

Beepul Bharti

Biomedical Engineering Department & Mathematical Institute of Data Science, JHU

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Research Interests

- Theory of reliable ML: interpretability, explainability, and algorithmic fairness
- Uncertainty in learning: calibration, multiaccuracy, multicalibration, etc
- Applications: high-stakes decision areas such as governance and healthcare

Education

- 2020– Ph.D. in Biomedical Engineering, Johns Hopkins University
GPA: 4.00/4.00
Advisor: Dr. Jeremias Sulam
Relevant Coursework: Statistical Learning, Matrix Analysis, Causal Inference, Nonlinear Optimization, Sparsity in ML/CV, Learning Theory
- 2016–20 B.S. in Biomedical Engineering & B.A. in Mathematics, Duke University
GPA: 3.86/4.00
Honors: Cum Laude, Departmental Distinction
Relevant Coursework: Real Analysis, Abstract Algebra, Ordinary & Partial Differential Equations, Fluid Dynamics, Biostatistics, Probability, Multivariable Calculus

Experience

- Sum' 2024 Machine Learning Research Intern San Francisco, CA
Deep Learning Theory and Algorithms Lab, Genentech R&D (gRED)
- Sum' 2017 Bass Connections Fellow Durham, NC
Department of Biostatistics, Duke University

Publications

Journal Papers

- (j.2) David Li, Beepul Bharti, Jinchi Wei, Jeremias Sulam, Paul H Yi. Sex imbalance produces biased deep learning models for knee osteoarthritis detection. *Canadian Association of Radiologists Association*, 2023.
- (j.1) Beepul Bharti, Jacopo Teneggi, Yaniv Romano, Jeremias Sulam. SHAP-XRT: The Shapley Value Meets Conditional Independence Testing. *Transactions on Machine Learning Research*, 2023.

Conference Proceedings

- (c.1) Beepul Bharti, Paul Yi, Jeremias Sulam. Estimating and Controlling for Equalized Odds via Sensitive Attributes. *Neural Information Processing Systems*, 2023.

Preprints & Working Papers

- (p.2) Beepul Bharti, Gabrielle Scalia, Alex Tseng. Uncovering BioLOGICAL Motifs and Syntax via Sufficiency and Necessary Explanations, 2024.
- (p.1) Beepul Bharti, Paul Yi, Jeremias Sulam. Sufficient and Necessary Explanations (and What Lies in Between), 2024.

Honors & Awards

2023	Alpha Eta Mu Beta: National Biomedical Engineering Honor Society
2022	JHU Mathematical Institute for Data Science Fellowship
2020	JHU Institute of Computational Medicine Fellowship
2016–2020	Duke University Dean's list
2019–2020	Duke University Pratt Fellowship
2019	Tau Beta Pi: The Engineering Honor Society

Teaching

Teaching Assistant

2023	EN.580.69: Biomedical Data Design, JHU
2021	EN.580.697: Computational Cardiology, JHU
2018	ECE 110L: Fundamentals of Electrical and Computer Engineering, Duke

Presentations

Talks

2024	SHAP-XRT: The Shapley Value Meets Conditional Independence Testing <i>Explainable AI Seminars at Imperial College London</i> Algorithmic Fairness in Machine Learning and Data Science <i>EN.540.464: Advanced Biomedical Data Science for Biomedical Engineering</i>
2023	Evaluating Fairness of AI Models in Radiology <i>Radiological Society of North America (RSNA) Annual Meeting</i> Fairness in Machine Learning <i>EN.540.464: Advanced Biomedical Data Science for Biomedical Engineering</i>
2022	Shapley Values and Hypothesis Testing <i>QMUL Intelligent Sensing Winter School</i>

Posters

2024	Certifying Fairness with Incomplete Sensitive Information <i>SIAM Conference on Mathematics of Data Science</i>
2023	Fairness via Sensitive Attribute Predictors <i>Columbia University Workshop on Fairness in Operations and AI</i> Fairness with Missing Sensitive Attributes <i>Johns Hopkins AI-X Foundry Fall Symposium</i> Shapley Values and Hypothesis Testing <i>Bern Interpretable AI Symposium</i>
2018	Using Machine Learning to Predict Schizophrenia Admittance <i>Duke School of Medicine Clinical Research Day</i>

Reviewing

ICLR, TMLR, FAccT, ISIT, AISTATS, NeurIPS

Other

Skills	Python, PyTorch, Matlab, R, L ^A T _E X
Languages	English, Hindi (fluent)
Interests	Running, soccer, pickleball, reading, volunteering