

Beepul Bharti

Biomedical Engineering Department & Mathematical Institute of Data Science, JHU

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Research Interests

- Theory of reliable & ethical AI: 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
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
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 (*Indicates Equal Contribution)

- (j.3) Paul H Yi, Preetham Bachina, Beepul Bharti, Sean P Garin, Adway Kanhere, Pranav Kulkarni, David Li, Vishwa S Parekh, Samantha M Santomartino, Linda Moy, Jeremias Sulam, Pitfalls and Best Practices in Evaluation of AI Algorithmic Biases in Radiology. *Radiology*, 2024. (Upcoming)
- (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) Jacopo Teneggi*, Beepul Bharti*, 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.3) Beepul Bharti, Jeremias Sulam. Multigroup Fairness with Missing Groups, 2024.
- (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), *Under Review*, 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
Explainable AI Seminars at Imperial College London
- Algorithmic Fairness in Machine Learning and Data Science
EN.540.464: Advanced Biomedical Data Science for Biomedical Engineering
- 2023 Evaluating Fairness of AI Models in Radiology
Radiological Society of North America (RSNA) Annual Meeting
- Fairness in Machine Learning
EN.540.464: Advanced Biomedical Data Science for Biomedical Engineering
- 2022 Shapley Values and Hypothesis Testing
QMUL Intelligent Sensing Winter School

Posters

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

Reviewing

ICLR, TMLR, FAccT, ISIT, AISTATS, NeurIPS, CPAL

Other

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