# Beepul Bharti

Biomedical Engineering Department & Mathematical Institute of Data Science, JHU
bbharti1@jh.edu | beepulbharti.github.io | beepulbharti

## Research Interests

- Theory of reliable ML: interpretability, explainablity, 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: 3.85/4.00
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 Assosciation*, 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 Suffiency and Necessary Explanations, 2024.

(p.1) Beepul Bharti, Paul Yi, Jeremias Sulam. Sufficient and Necessary Explantions (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<br>*Explainable AI Seminars at Imperial College London* |
| | Algorithmic Fairness in Machine Learning and Data Science<br>*EN.540.464: Advanced Biomedical Data Science for Biomedical Engineering* |
| 2023 | Evaluating Fairness of AI Models in Radiology<br>*Radiological Society of North America (RSNA) Annual Meeting* |
| | Fairness in Machine Learning<br>*EN.540.464: Advanced Biomedical Data Science for Biomedical Engineering* |
| 2022 | Shapley Values and Hypothesis Testing<br>*QMUL Intelligent Sensing Winter School* |

**Posters**

| | |
|---|---|
| 2023 | Fairness via Sensitive Attribute Predictors Columbia<br>*Columbia University Workshop on Fairness in Operations and AI* |
| | Fairness with Missing Sensitive Attributes<br>*Johns Hopkins AI-X Foundry Fall Symposium* |
| | Shapley Values and Hypothesis Testing<br>*Bern Interpretable AI Symposium* |
| 2018 | Using Machine Learning to Predict Schizophrenia Admittance<br>*Duke School of Medicine Clinical Research Day* |

## Reviewing

ICLR, TMLR, FAccT, ISIT, AISTATS, NeurIPS

## Other

| | |
|---|---|
| Skills | Python, PyTorch, Matlab, R, LaTeX |
| Languages | English, Hindi (fluent) |
| Interests | Running, soccer, pickleball, reading, volunteering |