

Daniel L. Sussman

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111 Cummington Avenue
Boston, MA 02215

Education

- 2014** Ph.D. Applied Math and Statistics
Johns Hopkins University
Thesis: Foundations of Adjacency Spectral Embeddings
Advisor: Carey E. Priebe
- 2008** B.A. *magna cum laude*, Mathematics
Cornell University

Positions

- 2021–** Associate Director for the Program in Statistics
Present Department of Mathematics and Statistics, Boston University
- 2016–** Assistant Professor
Present Department of Mathematics and Statistics, Boston University
- 2014–2016** Postdoctoral Researcher
Airoldi Lab, Statistics Department, Harvard University
- 2014 Spring** Postdoctoral Researcher and Lecturer
Applied Math and Statistics Department, Johns Hopkins University

Publications

Preprints

- [1] Zihuan Qiao and Daniel Sussman (Dec. 2021a). “iGraphMatch: an R Package for the Analysis of Graph Matching”. In: arXiv: [2112.09212](https://arxiv.org/abs/2112.09212) [[stat.CO](#)]
- [2] Wenrui Li, Daniel L Sussman, and Eric D Kolaczyk (May 2021). “Causal Inference under Network Interference with Noise”. In: arXiv: [2105.04518](https://arxiv.org/abs/2105.04518) [[stat.ME](#)]
- [3] Christy Lin, Daniel Sussman, and Prakash Ishwar (Sept. 2021). “Ergodic Limits, Relaxations, and Geometric Properties of Random Walk Node Embeddings”. In: arXiv: [2109.04526](https://arxiv.org/abs/2109.04526) [[stat.ML](#)]
- [4] Benjamin Draves and Daniel L Sussman (May 2020). “Bias-Variance Tradeoffs in Joint Spectral Embeddings”. In: arXiv: [2005.02511](https://arxiv.org/abs/2005.02511) [[math.ST](#)]
- [5] Wenrui Li, Daniel L Sussman, and Eric D Kolaczyk (Feb. 2020). “Estimation of the Epidemic Branching Factor in Noisy Contact Networks”. In: arXiv: [2002.05763](https://arxiv.org/abs/2002.05763) [[stat.ME](#)]
- [6] Fei Fang, Daniel L Sussman, and Vince Lyzinski (July 2018). “Tractable Graph Matching via Soft Seeding”. In: arXiv: [1807.09299](https://arxiv.org/abs/1807.09299) [[stat.CO](#)]
- [7] Daniel L Sussman and Edoardo M Airoldi (Feb. 2017). “Elements of estimation theory for causal effects in the presence of network interference”. In: arXiv: [1702.03578](https://arxiv.org/abs/1702.03578) [[stat.ME](#)]
- [8] Daniel L Sussman, Alexander Volfovsky, and Edoardo M Airoldi (June 2015). “Analyzing statistical and computational tradeoffs of estimation procedures”. In: arXiv: [1506.07925](https://arxiv.org/abs/1506.07925) [[stat.CO](#)]

Published

- [1] Jesús Arroyo et al. (Jan. 2021). “Maximum likelihood estimation and graph matching in errorfully observed networks”. en. In: *Journal of computational and graphical statistics*, pp. 1–33

- [2] Vince Lyzinski and Daniel L Sussman (Dec. 2020). “Matchability of heterogeneous networks pairs”. en. In: *Information and inference* 9.4, pp. 749–783
- [3] Daniel L Sussman, Youngser Park, et al. (Nov. 2020). “Matched Filters for Noisy Induced Subgraph Detection”. en. In: *IEEE transactions on pattern analysis and machine intelligence* 42.11, pp. 2887–2900
- [4] Runze Tange et al. (June 2019). “Connectome Smoothing via Low-Rank Approximations”. en. In: *IEEE transactions on medical imaging* 38.6, pp. 1446–1456
- [5] Avanti Athreya, Donniell E Fishkind, et al. (2018). “Statistical Inference on Random Dot Product Graphs: a Survey”. In: *Journal of machine learning research: JMLR* 18.226, pp. 1–92
- [6] John Bliton et al. (Nov. 2017). “Adipose tissue measurement using magnetic resonance imaging: A survey”. In: *Current medical imaging reviews* 13.4, pp. 1–19
- [7] Minh Tang, Avanti Athreya, Daniel L Sussman, Vince Lyzinski, and Carey E Priebe (Aug. 2017). “A nonparametric two-sample hypothesis testing problem for random graphs”. en. In: *Bernoulli* 23.3, pp. 1599–1630
- [8] Minh Tang, Avanti Athreya, Daniel L Sussman, Vince Lyzinski, Youngser Park, et al. (Apr. 2017). “A Semiparametric Two-Sample Hypothesis Testing Problem for Random Graphs”. In: *Journal of computational and graphical statistics* 26.2, pp. 344–354
- [9] A Athreya, C E Priebe, et al. (Feb. 2016). “A Limit Theorem for Scaled Eigenvectors of Random Dot Product Graphs”. en. In: *Sankhya A* 78.1, pp. 1–18
- [10] Shakira Suwan et al. (Jan. 2016). “Empirical Bayes estimation for the stochastic blockmodel”. In: *Electronic journal of statistics* 10.1, pp. 761–782
- [11] Carey E Priebe et al. (Oct. 2015). “Statistical Inference on Errorfully Observed Graphs”. In: *Journal of computational and graphical statistics* 24.4, pp. 930–953
- [12] Vince Lyzinski, Daniel L Sussman, Donniell E Fishkind, et al. (Aug. 2015). “Spectral clustering for divide-and-conquer graph matching”. en. In: *Parallel computing* 47, pp. 70–87
- [13] Narayanan Kasthuri et al. (July 2015). “Saturated Reconstruction of a Volume of Neocortex”. en. In: *Cell* 162.3, pp. 648–661
- [14] Vince Lyzinski, Daniel L Sussman, Minh Tang, et al. (Jan. 2014). “Perfect clustering for stochastic blockmodel graphs via adjacency spectral embedding”. In: *Electronic journal of statistics* 8.2, pp. 2905–2922
- [15] Daniel L Sussman, Minh Tang, and Carey E Priebe (Jan. 2014). “Consistent latent position estimation and vertex classification for random dot product graphs”. en. In: *IEEE transactions on pattern analysis and machine intelligence* 36.1, pp. 48–57
- [16] Minh Tang, Daniel L Sussman, and Carey E Priebe (June 2013). “Universally consistent vertex classification for latent positions graphs”. In: *Annals of statistics* 41.3, pp. 1406–1430
- [17] Donniell E Fishkind et al. (Jan. 2013). “Consistent Adjacency-Spectral Partitioning for the Stochastic Block Model When the Model Parameters Are Unknown”. In: *SIAM Journal on Matrix Analysis and Applications* 34.1, pp. 23–39
- [18] Daniel L Sussman, Minh Tang, Donniell E Fishkind, et al. (Sept. 2012). “A Consistent Adjacency Spectral Embedding for Stochastic Blockmodel Graphs”. In: *Journal of the American Statistical Association* 107.499, pp. 1119–1128
- [19] Ronald M Summers et al. (July 2012). “Association between visceral adiposity and colorectal polyps on CT colonography”. en. In: *AJR. American journal of roentgenology* 199.1, pp. 48–57

Thesis

- [1] Daniel Lewis Sussman (Jan. 2014). “Foundations of adjacency spectral embedding”. en. PhD thesis. Johns Hopkins University

Book Chapters

- [1] Eric W Bridgeford et al. (2018). “What Is Connectome Coding?” In: *SHORT COURSE 2: Functional, Structural, and Molecular Imaging, and Big Data Analysis*. Ed. by Ed Boyden and Kwanghun Chung. Society for Neuroscience, p. 62
- [2] Li Chen et al. (2013). “Refinement of a Method for Identifying Probable Archaeological Sites from Remotely Sensed Data”. In: *Mapping Archaeological Landscapes from Space*. Ed. by Douglas C Comer and Michael J Harrower. SpringerBriefs in Archaeology. New York, NY: Springer New York, pp. 251–258

Conference Proceedings

- [1] K Pantazis et al. (Dec. 2019). “Multiplex graph matching matched filters”. In: *2019 IEEE International Conference on Big Data (Big Data)*, pp. 4921–4927
- [2] L Li and D L Sussman (Dec. 2019). “Graph Matching via Multi-Scale Heat Diffusion”. In: *2019 IEEE International Conference on Big Data (Big Data)*. ieeexplore.ieee.org, pp. 1157–1162
- [3] Daniel L Sussman, Vince Lyzinski, et al. (Feb. 2018). “Matched Filters for Noisy Induced Subgraph Detection”. In: *GTA3 2018: Workshop on Graph Techniques for Adversarial Activity Analytics at WSDM*. Won *Best Paper Award* for workshop.
- [4] Joel Douglas et al. (Feb. 2018). “Metrics for Evaluating Network Alignment”. In: *GTA3 2018: Workshop on Graph Techniques for Adversarial Activity Analytics at WSDM*. hrl.com
- [5] D Mhembere et al. (Dec. 2013). “Computing scalable multivariate global invariants of large (brain-) graphs”. In: *2013 IEEE Global Conference on Signal and Information Processing*, pp. 297–300
- [6] D L Sussman, D Mhembere, et al. (2013). “Massive Diffusion MRI Graph Structure Preserves Spatial Information”. In: *Organization for Human*
- [7] James C Tilton et al. (2012). “Refinement of a method for identifying probable archaeological sites from remotely sensed data”. In: *Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XVIII*
- [8] Jianhua Yao, Daniel L Sussman, and Ronald M Summers (2011). “Fully automated adipose tissue measurement on abdominal CT”. in: *SPIE Medical Imaging. Orlando, Florida: SPIE, 79651Z*
- [9] Daniel L Sussman, Jianhua Yao, and Ronald M Summers (Mar. 2010b). “Automated fat measurement and segmentation with intensity inhomogeneity correction”. In: *Medical Imaging 2010: Image Processing*. Vol. 7623. International Society for Optics and Photonics, p. 76233X
- [10] D L Sussman, J Yao, and R M Summers (Apr. 2010a). “Automated measurement and segmentation of abdominal adipose tissue in MRI”. in: *2010 IEEE International Symposium on Biomedical Imaging: From Nano to Macro*, pp. 936–939

Software

- [1] Zihuan Qiao and Daniel L Sussman (Jan. 2021b). *iGraphMatch*

Invited Presentations

- [1] New England Statistics Symposium, University of Rhode Island, October 2021.
- [2] Online Stochastics Seminar, Georgia Tech, October 2020.
- [3] IMA Workshop on Theory and Algorithms of Graph-based Learning, September 2020.
- [4] Joint Statistics Meetings, Invited Session on *The future of designed experiments in the age of Big Data*, Baltimore, MD, July 2020.
- [5] IEEE International Conference on Big Data, Los Angeles, CA, December 2019.
- [6] Mathematics Seminar, University of Massachusetts Boston, Boston, MA, November 2019.
- [7] Applied Statistics Symposium, International Chinese Statistical Association, Raleigh, NC, June 2019.
- [8] Graph Exploitation Symposium, MIT Lincoln Laboratories, Newton, MA, April 2019.
- [9] Data Science Seminar Seminar, University of Tennessee Knoxville, February 2019.
- [10] Applied Mathematics Seminar, Tufts University, January 2019.
- [11] “Multiple Graph Inference: From Joint Embeddings to Graph Matching,” Statistics Seminar, Temple University, October, 2018.
- [12] “Decision Theoretic Aspects of Causal Inference Under Network Interference,” JSM. July, 2018.
- [13] “Decision Theoretic Aspects of Causal Inference Under Network Interference,” ISBA. June, 2018.
- [14] “Multiple Graph Inference: From Omnibus Embeddings to Graph Matching,” Machine Learning Seminar, University of Bristol. June, 2018.
- [15] “Decision Theoretic Aspects of Causal Inference Under Network Interference,” NetSci. June, 2018.
- [16] “Multiple Graph Inference: From Omnibus Embeddings to Graph Matching,” Statistics Seminar, UMass Amherst. February 2018.
- [17] “Matched Filters for Noisy Induced Subgraph Detection,” Workshop on Graph Techniques for Adversarial Activity Analytics, 11th ACM International Conference on Web Search and Data Mining. February, 2018
- [18] “Multiple Graph Inference: From Omnibus Embeddings to Graph Matching,” Math IRL Seminar. December 2017.
- [19] “Multiple Graph Inference: From Omnibus Embeddings to Graph Matching,” Random Matrix & Probability Theory Seminar, Harvard University, Center of Mathematical Sciences and Applications, Cambridge, MA, November 2017.
- [20] “Multiple Graph Inference: From Omnibus Embeddings to Graph Matching,” Statistics Seminar, University of Connecticut, Storrs, CT, November 2017.
- [21] “Multiple Graph Inference: From Omnibus Embeddings to Graph Matching,” Wed@Hariri/Meet Our Fellows Talk, Rafik B. Hariri Institute for Computing and Computational Science & Engineering, Boston University, Boston, MA, November, 2017.
- [22] “Unbiased estimation under network interference”, Joint Statistics Meetings, Invited Session on *Experiments and Inference for Social Networks*, Baltimore, MD, July 2017.

- [23] “Optimal Unbiased Estimation of Causal Effects under Network Interference”, NetSciX, Tel Aviv, Israel, January 2017.
- [24] “Statistical Inference for Networks via Spectral Embedding”, Yale Biostatistics Seminar, New Haven, CT, October 2016.
- [25] “Unbiased Estimation of Causal Effects under Network Interference ”, International Indian Statistical Association Conference on Statistics, Session on *New directions in network analysis*, Corvallis, OR, August 2016.
- [26] “Estimating the Population Mean Network from a Random Sample of Networks”, Joint Statistics Meetings, Invited Session on *Advances and Novel Problems in Network Statistics*, Chicago, IL, July 2016.
- [27] “Unbiased Estimation of Causal Effects under Network Interference ”, Conference on Statistical Learning and Data Science, Session on *Network Inference*, Chapel Hill, NC, June 2016.
- [28] “Unbiased Estimation of Causal Effects under Network Interference ”, NetSci 2016 Satellite Symposium on *Statistical Inference for Network Models*, Seoul, South Korea, May 2016.
- [29] “Statistical Inference for Networks via Adjacency Spectral Embedding”, Duke Network Analysis Center, Duke University, September 2015.
- [30] “Statistical Inference for Networks via Adjacency Spectral Embedding”, ISNPS Meeting on *Biosciences, Medicine, and novel Non-Parametric Methods*. Graz, Austria, July 2015.
- [31] “Challenges in (Spectral) Network Denoising”, SIAM Conference on Computational Science and Engineering, Salt Lake City, March 2015.
- [32] “Computational and Statistical Trade-offs: Towards a Mathematical Framework”, Workshop on *Mathematics of Data Analysis in Cybersecurity*, ICERM, Brown University, October 2014.
- [33] “Adjacency Spectral Embedding for Random Graphs”, Temple University Statistics Department Seminar, Fox School of Business, Temple University, September 2014
- [34] “Testing for Commonality Among Graphs and Subgraphs”, Topic Contributed Talk in *Estimation and Testing for Models of Network Data*, Joint Statistics Meeting, Boston, August 2014, [\[Online\]](#)
- [35] ‘Consistent Vertex Classification with Applications in Massive MR Brain-Graphs”, Norbert Wiener Center Seminar, University of Maryland, March 2013.
- [36] “Consistent Vertex Classification with Applications in Massive MR Brain-Graphs”, Duke Data Seminar, Duke University, January 2013.
- [37] “Estimating Latent Positions and Vertex Classification for Random Dot Product Graphs”, Invited Talk in *Stochastic Blockmodels: New Uses and Directions*, Joint Statistical Meetings, 2012. [\[Online\]](#)
- [38] “Statistical Enhancement of Archaeological Site Discovery Protocols via Multi-spectral Imagery.” NASA ROSES Space Archaeology Workshop on Research and World Heritage, Johns Hopkins University, October 2011.

Posters

- [1] “Unbiased Estimation of Causal Effects under Network Interference”, IMS New Researchers Conference, Madison, WI, July 2016.
- [2] A. Volfvovsky, D. L. Sussman, E. Airoldi, “Computational and Statistical Trade-offs: Towards a Mathematical Framework”, SIAM Conference on Computational Science and Engineering, March 2015.

- [3] D. L. Sussman. “Wavelets for Space Archaeology” February Fourier Talks, February 2013.
- [4] J. T. Vogelstein, D. E. Fishkind, D. L. Sussman and C. E. Priebe. “Large Graph Classification: Theory and Statistical Connectomics Applications.” IMA Large Graphs: Modeling, Algorithms and Applications, October 2011.
- [5] D. E. Fishkind , D. L. Sussman, M. Tang, J. T. Vogelstein and C. E. Priebe. “Dot Product Embedding in Large (Errorfully Observed) Graphs with Applications in Statistical Connectomics.” IMA Large Graphs: Modeling, Algorithms and Applications, October 2011.

Funding

2020-2022	DARPA, “Algorithmic Primitives for Aligning and Merging Complex Network,” PI.
2017-2019	ASD R&E, “Statistical Modeling and Analysis of Graph Data and Graph Matching,” PI. Prime: MIT Lincoln Labs
2017-2019	DARPA, “Universally Useful Primitives for Aligning Networks Across Time and Space,” PI. Prime: University of Massachusetts, Amherst

Awards and Honors

2018	Best Paper Award Workshop on Graph Techniques for Adversarial Activity Analytics at WSDM
2017	Rafik B. Hariri Institute for Computing Junior Faculty Fellow
2013–2015	Whiting School of Engineering Centennial Fellowship
2012, 2013	Acheson J. Duncan Fund for the Advancement of Research in Statistics Travel Award
2012	National Science Foundation Graduate Research Fellowship Program Honorable Mention
2011–2015	Charles and Catherine Counselman Endowed Fellowship
2010–2015	Newman Family Fellowship

Teaching

Boston University

Assistant Professor

2021 Fall	MA 415/615: Data Science with R MA 681: Accelerated Introduction to Statistical Methods for Quantitative Research
2021 Spring	MA 415/615: Data Science with R
2020 Fall	MA 415/615: Data Science with R MA 681: Accelerated Introduction to Statistical Methods for Quantitative Research
2020 Spring	MA 415/615: Data Science with R MA 581: Probability
2019 Fall	MA 415/615: Data Science with R
2018 Fall	MA 681: Accelerated Introduction to Statistical Methods for Quantitative Research
2018 Spring	MA 703: Statistical Analysis of Networks
2017 Fall	MA 681: Accelerated Introduction to Statistical Methods for Quantitative Research
2017 Spring	MA 882: Statistics Seminar on Network Modeling and Inference
2016 Fall	MA 681: Accelerated Introduction to Statistical Methods for Quantitative Research

Johns Hopkins University

Lecturer

2014 Spring	Probability and Statistics for Biological Sciences and Engineering
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Teaching Assistant

2013 Fall Graduate Probability Theory
 2013 Spring Probability and Statistics for the Life Sciences
 2012 Fall Introductory Statistics through Case Study
 2012 Fall Introductory Statistics

Instructor

2013 Summer Financial Math Masters Student Orientation
 2012 Summer Financial Math Masters Student Orientation
Three 90-minute lectures on undergraduate statistics and R.

Weill Cornell Medical College in Qatar

Academic Assistant

2008 Fall Introductory Calculus

Experience and Service

2020 Committee Member
 BU MA Neuro-stats Job Search Committee

2017-2021 Co-organizer
 BU MA Probability and Statistics Seminar Committee

2017-Present Committee Member
 BU MA Graduate Committee

2014-Present Committee Member
Junior IMS Committee for Young Researchers

July 2015 Session Organizer and Chair
Organized a session with Vince Lyzinski on “Statistical Inference for High-Dimensional Data” at ISNPS Meeting on Biosciences, Medicine, and novel Non-Parametric Methods.

2012–2013 Student Seminar Co-chair, Applied Math and Statistics, Johns Hopkins University
Recruited students to speak and organized a weekly student seminar series.

July 2012 Summer School Fellow
 Summer School on Geometry and Data

June 2012 Course Developer, Applied Math and Statistics, Johns Hopkins University
Helped develop a new introductory statistics course based on case studies.

2011–2012 Statistical Consultant
 Cultural Site Research Management
Trained classifiers to detect archaeological sites from satellite images with Carey Priebe and Douglas Comer.

2009–2010 Intramural Research Training Award Fellow
 Summers Lab, National Institutes of Health
Developed clinical software and algorithms to automatically segment adipose tissue in abdominal MR and CT scans with Dr. Jianhua Yao.

2007–2008 Undergraduate Researcher
 Siepel Lab, Biostatistics and Computational Biology Department, Cornell University
Investigated an 18-way mammalian whole genome alignment in an independent project to determine the percentage of the genome under selective pressure.

Professional Memberships

2016–Present Institute for Mathematical Statistics
2013–Present American Statistical Association
2014–Present Society for Industrial and Applied Mathematics