Soham Biren Katlariwala

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IIT Madras B.S. Degree

Summary

Final-year computer engineering (AI & ML) and health science student working on clinical machine learning: interpretable risk prediction, cross-site generalizability and fairness of medical AI, neuroimaging and EEG-based modelling, and evidence synthesis (systematic reviews and meta-analyses). Author of 7 full papers (4 IEEE and 1 Springer LNCS conference papers, 1 workshop paper, 1 proceedings paper), 7 further accepted conference papers (2 at IEEE BIBE 2026 and 2 at ICTDsC 2026 with Springer LNNS proceedings, 1 first-author paper at each; 3 at MetaSphere 2026, Springer proceedings forthcoming, as corresponding author), a first-author oral presentation at IC-AICSE 2026 (full paper under review), 1 journal article, 1 journal letter (in press), and 19 accepted conference presentations at TCT, AHA Scientific Sessions, SVIN, CNS, ASH, ACG and AADMD, 6 of them as first author (2 published in the *JACC* supplement, 5 in *Circulation*, 3 in the *American Journal of Gastroenterology* supplement, and 2 to be published in *Blood*).

Research Interests

Clinical AI • Deep learning for neuroimaging (MRI, fMRI) and EEG • Generalizability, domain shift and fairness of medical AI • Interpretable machine learning • Diagnostic-accuracy meta-analysis

Education

Indian Institute of Technology Madras **India**
Bachelor of Science (BS) in Data Science and Applications, 4-year programme *2023 – 2027 (expected)*
• **GPA: 3.22/4.0 (ECE/AACRAO)**

Gujarat Technological University **India**
Bachelor of Engineering (Honours) in Computer Engineering, 4-year programme *2023 – 2027 (expected)*
• Honours in Artificial Intelligence and Machine Learning **GPA: 3.40/4.0 (ECE/AACRAO)**

University of the People **USA**
Bachelor of Health Science (Honours), 4-year programme *2025 – 2027 (expected)*
• **CGPA: 3.88/4.0**

Research Experience

Research Intern **February 2026 – Present**
MIT Critical Data, Laboratory for Computational Physiology, MIT *Remote*
- Co-authored SAKSHI, a community-operated platform for accountability in clinical AI deployment, with a 20-member international team (COLM 2026 workshop paper [P5]).
- Co-authored a study of data provenance and ethics in 36 U.S. health AI curricula (arXiv preprint [R1]) and its open Zenodo dataset.

Research Intern **July 2025 – September 2025**
University of California, Berkeley *United States*
- Co-authored a review on quantum-enhanced fiber-optic sensing using quantum metrology.
- Investigated AI and quantum-enhanced fiber-optic biosensors for real-time, non-invasive diagnostics.
- Analyzed the integration of ML with quantum sensing, mapping challenges and sensing mechanisms.

Research Intern **June 2025 – July 2025**
The LNM Institute of Information Technology *India*
- Reviewed foundational and recent literature on quantum entanglement, focusing on SVD in bipartite systems.
- Studied entanglement entropy and quantum state separability to support theoretical development.
- Implemented data preprocessing and visualization workflows in Python (Google Colab) for ML-based quantum analysis.

Research Intern **January 2025 – August 2025**
Texas A&M University–Kingsville *United States*
- Developed an eigenvector-centrality-based pruning method to improve fine-tuning efficiency in CNNs (ISVC 2025, Springer LNCS [P7]).
- Constructed neuron-similarity graphs to rank neuron importance and pruned low-centrality neurons to reduce model complexity.

- Evaluated on VGG16, ResNet50 and EfficientNet across Oxford-Flowers102, Caltech101 and TF-Flowers, reporting accuracy alongside parameter reduction.

Research Intern **June 2024 – September 2024**

University of California, Berkeley (REYES 2024) *United States*

- Developed a BERT-based model for AI-generated text detection, achieving an **F1-score of 0.9436** and outperforming logistic regression and SVM baselines.
- Built NLP preprocessing pipelines (tokenization, normalization, embeddings); sole-authored paper in the *2024 REYES Proceedings* [P6].

Collaborative Clinical AI & Evidence-Synthesis Research **2025 – Present**

Multi-institution collaborations (cardiology, neurology, neurosurgery, gastroenterology) *Remote*

- Led interpretable and fairness-aware ML analyses for coronary artery disease and stroke risk prediction [A1, A3, A4].
- Benchmarked cross-site generalizability of cardiac AI across 5 international catheterization laboratories (1,190 patients), including a domain-adaptation benchmark [A2].
- Led two systematic reviews and meta-analyses on graph neural networks for pre-operative fMRI in glioma and on EEG machine learning for Parkinson's disease and DBS candidate selection [A5, A6].
- Contributed to diagnostic-accuracy meta-analyses (PRISMA, QUADAS-2, PROBAST, bivariate random-effects models) in gastroenterology, dentistry and neurointervention.

Publications

Journal Articles and Letters

[J1] Chandran MM, **Katlariwala SB**, Morker JK. Beyond target trial emulation: Residual confounding in a statin–colorectal cancer study [Letter]. *The American Journal of Medicine*. 2026. **Accepted, article in press.** doi:10.1016/j.amjmed.2026.09.039 (DOI registration pending)

[J2] Khan R, Khan A, Khan T, Mubashir H, **Katlariwala SB**, Ali W. Rising mortality in elderly men with prostate cancer and hypertensive comorbidity: A two-decade epidemiological analysis with projections to 2035. *Journal of Saidu Medical College*. 2026;16(3s). doi:10.52206/jsmc.2026.16.3s.1716

Peer-Reviewed Conference, Workshop and Proceedings Papers

[P1] **Katlariwala SB**, Gandhi VC, Patel N, Parmar D, Desai A. TriBoost and beyond: Advanced machine learning approaches for diabetes risk prediction. *2025 International Conference on Electronics and Renewable Systems (ICEARS)*, IEEE, 2025, pp. 1780–1785. doi:10.1109/ICEARS64219.2025.10941310

[P2] Arora P, **Katlariwala SB**, Raj M, Moradi M, Sahu S. Evaluation of deep learning architectures for network intrusion detection. *2026 1st International Conference on Advancing Sustainable Solutions through Technologies (ICASST)*, IEEE, 2026, pp. 1–6. doi:10.1109/ICASST68917.2026.11484132

[P3] Gandhi VC, Panchal K, Lakhtaria J, Gami CC, Gameti N, **Katlariwala SB**. Hybrid deep learning model: Weather classification using ResNet-50 and SVM. *2025 International Conference on Sustainable Technologies for Humanity and Smart World (HSWTech)*, IEEE, 2025, pp. 1–7. doi:10.1109/HSWTech64936.2025.11277422

[P4] Srividhya R, Gandhi VC, D A, Rajesh S, **Katlariwala SB**, Panchal K. YOLOv5 with SVM-aided post-classification for high-precision skin lesion detection. *2025 International Conference on Sustainable Technologies for Humanity and Smart World (HSWTech)*, IEEE, 2025, pp. 1–6. doi:10.1109/HSWTech64936.2025.11278157

[P5] Al-Louzi R, Ali HN, Bank AMC, Celi LA, Cocucci C, Gameiro R, Gorijavolu R, Jaiswal N, Koumbia M, Kasimbazi HC, **Katlariwala SB**, Nazarian N, Lucas MM, Madapati K, Mikolutskaya S, Mwavu R, Patel MS, Rojas Sillery RI, Nanyonjo J, Xiang AQ. SAKSHI: A community-operated investigative platform for accountability in clinical AI deployment. *COLM 2026 Workshop on LLM/VLM Deployment Opportunities and Risks in Healthcare*, 2026. openreview.net/forum?id=gnMnqG08xo

[P6] **Katlariwala SB**. BERT-based detection of AI-generated text for content verification. *2024 REYES Proceedings*, Old Dominion University Digital Commons, 14. digitalcommons.odu.edu/reyes-2024/14

[P7] Chowdhury S, **Katlariwala SB**, Kashyap D. Effective fine-tuning with eigenvector centrality based pruning. In: *Advances in Visual Computing (ISVC 2025)*, Lecture Notes in Computer Science, Springer, 2026, pp. 3–15. doi:10.1007/978-3-032-14492-8_1

Accepted and Presented Conference Papers (Proceedings Forthcoming or Under Review)

[C1] **Katlariwala SB***, Jothilingam K, Muhammed SS. SHAP-guided iterative feature pruning (SIFP): Stable gene selection for breast cancer subtype classification. *ICTDsC 2026*, Siliguri, India. **Oral; Springer LNNS (forthcoming).**

[C2] Patel JD, **Katlariwala SB***, Chauhan JA, Patel NI, Raval DK, Prajapati CD. Characterising digital twin fidelity under real 5G network impairments via autoregressive Kalman filtering. *ICTDsC 2026*, Siliguri, India. **Oral; Springer LNNS (forthcoming).**

[C3] **Katlariwala SB**, Roy N, Kundu S, Adedigba A, Mallipeddi R. Does shift-aware conformal correction help? An audit-gated study on cross-site breast ultrasound. *IEEE International Conference on Bioinformatics and Bioengineering (BIBE 2026)*. **Full paper accepted.**

[C4] Roy N, **Katlariwala SB**, Kundu S, Adedigba A, Mallipeddi R. CLEAR-Net: Adaptive denoising for robust polyp segmentation. *IEEE BIBE 2026*. **Full paper accepted.**

[C5] **Katlariwala SB**, Saeed A, Khati HK, Roy N, Moradi M. Questioning the benchmarks: Hidden circularity in AQ-10 autism screening datasets. *International Conference on AI in Computational Science and Engineering (IC-AICSE 2026)*, Everest Engineering College, Lalitpur, Nepal, Oct 2026. **Oral presentation; full paper under review.**

[C6] **Katlariwala SB***, Patel JD, Chauhan JA, Patel NI, Raval DK, Prajapati CD. Anatomical GraphSAGE-enhanced CNN ensemble for paediatric bone age estimation with Monte Carlo dropout. Paper 109. *Global Conference on Cloud Computing, Virtualization & Metaverse (MetaSphere 2026)*, IEM, Kolkata, India, Aug 2026.

[C7] **Katlariwala SB***, Chauhan JA, Patel JD, Patel NI, Raval DK, Prajapati CD. Temporal cart memory and billing verification: A three-component framework for vision-based smart trolley systems. Paper 108. *MetaSphere 2026*, IEM, Kolkata, India, Aug 2026.

[C8] Chauhan JA, Patel JD, Patel NI, **Katlariwala SB***. Criterion-level automated scoring of the FMS deep squat using interpretable 2D pose geometry. Paper 203. *MetaSphere 2026*, IEM, Kolkata, India, Aug 2026.

*Corresponding author.

Preprints

[R1] **Katlariwala SB**, Saeed A, Khati HK, Roy N, Moradi M. Questioning the benchmarks: Hidden circularity in AQ-10 autism screening datasets. *medRxiv*. 2026. doi:10.64898/2026.11.01.26367003

[R2] Giancotti R, Santucci F, Anjum A, de Villa M, Mitra R, **Katlariwala SB**, Mishra V, Celi LA. Data provenance and ethics in the curricula of U.S. health AI education programs. *arXiv preprint* arXiv:2610.39606 [cs.CY], 2026. doi:10.48550/arXiv.2610.39606. Dataset (Zenodo): doi:10.5281/zenodo.22936034

Conference Presentations (19)

[A1] **Katlariwala SB**, Chunchu VA, Gandhi V, Kuraku DR, Moradi M, Patel P, Kanakamedala SC, Keshapogu N, Chenna VB, Pina JM. Valvular heart disease severity modifies the discriminative power of clinical coronary artery disease predictors: An interpretable machine learning analysis. Abstract TCT-34. *TCT 2026*, San Diego, CA; *JACC* 2026;88(18_Suppl):B14. doi:10.1016/j.jacc.2026.09.077

[A2] **Katlariwala SB**, Mohammed S, Gandhi V, Qamar I, Moradi M. Institutional referral threshold bias limits generalizability of cardiac AI across 5 international catheterization laboratories: A 1,190-patient cross-site analysis with domain adaptation benchmark. Abstract TCT-958. *TCT 2026*, San Diego, CA; *JACC* 2026;88(18_Suppl):B409. doi:10.1016/j.jacc.2026.09.1168

[A3] **Katlariwala SB**, Jothilingam K, Gandhi V, Moradi M. Trajectory-informed stroke risk prediction using disease duration and glycemic burden in a nationally representative US adult sample. Abstract 26-A-1291. *Society of Vascular and Interventional Neurology (SVIN) 2026 Annual Meeting*, Las Vegas, NV, Nov 2026. **Moderated poster.**

[A4] **Katlariwala SB**, Jothilingam K, Gandhi V, Moradi M. Logistic regression outperforms deep ensembles for tabular stroke risk prediction: A fairness-aware benchmarking study. Abstract 26-A-1299. *Society of Vascular and Interventional Neurology (SVIN) 2026 Annual Meeting*, Las Vegas, NV, Nov 2026. Poster.

[A5] Jothilingam K, **Katlariwala SB**, Gandhi V, Moradi M. Patient-agnostic wearable activity recognition via cross-subject contrastive learning: Toward post-stroke monitoring. Abstract 26-A-1415. *Society of Vascular and Interventional Neurology (SVIN) 2026 Annual Meeting*, Las Vegas, NV, Nov 2026. E-poster.

[A6] Jothilingam K, Zafarullah M, **Katlariwala SB**, Kumar A, Ahmed F, Tabassum H, Khan M. Transradial versus transfemoral access in posterior circulation endovascular interventions: A systematic review and meta-analysis. Abstract 26-A-1303. *Society of Vascular and Interventional Neurology (SVIN) 2026 Annual Meeting*, Las Vegas, NV, Nov 2026. E-poster.

[A7] **Katlariwala SB**, Pineda Guerrero A, Romero Moreno J, Saxena MD, Muraleedharan T, Diwan SS, Chandran MM, Qamar I, Mal M. Graph neural network analysis of pre-operative resting-state fMRI predicts extent of resection and post-operative neurocognitive outcome in eloquent-area diffuse glioma: A systematic review and meta-analysis. Poster 4657. *Congress of Neurological Surgeons (CNS) 2026 Annual Meeting*, Washington, DC, Oct–Nov 2026. **Presented.**

[A8] **Katlariwala SB**, Pineda Guerrero A, Romero Moreno J, Saxena MD, Muraleedharan T, Diwan SS, Chandran MM, Qamar I, Mal M. Machine learning of EEG biomarkers for Parkinson's disease subtyping and deep brain stimulation candidate stratification: A systematic review and meta-analysis. Poster 3576. *Congress of Neurological Surgeons (CNS) 2026 Annual Meeting*, Washington, DC, Oct–Nov 2026. **Presented.**

[A9] **Katlariwala SB** (submitter and lead researcher). Bedside risk stratification in the cardio-metabolic intensive care unit: Machine learning applications for comorbid heart failure and diabetes. Abstract 16575. *AHA Scientific*

Sessions 2026; *Circulation* 2026;154(Suppl 1). doi:10.1161/circ.154.suppl_1.16575

[A10] **Katlariwala SB** (submitter). Baseline LDL cholesterol and clinical outcomes in older adults: Reassessing the cholesterol paradox. A systematic review and meta-analysis. Abstract 18422. *AHA Scientific Sessions 2026*; *Circulation* 2026;154(Suppl 1). doi:10.1161/circ.154.suppl_1.18422

[A11] **Katlariwala SB** (submitter). Machine learning versus conventional risk models for predicting futility and adverse clinical outcomes following transcatheter aortic valve replacement: A systematic review and meta-analysis. Abstract 17460. *AHA Scientific Sessions 2026*; *Circulation* 2026;154(Suppl 1). doi:10.1161/circ.154.suppl_1.17460

[A12] **Katlariwala SB** (co-author). Diagnostic accuracy of artificial intelligence-enabled electrocardiography for detecting occlusion myocardial infarction: A systematic review and meta-analysis. Abstract 15546. *AHA Scientific Sessions 2026*; *Circulation* 2026;154(Suppl 1). doi:10.1161/circ.154.suppl_1.15546

[A13] **Katlariwala SB** (co-author). Remote-only follow-up strategies for patients with cardiac implantable electronic devices: A systematic review and meta-analysis of clinical outcomes. Abstract 14440. *AHA Scientific Sessions 2026*; *Circulation* 2026;154(Suppl 1). doi:10.1161/circ.154.suppl_1.14440

[A14] Srinivasan V, Bhavanam S, Zafarullah M, Sajid H, Chandran MM, **Katlariwala SB**, Kukreja N, Shah S, Thadisina SR, Raslan M, Umer H, Sahar N. Diagnostic accuracy of artificial intelligence in differentiating iron deficiency anemia from thalassemia trait: A systematic review and meta-analysis. Abstract abs26-12948. *American Society of Hematology (ASH) 2026 Annual Meeting*; to appear in *Blood*.

[A15] Sakalabaktula KSK, Hayat M, Rehman L, Kuraku DR, Latif B, Adel A, **Katlariwala SB**, Yousaf H, Walizai MK, Ramzan R, Kambhampati B, Javed S, Keshapogu N. Diagnostic accuracy of artificial intelligence/machine learning assisted flow cytometry for measurable residual disease detection in leukemia: A systematic review and meta-analysis. Abstract abs26-13932. *American Society of Hematology (ASH) 2026 Annual Meeting*; to appear in *Blood*.

[A16] Qamar I, Hayat M, Chandran MM, **Katlariwala SB**, Sikander DM, Asad S, Khan S, Sajid H, Jothilingam K, Tariq MT, Ullah A. S1142: Computer-aided detection versus computer-aided diagnosis of early Barrett's neoplasia: A systematic review and meta-analysis. *American College of Gastroenterology (ACG) 2026 Annual Scientific Meeting. Am J Gastroenterol.* 2026;121(10S1):S248. doi:10.14309/01.ajg.0001213820.29928.0b

[A17] Mohammed S, Marupuru S, Sikander DM, Chandran MM, **Katlariwala SB**, Sajid H, Hayat M, Khan S, Jothilingam K, Shah SZA, Tariq MT, Kuraku DR, Chandrashekar C. S3467: Diagnostic precision and operational efficiency of AI-assisted esophagogastroduodenoscopy for gastric neoplasm detection: A systematic review and meta-analysis of randomized controlled trials. *American College of Gastroenterology (ACG) 2026 Annual Scientific Meeting. Am J Gastroenterol.* 2026;121(10S1):S755. doi:10.14309/01.ajg.0001223120.73712.78

[A18] Singh S, Sikander DM, Vijaykumar R, Chandran MM, **Katlariwala SB**, Keshapogu N, Sajid H, Hayat M, Shah SZA, Marupuru S, Jothilingam K, Kuraku DR, Tariq MT. S2917: Artificial intelligence versus conventional prognostic scores for mortality prediction in acute-on-chronic liver failure: A systematic review. *American College of Gastroenterology (ACG) 2026 Annual Scientific Meeting. Am J Gastroenterol.* 2026;121(10S1):S634. doi:10.14309/01.ajg.0001220920.71799.8e

[A19] Bisani JT, **Katlariwala SB**, Moradi M, Saxena MD, Mukhtar SF, Gyawali P. AI-driven severity grading of dental caries: A systematic review, meta-analysis and translational readiness assessment. *American Academy of Developmental Medicine and Dentistry (AADMD) One Voice Conference* (Alliance for Oral Health Across Borders), 2026. Poster.

Honors and Recognition

- Selected for a **moderated poster presentation** (first author), SVIN 2026 Annual Meeting, Las Vegas, NV (Abstract 26-A-1291).
- **Oral presentation** (first author), IC-AICSE 2026, Lalitpur, Nepal (technically supported by IEEE Nepal Section); full paper under review.

Technical Skills

Programming Languages: Python (Pandas, NumPy, Scikit-learn, SciPy, statsmodels), R (metafor, mada), SQL (MySQL, PostgreSQL), JavaScript, LaTeX

ML & Deep Learning: PyTorch, TensorFlow, Hugging Face, XGBoost/LightGBM/CatBoost, CNNs (ResNet50, DenseNet121, VGG16, EfficientNet), transformers (BERT), graph neural networks (GraphSAGE, GAT), contrastive learning, domain adaptation (CORAL), model pruning

Computer Vision: YOLOv8, multi-object tracking, MediaPipe pose estimation, medical image analysis (radiographs, MRI/fMRI)

Uncertainty & Interpretability: SHAP, GNNExplainer, conformal prediction, MC dropout, calibration

Statistics & Evidence Synthesis: DeLong, bootstrap CIs, joinpoint, ARIMA, PRISMA 2020, QUADAS-2, meta-analysis