Tobias Lee Johnson
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EMPLOYMENT AND EDUCATION

Assistant Professor
CUNY Graduate Center — *Fall 2020—*
College of Staten Island (CUNY) — *Fall 2017—*

NSF Postdoctoral Fellow
New York University; sponsored by Gérard Ben Arous — *Fall 2016–Spring 2017*
University of Southern California; sponsored by Larry Goldstein — *Fall 2014–Spring 2016*

Ph.D. in Mathematics, University of Washington — *Fall 2008–Spring 2014*
Advised by Ioana Dumitriu and Soumik Pal

RESEARCH

Interests:

probability theory and combinatorics, with a focus on discrete random structures, interacting particle systems, and statistical physics; Stein's method

Papers:

21. *Particle density in diffusion-limited annihilating systems*, with Matthew Junge, Hanbaek Lyu, and David Sivakoff.
Under revision at the *Annals of Probability*. arXiv:2005.06018

2022 20. *Diffusion-limited annihilating systems and the increasing convex order*, with Riti Bahl, Philip Barnet, and Matthew Junge.
Electron. J. Probab., 27 (2022), no. 84, 1–19. arXiv:2104.12797

19. *Concentration inequalities from monotone couplings for graphs, walks, trees and branching processes*, with Erol Peköz.
Stochastic Process. Appl. 152 (2022), 1–31. arXiv:2108.02101

18. *Continuous phase transitions on Galton–Watson trees*.
Combin. Probab. Comput., 31(2):184–367, 2022. arXiv:2007.13864

2020 17. *Random tree recursions: which fixed points correspond to tangible sets of trees?*, with Moumanti Podder and Fiona Skerman.
Random Structures Algorithms, 56(3):796–837, 2020. arXiv:1808.03019

2019 16. *Cover time for the frog model on trees*, with Christopher Hoffman and Matthew Junge.
Forum Math. Sigma, 7, e41 1–49, 2019. arXiv:1802.03428

15. *Infection spread for the frog model on trees*, with Christopher Hoffman and Matthew Junge.
Electron. J. Probab., 24 (2019), no. 112, 1–29. arXiv:1710.05884

14. *Sensitivity of the frog model to initial conditions*, with Leonardo T. Rolla.
Electron. Commun. Probab., 24 (2019), no. 29, 1–9. arXiv:1809.03082

2018 13. *Stochastic orders and the frog model*, with Matthew Junge.
Ann. Inst. H. Poincaré Probab. Statist., 54(2):1013–1030, 2018. arXiv:1602.04411.

12. *Bounds to the normal for proximity region graphs*, with Larry Goldstein and Raphaël Lachièze-Rey.
Stochastic Process. Appl., 128(4):1208–1237, 2018. arXiv:1510.09188.

11. *Size biased couplings and the spectral gap for random regular graphs*, with Nicholas Cook and Larry Goldstein.
Ann. Probab., 46(1):72–125, 2018. arXiv:1510.06013.

2017 10. *Recurrence and transience for the frog model on trees*, with Christopher Hoffman and Matthew Junge.
Ann. Probab., 45(5):2826–2854, 2017. arXiv:1404.6238.

9. *Local limit of the fixed point forest*, with Anne Schilling and Erik Slivken.
Electron. J. Probab., 22 (2017), no. 18, 1–26. arXiv:1605.09777.

2016 8. *The critical density for the frog model is the degree of the tree*, with Matthew Junge.
Electron. Commun. Probab., 21 (2016), no. 82, 1–12. arXiv:1607.07914.

7. *From transience to recurrence with Poisson tree frogs*, with Christopher Hoffman and Matthew Junge.
Ann. Appl. Probab., 26(3):1620–1635, 2016. arXiv:1501.05874.

6. *The Marčenko-Pastur law for sparse random bipartite biregular graphs*, with Ioana Dumitriu. *Random Structures Algorithms*, 48(2):313–340, 2016. arXiv:1304.4907.

2015 5. *Exchangeable pairs, switchings, and random regular graphs*. *Electron. J. Combin.*, 22(1):P1.33, 2015. arXiv:1112.0704.

4. *Quantitative small subgraph conditioning*, with Elliot Paquette. Unpublished. arXiv:1307.4858.

2014 3. *Cycles and eigenvalues of sequentially growing random regular graphs*, with Soumik Pal. *Ann. Probab.*, 42(4):1396–1437, 2014. arXiv:1203.1113.

2013 2. *Functional limit theorems for random regular graphs*, with Ioana Dumitriu, Soumik Pal, and Elliot Paquette. *Probab. Theory Related Fields*, 156(3–4):921–975, 2013. arXiv:1109.4094.

2009 1. *On universal cycles for multisets*, with Glenn Hurlbert and Joshua Zahl. *Discrete Math.*, 309::5321-5327, 2009. arXiv:math/0701488.

Grants, Honors, and Awards

PSC-CUNY Grant, Award #62628-00 50	*2019–2020*
NSF Grant, Standard Grant, Probability, Award DMS-1811952	*2018–2021*
PSC-CUNY Grant, Award #61540-00 49	*2018–2019*
NSF Postdoctoral Fellow, University of Southern California and Courant Institute	*2014–2017*
ARCS Fellowship, ARCS Foundation, Seattle chapter	*2008–2010*
NSF VIGRE Graduate Fellowship, University of Washington	*2008–2009*

Talks

University of Washington, Probability Seminar — *May 2022*
Continuous phase transitions on Galton-Watson trees

University of British Columbia, Probability Seminar, online — *April 2021*
Continuous phase transitions on Galton-Watson trees

AMS Eastern Sectional, online — *March 2021*
Continuous phase transitions on Galton-Watson trees

Northwestern University, Probability Seminar — *February 2020*
Two-type diffusion-limited annihilating systems

CUNY, Probability Seminar — *October 2019*
Two-type diffusion-limited annihilating systems

CUNY, Graduate Student Colloquium — *April 2019*
The frog model and other processes in discrete probability

AMS Eastern Sectional, Delaware — *September 2018*
Fixed points of random tree recursions

University of Massachusetts Amherst, Discrete Math Seminar — *September 2018*
The frog model on trees

City College, Colloquium — *September 2018*
The frog model on trees

Indiana University, Probability Seminar — *September 2018*
Fixed points of recursive functions on Galton-Watson trees

CIMPA School, Geometry and scaling of random structures, Buenos Aires — *July 2018*
Cover time for the frog model on trees

Georgia Tech, Stochastics Seminar — *February 2018*
Cover time for the frog model on trees

CUNY, Probability Seminar — *October 2017*
Size biased couplings and the spectral gap for random regular graphs

Penn/Temple, Probability Seminar — *April 2017*
Galton-Watson fixed points, tree automata, and interpretations

University of Minnesota, Probability Seminar — *March 2017*
Cover time for the frog model on trees

NYU-ECNU (Shanghai), Probability Seminar — *March 2017*
Cover time for the frog model on trees

Columbia University, Probability Seminar — *February 2017*
Galton-Watson fixed points, tree automata, and interpretations

Duke University, Probability Seminar *February 2017*
Galton-Watson fixed points, tree automata, and interpretations

University of Chicago, Probability and Satistical Physics Seminar *February 2017*
Galton-Watson fixed points, tree automata, and interpretations

Purdue University, Probability Seminar *January 2017*
Galton-Watson fixed points, tree automata, and interpretations

Ohio State University, Combinatorics and Probability Seminar *December 2016*
Galton-Watson fixed points, tree automata, and interpretations

Rutgers, Discrete Math Seminar *September 2016*
The frog model on trees

Carnegie Mellon University, Algorithms, Combinatorics and Optimization Seminar *May 2016*
Size biased couplings and the spectral gap for random regular graphs

Bay Area Discrete Math Day, UC Berkeley *April 2016*
The frog model on trees

Simons Institute (Berkeley), Counting Program Seminar *April 2016*
Nonexistent properties of Galton–Watson trees

Stanford University, Probability Seminar *March 2016*
Size biased couplings and the spectral gap for random regular graphs

Cornell University, Oliver Club (Colloquium) *March 2016*
The frog model on trees

Courant Institute, Probability Seminar *March 2016*
The frog model on trees

UT Austin, Random Structures Seminar *February 2016*
Size biased couplings and the spectral gap for random regular graphs

UC Irvine, Probability Seminar *January 2016*
Size biased couplings and the spectral gap for random regular graphs

Davis–Warwick Probability Workshop, UC Davis *December 2015*
Size biased couplings and the spectral gap for random regular graphs

UCLA, Probability Seminar *October 2015*
Size biased couplings and the spectral gap for random regular graphs

Yale University, Combinatorics and Probability Seminar *September 2015*
The second eigenvalue of dense random regular graphs

Rutgers, Discrete Math Seminar *September 2015*
The second eigenvalue of dense random regular graphs

Penn/Temple, Probability Seminar *September 2015*
The frog model on trees

CUNY, Probability Seminar *September 2015*
The frog model on trees

Sherman Memorial Conference, Indiana University *May 2015*
The frog model on trees

UC Davis, Mathematical Physics & Probability Seminar *May 2015*
The frog model on trees

IMA, Postdoc Seminar *April 2015*
The frog model on trees

Weizmann Institute, Geometric Functional Analysis & Probability Seminar *March 2015*
The frog model on trees

UCLA, Probability Seminar *February 2015*
Random matrices, random regular graphs, and Stein's method

UC Irvine, Probability Seminar *February 2015*
The frog model on trees

Southern California Probability Symposium, UCLA *December 2014*
The frog model on trees

AMS Special Session on Random Matrices, Joint Meetings, Baltimore *January 2014*
Random matrices and random regular graphs

University of Southern California, Probability Seminar *September 2013*
Stein's method and random regular graphs

Courant Institute, Probability Seminar *April 2012*
Growing random regular graphs and the Gaussian free field

PROFESSIONAL ACTIVITIES

- reviewer for *ALEA*, *Annals of Applied Probability*, *Annals of Probability*, *Australasian Journal of Combinatorics*, *Communications on Pure and Applied Mathematics*, *Electronic Journal of Probability*, *Journal of Applied Probability*, *Journal of Integer Sequences*, *Probability Theory and Related Fields*, *Random Structures and Algorithms*, *Statistics and Probability Letters*, and *Symposium on Discrete Algorithms*
- co-organizer, AMS Special Session on Stochastic Spatial Models at the AMS–MAA Joint Meetings, January 2020
- organizer for the CUNY Probability Seminar, various semesters, and for USC's Probability/Statistics Seminar

TEACHING

Students mentored:

- PhD student: Matvey Genkin (2022–)
- Undergraduates: research collaboration with Riti Bahl, Philip Barnet, summer 2020; co-supervised undergraduate research project (students Zoe McDonald and Jean Pulla) as part of the Baruch College Combinatorics REU, summer 2021; supervised LSAMP fellowship project with Chukwurado Umeaka, summer 2021.

Classes taught:

Introduction to Proof (MTH 301, CSI)	*Fall 2021*
College Algebra and Trigonometry (MTH 123, CSI)	*Fall 2021*
Probability (MTH 311, CSI)	*Fall 2017, Fall 2018, Spring 2021*
Statistics (MTH 214, CSI)	*Fall 2017, Spring 2018, Fall 2019, Spring 2021, Spring 2022*
Calculus I (MTH 231, CSI)	*Spring 2018, Fall 2019*
Calculus II (MTH 232, CSI)	*Fall 2020*
Analysis (MATH 325, NYU)	*Spring 2017*
Math for Economics II (MATH 212, NYU)	*Fall 2016*
Business Calculus (MATH 118x, USC)	*Fall 2014*
Differential Equations (MATH 307, UW)	*Winter 2014*
Linear Algebra (MATH 308, UW)	*Winter 2011, Summer 2011, Spring 2013*
Calculus I (MATH 124, UW)	*Summer 2010*

Other teaching duties:

Lead TA, University of Washington Trained and supervised all first-year teaching assistants	*Fall 2012–Spring 2013*
TA Mentor, University of Washington Observed and advised first-year teaching assistants	*Fall 2010, Fall 2011*
TA for calculus classes, University of Washington	*Fall 2008, Spring 2009, Fall 2010, Fall 2011*