

Office Contact Information

Mathematical Institute for Data Science

Johns Hopkins University

Baltimore, MD 21218

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CURRICULUM VITAE

Aranyak Acharyya

Employment

Johns Hopkins University

Postdoctoral Fellow (on-going) in Mathematical Institute for Data Science

2024 -Present

Baltimore, USA

Education

Johns Hopkins University

Ph.D. in Applied Mathematics and Statistics

2019 -2024

Baltimore, USA

Johns Hopkins University

Master of Science in Engineering in Applied Mathematics and Statistics

2023

Baltimore, USA

Indian Institute of Technology Kanpur

Master of Science in Statistics

2017 – 2019

Kanpur, India

Presidency University

Bachelor of Science in Statistics

2014 – 2017

Kolkata, India

Research interests

- **Statistical inference on networks:** Developing methods with desirable large sample guarantees for inference on network data, with applications in neuroscience, biology and social science
- **High dimensional Statistics:** Extracting information from high dimensional data by leveraging underlying low dimensional manifold structure
- **Artificial intelligence:** Study of generative models, including but not restricted to large language models, by statistical analysis of their embeddings in finite-dimensional Euclidean space, establishing concentration bounds and asymptotic convergence guarantees
- **Nonparametric Statistics:** Analyzing the redundancy of the features in a nonparametric regression setting to help develop a parsimonious model
- **Measurement error models:** Suggesting finite-sample adjustments for statistical inference procedures on network data with asymptotically vanishing noise

Publications

- “Convergence guarantees for response prediction for latent structure network time series”, [Aranyak Acharyya](#), Francesco Sanna Passino, Michael W. Trosset, Carey Priebe, *IEEE Transactions on Network Science and Engineering*. doi:10.1109/TNSE.2025.3588397 (2025)
- “Embedding-based statistical inference on generative models”, Hayden Helm, [Aranyak Acharyya](#), Brandon Duderstadt, Youngser Park, Carey Priebe, *Findings of the Association for Computational Linguistics, ACL 2025*
- “Semisupervised regression in latent structure networks on unknown manifolds”, [Aranyak Acharyya](#), Joshua Agterberg, Michael W. Trosset, Youngser Park, Carey E. Priebe, *Applied Network Science* 75 (8), November 2023. doi: 10.1007/s41109-023-00598-9. (2023)
- “Variable Selection in Multiple Nonparametric Regression Modelling”, Subhra Sankar Dhar, Shalabh, P. Jha, [Aranyak Acharyya](#), *Advanced Mathematical Techniques in Computational and Intelligent Systems*, ISBN 9781032398662. (2023)
- “Random walk with nonuniform angular distribution biased by an external periodic pulse”, Aranyak Acharyya, *European Journal of Physics* 37 (2016) 065104. (2016)

Preprints

- “Testing for LLM response differences: the case of a composite null consisting of semantically irrelevant query perturbations”, [Aranyak Acharyya](#), Carey E. Priebe, Hayden S. Helm, *arXiv preprint, arXiv:2509.10963v1*. (2025)
- “Consistent estimation of generative model representations in the data kernel perspective space”, [Aranyak Acharyya](#), Michael W. Trosset, Carey E. Priebe, Hayden S. Helm, *arXiv preprint, arXiv:2409.17308v2*. (2024)
- “Consistent response prediction for multilayer networks on unknown manifolds”, [Aranyak Acharyya](#), Jesús Arroyo Relión, Michael Clayton, Marta Zlatic, Youngser Park, Carey E. Priebe, *arXiv preprint, arXiv:2405.03225*. (2024)

Talks

- *5th August 2025*: “Vector representations of generative models and their consistent estimation”, Joint Statistical Meetings 2025, Nashville, Tennessee, USA
- *3rd July 2025*: “Consistent estimation of vector embeddings of black-box generative AI models”, Interdisciplinary Statistical Research Unit, Indian Statistical Institute, Kolkata, India
- *14th December 2024*: “Response prediction with convergence guarantees in multiple random graphs on unknown manifolds”, 18th International Joint Conference on Computational and Financial Econometrics and Computational and Methodological Statistics, King’s College London, United Kingdom [virtual]
- *28th August 2024*: “Response prediction with convergence guarantees in multiple random graphs on unknown manifolds”, 26th International Conference on Computational Statistics, University of Giessen, Germany [virtual]
- *5th March 2024*: “Convergence guarantees for response prediction in latent structure networks on unknown one-dimensional manifolds”, Student Seminar, Department of Applied Mathematics and Statistics, Johns Hopkins University
- *4th March 2024*: “Convergence guarantees for response prediction in latent structure networks on unknown one-dimensional manifolds”, Research Interaction Team, University of Maryland at College Park
- *17th December 2023*: “Convergence guarantees for response prediction in latent structure networks on unknown one-dimensional manifolds”, International Conference of the ERCIM WG on Computational and Methodological Statistics, HTW Berlin, University of Applied Sciences, Berlin, Germany ([invited talk](#))

- *18th April 2023*: “Measurement Error correction in RDPG on manifolds”, Student seminar, Department of Applied Mathematics and Statistics, Johns Hopkins University
- *9th November 2021*: “On convergence guarantees of regression parameter estimates for Random Dot Product Graphs (RDPGs) with latent positions on 1-dimensional manifold in a high dimensional ambient space”, Student seminar, Department of Applied Mathematics and Statistics, Johns Hopkins University
- *13th April 2021*: “Improving performance of regression parameter estimator on random dot product graph using Fuller’s measurement error adjustment”, Student seminar, Department of Applied Mathematics and Statistics, Johns Hopkins University

Poster presentation

- *26th April 2025*: “A technique for consistent response prediction on a collection of time series of graphs”, SIAM Applied Mathematics Conference, Johns Hopkins University, USA

Teaching Experience

- **Statistical Analysis I (EN.553.111)**, Instructor, Fall 2025, Johns Hopkins University
- **Probability and Statistics for Life Sciences (EN.553.211)**, Instructor, Spring 2025, Johns Hopkins University
- **High Dimensional Approximation, Probability and Statistical Learning (EN.553.738)**, Teaching Assistant, Spring 2024, Johns Hopkins University
- **Applied Statistics and Data Analysis (EN.553.613)**, Teaching Assistant, Fall 2023, Johns Hopkins University
- **Shape and Differential Geometry (EN.553.780)**, Teaching Assistant, Fall 2022, Johns Hopkins University
- **Statistical Pattern Recognition Theory and Methods (EN.553.739)**, Teaching Assistant, Spring 2022, Johns Hopkins University
- **Statistical Theory (EN.553.730)**, Teaching Assistant, Fall 2021, Johns Hopkins University
- **Statistical Theory (EN.553.730)**, Teaching Assistant, Fall 2020, Johns Hopkins University
- **Introduction to Data Science (EN.553.436)**, Teaching Assistant, Spring 2020, Johns Hopkins University
- **Introduction to Statistics (EN.553.430)**, Teaching Assistant, Spring 2020, Johns Hopkins University
- **Discrete Mathematics (EN.553.171)**, Teaching Assistant, Fall 2019, Johns Hopkins University
- **Introduction to Statistics (EN.553.430)**, Teaching Assistant, Fall 2019, Johns Hopkins University

Referee Service

- Journal of the Indian Society for Probability and Statistics (2)

Miscellaneous Experience

Awards

- **MINDS Fellowship**, Johns Hopkins University (2022)
- **Edwin D. and Rachel Lowthian Endowed Fellowship**, Whiting School of Engineering, Johns Hopkins University (2019-2020)
- **INSPIRE Scholarship**, Department of Science and Technology, Government of India (2014-2019)

Certification

- **Certificate for Merit of Academic Excellence**, Department of Mathematics and Statistics, Indian Institute of Technology Kanpur (2017)

Technical Skills

Coding: C, R, Python

Word processing: LATEX

Other

Languages: English (proficient), Hindi (fluent), Bengali (native)