

# Paxton Turner

## Curriculum Vitae

Department of Statistics

Harvard University

<https://paxtonturner.github.io>

✉ [paxtonturner@g.harvard.edu](mailto:paxtonturner@g.harvard.edu)

### 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<sup>†</sup>. [Gaussian Discrepancy: a Probabilistic Relaxation of Vector Balancing](#). *Discrete Applied Mathematics*. 2022.

### Preprints

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

---

<sup>†</sup> indicates alphabetical ordering. Titles in blue are hyperlinks to the corresponding paper.

- Younhun Kim, Elchanan Mossel, Govind Ramnarayan, and Paxton Turner<sup>†</sup>. Efficient Reconstruction of Stochastic Pedigrees. [arxiv.org/abs/2005.03810](https://arxiv.org/abs/2005.03810). 2020.

## Additional publications

- Paxton Turner and Yuhuai Wu<sup>†</sup>. Ehrhart Theory and Discrete Equidecomposability of Polygons. *Discrete and Computational Geometry*. 2020.
- Megan Leoni, Gregg Musiker, Seth Neel, and Paxton Turner<sup>†</sup>. 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 **Testing Variability of Multinomial Data with Applications to Text Analysis**, *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