

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, conformal prediction, 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 **Genentech**, Machine Learning Research Intern San Francisco, CA
Deep Learning Theory and Algorithms Lab (DELTA)
- Explainability for motif discovery in genomic neural networks
- Sum' 2017 **Duke University**, Bass Connections Fellow Durham, NC
Department of Biostatistics
- Machine learning to predict schizophrenia admittance

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.2) Beepul Bharti, Paul Yi, Jeremias Sulam. Sufficient and Necessary Explanations (and What Lies in Between). *Conference on Parsimony and Learning*, PMLR, 2024.
- (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, Mary Versa Clemens-Sewall, Paul Yi, Jeremias Sulam. Multiaccuracy and Multicalibration via Proxy Groups, *Under Review*, 2025.
- (p.2) Ryan Pilgrim*, Beepul Bharti*, Jeremias Sulam, Rene Vidal, On the (Non)uniqueness of Local Model Explanations, 2025.
- (p.1) Beepul Bharti, Gabrielle Scalia, Alex Tseng. Uncovering BioLOGICAL Motifs and Syntax via Sufficiency and Necessary Explanations, *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

- 2025 Sufficient vs. Necessary Explanations
Machine Learning in Healthcare Club, University of North South Wales
- 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

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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

Service

- 2024 High School Student Mentor
JHU Whiting School of Internships in Science and Engineering (WISE)
- 2023 Mentor Liasion
JHU Biomedical Engineering Application Assistance Program (BMEAAP)

Reviewing

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

Other

- Skills Python, PyTorch, Matlab, R, L^AT_EX
- Languages English, Hindi (fluent)
- Interests Running, soccer, pickleball, reading, volunteering