

# Joshua Agterberg

January 2022

[jagterberg.github.io](https://jagterberg.github.io)

[jagterberg@jhu.edu](mailto:jagterberg@jhu.edu)

## EDUCATION

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### 2017-Present    **Johns Hopkins University**

2019-Present    PhD in Applied Mathematics and Statistics

2017-2019    Master of Science in Engineering in Applied Mathematics and Statistics  
Advised by Professor Carey Priebe

### 2013-2017    **University of Wisconsin-Madison**

Bachelor of Business Administration, Majors in Actuarial Science and Mathematics  
Advised by Professor Marjorie Rosenberg  
GPA: 3.73/4.0, Actuarial Science Major GPA: 4.0/4.0  
Graduated with Distinction

## RESEARCH INTERESTS

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- Statistical Network Analysis
- High-dimensional Statistics
- Spectral Methods
- Mathematical Data Science
- Nonparametric Statistics

## PREPRINTS AND PUBLICATIONS

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1. *Entrywise Recovery Guarantees for Sparse PCA via Sparsistent Algorithms*  
**Joshua Agterberg** and Jeremias Sulam, Accepted to *AISTATS*, 2022.
2. *Entrywise Estimation of Singular Vectors of Low-Rank Matrices with Heteroskedasticity and Dependence*  
**Joshua Agterberg**, Zachary Lubbets, and Carey Priebe, Submitted, 2021.
3. *Valid Two-Sample Graph Testing via Optimal Transport Procrustes and Multiscale Graph Correlation: Applications in Connectomics*  
Jaewon Chung, Bijan Varjavand, Jesús Arroyo, Anton Alyakin, **Joshua Agterberg**, Minh Tang, Joshua Vogelstein, and Carey Priebe, Published in *Stat*, 2021.
4. *Nonparametric Two-Sample Hypothesis Testing for Random Graphs with Negative and Repeated Eigenvalues*  
**Joshua Agterberg**, Minh Tang, and Carey Priebe, Submitted, 2020.  
(Won best presentation award in Nonparametric Statistics Student Competition, JSM 2021)  
(Selected as a finalist for the Nonparametric Statistics Student Competition, JSM 2021.)

5. *Correcting a Nonparametric Two-sample Graph Hypothesis Test for Graphs with Different Numbers of Vertices*  
Anton Alyakin, **Joshua Agterberg**, Hayden Helm, and Carey Priebe, Submitted, 2020.
6. *On Two Distinct Sources of Nonidentifiability in Latent Position Random Graph Models*  
**Joshua Agterberg**, Minh Tang, and Carey Priebe, Submitted, 2020.
7. *Spectral Graph Clustering via the Expectation-Solution Algorithm*  
Zachary Pisano, **Joshua Agterberg**, Carey Priebe, and Daniel Naiman, Submitted, 2020.
8. *Vertex Nomination, Consistent Estimation, and Adversarial Modification*  
**Joshua Agterberg**, Youngser Park, Jonathan Larson, Chris White, Carey Priebe, and Vince Lyzinski, Published in the *Electronic Journal of Statistics*, 2020.
9. *Social Determinant-Based Profiles of US Adults with the Highest and Lowest Health Expenditures Using Clusters*  
Fanghao Zhong, Margie Rosenberg, **Joshua Agterberg**, and Richard Crabb, Published in *North American Actuarial Journal*, 2020.
10. *Cluster Analysis Application to Identify Groups of Individuals with High Health Expenditures*  
**Joshua Agterberg**, Fanghao Zhong, Richard Crabb, and Margie Rosenberg, Published in *Health Services and Outcomes Research Methodology*, 2020.

## TALKS

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| 1/20/2022 | “Entrywise Estimation of Singular Vectors of Low-Rank Matrices with Heteroskedasticity and Dependence,” <i>2022 TRIPODS Winter School on Interplay between Artificial Intelligence and Dynamical Systems</i> , JHU  |
| 12/6/2021 | “From RDPGs to General Signal Plus Noise Models,” <i>Guest Lecture for 553.742 Statistical Inference on Graphs</i> , JHU  |
| 9/21/2021 | “Entrywise Estimation of Singular Vectors of Low-Rank Matrices with Heteroskedasticity and Dependence,” <i>Applied Mathematics and Statistics Student Seminar</i> , JHU   |
| 8/10/2021 | “Nonparametric Two-Sample Hypothesis Testing for Random Graphs with Negative and Repeated Eigenvalues,” <i>Joint Statistical Meetings, Seattle, WA</i> Virtual<br>( <b>Received Best Presentation Award in the Nonparametric Statistics Student Competition</b> ) |
| 2/2/2021  | “Nonparametric Two-Sample Hypothesis Testing for Random Graphs with Negative and Repeated Eigenvalues,” <i>Applied Mathematics and Statistics Student Seminar</i> , JHU   |
| 8/6/2020  | “Consistent Nonparametric Hypothesis Testing for Low Rank Random Graphs with Negative and Repeated Eigenvalues,” <i>Joint Statistical Meetings, Philadelphia, PA</i> Virtual  |
| 4/7/2020  | “Nonidentifiability and nonparametric random graph hypothesis testing,” <i>MINDS Seminar</i> , JHU  |

- 1/28/2020 “On Two Distinct Sources of Nonidentifiability in Latent Position Random Graph Models,” *Applied Mathematics and Statistics Student Seminar*, JHU
- 4/23/2019 “Vertex Nomination, Consistent Estimation, Adversarial Modification,” *Applied Mathematics and Statistics Student Seminar*, JHU

## HONORS AND AWARDS

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### *Johns Hopkins University*

- Spring 2022 MINDS (Mathematical Institute of Data Science) Fellowship
- Summer 2021 Best Presentation Award, JSM Student Competition in Nonparametric Statistics
- Spring 2021 IMS (Institute of Mathematical Statistics) Hannan Graduate Student Travel Award
- Spring 2021 MINDS (Mathematical Institute of Data Science) Fellowship
- Spring 2021 Finalist for JSM Student Competition in Nonparametric Statistics
- 2021-Present Applied Mathematics and Statistics Teaching Fellow
- 2020-2021 Applied Mathematics and Statistics Apprentice Teaching Fellow
- 2019-Present Charles and Catherine Counselman Fellowship
- Spring 2020 MINDS (Mathematical Institute of Data Science) Fellowship

### *University of Wisconsin-Madison*

- Spring 2017 Graduated with distinction
- Spring 2017 DW Simpson Scholarship
- Fall 2016 Bicknell Scholarship
- 2013-2014 Arthur C. Nielsen Scholarship
- 2013 Directly Admitted to Wisconsin School of Business
- 2014-2017 Dean's list (>3.8 Semester GPA – achieved five separate times)

## TEACHING

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### *Johns Hopkins University*

- Winter 2021 Instructor for 553.283 Introduction to R
- Fall 2021 Instructor for 500.111: Statistics and Data Science with Networks
- Summer 2021 Instructor for Master's Program Statistics Review
- Winter 2021 Instructor for 553.283 Introduction to R
- Summer 2020 Instructor for Master's Program Statistics Review
- Summer 2020 Teaching Assistant for 553.310 Probability and Statistics for Vittorio Loprinzo
- Fall 2019 Co-created a topics course in probability with another graduate student
- Summer 2019 Instructor for Master's Program Statistics Review
- Summer 2019 Teaching Assistant for 553.310 Probability and Statistics for Vittorio Loprinzo
- Spring 2019 Teaching Assistant for 553.762 Nonlinear Optimization II for Professor Daniel Robinson
- Fall 2018 Teaching Assistant for 553.730 Statistical Theory for Professor Carey Priebe
- Summer 2018 Instructor for Financial Mathematics Master's Program Statistics Review

*University of Wisconsin-Madison (Wisconsin School of Business, Risk and Insurance)*

Spring 2017 Grader for ActSci 655 Health Analytics for Professor Margie Rosenberg  
Fall 2016 Grader for ActSci 651 Life Contingencies II for Professor Paul Johnson  
Spring 2016 Grader for ActSci 650 Life Contingencies I for Professor Margie Rosenberg

*University of Wisconsin-Madison (School of Music)*

Spring 2015-Spring 2017 Private Piano Instructor

## PROFESSIONAL SERVICE

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<b>Member</b>	ASA, IMS
<b>Reviewer</b>	IEEE Transactions on Pattern Analysis and Machine Intelligence, AISTATS, Statistics and its Interface
<b>Co-Organizer</b>	Fall 2021 reading group on deep and graph learning
<b>Organizer</b>	Summer 2020 and Summer 2021 reading group on eigenvectors and random graph inference
<b>Organizer</b>	2020-2021 Johns Hopkins Applied Mathematics and Statistics student seminar
<b>Member</b>	Fall 2019 and Fall 2020 Graduate student committee to meet with potential JHU AMS faculty

## EXPERIENCE

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2018 - Present	<b>Research Assistant</b> , Johns Hopkins University, Baltimore, MD  Research assistant to Professor Carey Priebe in the Applied Mathematics and Statistics Department.
Summer 2017	<b>Analytics Intern</b> , CNA Financial, Chicago, IL  Analyzed loss data for products and professional liability for medical devices using new FDA data and GLMs.
Summer 2016	<b>Actuarial Intern</b> , CNA Financial, Chicago, IL  Developed a model for predicting the probability of payment for insurance.
Summer 2015	<b>Actuarial Intern</b> , CUNA Mutual Group, Madison, WI  Created spreadsheets to replicate GAAP and Statutory reserves results from PolySystems for equity-indexed annuity policies and analyzed mortality experience data for the purposes of creating a new mortality table.

## TECHNICAL QUALIFICATIONS

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### Skills

Proficient in R, Java, Python, Linux, Git, C++ (Rcpp), Matlab, LaTeX, Microsoft Excel, and VBA  
Passed three actuarial exams (P, FM, and MFE)

## Quantitative Coursework

*Johns Hopkins University*

Probability Theory I and II, Statistical Theory I and II, Nonlinear Optimization I and II, Combinatorial Optimization, Matrix Analysis, Topics in Statistical Pattern Recognition, Statistical Inference on Random Graphs, Riemannian Geometry I and II, Complex Variables, Functional Analysis, Topics in Probability (co-organized), Sparse Representations in Computer Vision and Machine Learning, Harmonic Analysis, Partial Differential Equations, Stochastic Calculus with Applications

*University of Wisconsin-Madison*

Real Analysis I and II, Measure Theory, Actuarial Mathematics, Loss Models I and II, Linear Programming, Numerical Analysis, Stochastic Processes, Stochastic Calculus, Linear Regression, Theory of Probability

## HOBBIES

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Playing jazz piano, playing with synthesizers, reading fantasy, hiking, and biking