Tobias Lee Johnson  
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EMPLOYMENT AND EDUCATION

**Assistant Professor**, 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  
Advised by Ioana Dumitriu and Soumik Pal  
Fall 2008–Spring 2014

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.  
Submitted. [arXiv:2005.06018](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](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](arXiv:2108.02101)

18. *Continuous phase transitions on Galton–Watson trees*, with Christopher Hoffman and Matthew Junge.  
*Combin. Probab. Comput.*, 31(2):184–367, 2022. [arXiv:2007.13864](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](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](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](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](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](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](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](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](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](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](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](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](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(8):5321-5327, 2009. [arXiv:math/0701488].

GRANTS, HONORS, AND AWARDS

| Grant Type                              | Institution/Details                        | Years   |
|-----------------------------------------|--------------------------------------------|---------|
| 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

| Conference/Seminar                      | Institution/Details                        | Date    |
|-----------------------------------------|--------------------------------------------|---------|
| AMS Eastern Sectional                   | online                                     | March 2021|
| Continuous phase transitions on Galton-Watson trees |                        |         |
| Northwestern University, Probability Seminar | Two-type diffusion-limited annihilating systems | February 2020|
| 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  |                                            | September 2018|
| University of Massachusetts Amherst, Discrete Math Seminar |                        |         |
| The frog model on trees                 |                                            | September 2018|
| 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 |                        |         |
| CINMPA 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  |                                            | September 2018|
| 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 | Cover time for the frog model on trees | March 2017|
| NYU-ECNU (Shanghai), Probability Seminar | Cover time for the frog model on trees | March 2017|
| Columbia University, Probability Seminar | Cover time for the frog model on trees | 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 Statistical 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 Probability, Communications on Pure and Applied Mathematics, Journal of Integer Sequences, Probability Theory and Related Fields, Random Structures and Algorithms, and Symposium on Discrete Algorithms
- reviewer for AMS MathSciNet
- organized USC’s Probability/Statistics Seminar
## Teaching

### Classes taught:

| Course                  | Semester(s)                  |
|-------------------------|------------------------------|
| Probability (MTH 311, CSI) | Fall 2017, Fall 2018, Spring 2021 |
| Statistics (MTH 214, CSI)   | Fall 2017, Spring 2018, Fall 2019, Spring 2021 |
| 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:

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