (top reviewer), Theory of Computing Systems, UAI 2021 (top reviewer), AISTATS 2021, ICALP 2020*.

2016–2020 **Organizer**, *MIT Integration Bee*.

2017–2018 **Co-organizer**, *MIT Graduate Student Applied Math Seminar (SPAMS)*.

2016–2017 **Tutor**, *English as a Second Language (ESL) Program for MIT Facilities Department Employees*, Student: Gabriel Castrillon.

Summer 2015, 2016 **Instructor**, *LSU Math Circle*, Enrichment program for mathematically gifted high school students.

Honors and Awards

2017 Levinson Fellow – Department of Mathematics, MIT

2015 LSU University Medalist (4.0/4.0 GPA)

2015 Betti and Robert Giles Senior Mathematics Award – Department of Mathematics, LSU

2014 Barry M. Goldwater Scholarship Recipient

2014 LSU College of Science Outstanding Junior

2013 1st Prize - LSU Undergraduate Research Conference - Math and Physical Sciences Oral Presentations

2013 Pasquale Porcelli Junior Scholarship – Department of Mathematics, LSU

2011–2015 LSU Chancellor's Alumni Scholarship (full tuition, room and board)

2011–2015 LSU Science Honors Scholarship