

# Shantanu Ghosh<sup>(he/him)</sup>

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https://shantanu-ai.github.io/ • Google scholar

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## Research Interests

**Method:** Robustness, Generalization, Trustworthy Machine Learning, Multimodal learning, Explainable AI.

**Applications:** Joint modeling of medical images (chest-X-rays or 2D mammograms) and reports for lung diseases (e.g., pneumonia) and breast cancer predictions.

## Education

### Boston University

Doctor of Philosophy, Electrical Engineering

Advisor(s): [Dr. Kayhan Batmanghelich](#)

Boston, Massachusetts, USA

Jan 2023 – Dec 2026 (Expected)

### University of Pittsburgh (Transferred to BU)

Doctor of Philosophy, Intelligent Systems

Advisor(s): [Dr. Kayhan Batmanghelich](#)

Pittsburgh, Pennsylvania, USA

Aug 2021 – Dec 2022

### University of Florida

Master of Science, Computer Science, **3.88/4.00**

Advisor: [Dr. Mattia Proserpi](#)

Gainesville, Florida, USA

Aug 2019 – May 2021

## Publications

### Conference Proceedings

- [C8] **LADDER: Language Driven Slice Discovery and Error Rectification**  
**Shantanu Ghosh**, Rayan Syed, Chenyu Wang, Vaibhav Choudhary, Binxu Li, Clare B. Poynton, Shyam Visweswaran, Kayhan Batmanghelich  
Findings of 2025 Conference on Association for Computational Linguistics ([ACL](#)) [[Project](#)] [[Paper](#)] [[Code](#)]
- [C7] **Semantic Consistency-Based Uncertainty Quantification for Factuality in Radiology Report Generation**  
Chenyu Wang, Weichao Zhou, **Shantanu Ghosh**, Kayhan Batmanghelich, Wenchao Li  
Findings of the Association for Computational Linguistics: NAACL 2025 ([NAACL](#)). [[Paper](#)] [[Code](#)]
- [C6] **Mammo-CLIP: A Vision Language Foundation Model to Enhance Data Efficiency and Robustness in Mammography**  
**Shantanu Ghosh**, Clare B. Poynton, Shyam Visweswaran, Kayhan Batmanghelich  
International Conference on Medical Image Computing and Computer Assisted Intervention ([MICCAI](#)), 2024.  
(Early accept, top 11%) [[Project](#)] [[Paper](#)] [[Reviews](#)] [[Code](#)]
- [C5] **Distilling BlackBox to Interpretable models for Efficient Transfer Learning**  
**Shantanu Ghosh**, Ke Yu, Kayhan Batmanghelich  
International Conference on Medical Image Computing and Computer Assisted Intervention ([MICCAI](#)), 2023.  
(Early accept, top 14%) [[Project](#)] [[Paper](#)] [[Reviews](#)] [[Code](#)]
- [C4] **Dividing and Conquering a BlackBox to a Mixture of Interpretable Models: Route, Interpret, Repeat**  
**Shantanu Ghosh**, Ke Yu, Forough Arabshahi, Kayhan Batmanghelich  
International Conference on Machine Learning ([ICML](#)), 2023. [[Project](#)] [[Paper](#)] [[Code](#)]
- [C3] **DR-VIDAL - Doubly Robust Variational Information-theoretic Deep Adversarial Learning for Counterfactual Prediction and Treatment Effect Estimation**

**Shantanu Ghosh**, Zheng Feng, Jiang Bian, Kevin Butler, Mattia Prosperi  
American Medical Informatics Association (**AMIA**) Symposium, 2022 (**Oral**). [\[Paper\]](#) [\[Code\]](#)

- [C2] **Anatomy-Guided Weakly-Supervised Abnormality Localization in Chest X-rays**  
Ke Yu, **Shantanu Ghosh**, Zhexiong Liu, Christopher Deible, Kayhan Batmanghelich  
International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI**), 2022. [\[Paper\]](#) [\[Code\]](#)
- [C1] **Causal AI with Real World Data: Do Statins Protect From Alzheimer's Disease Onset?**  
Mattia Prosperi, **Shantanu Ghosh**, Zhaoyi Chen, Marco Salemi, Tianchen Lyu, Jiang Bian  
International Conference on Medical and Health Informatics (**ICMHI**), 2021. [\[Paper\]](#)

## Journal Articles

- [J3] **Anatomy-specific Progression Classification in Chest Radiographs via Weakly-Supervised Learning**  
Ke Yu, **Shantanu Ghosh**, Zhexiong Liu, Clare Poynton, Christopher Deible, Kayhan Batmanghelich  
Radiology: Artificial Intelligence, (**RAD: AI**), **IF:8.1**, 2024 [\[Paper\]](#) [\[Code\]](#).
- [J2] **Propensity Score Synthetic Augmentation Matching using Generative Adversarial Networks (PSSAM-GAN)**  
**Shantanu Ghosh**, Christina Boucher, Jiang Bian, Mattia Prosperi  
Journal of Computer Methods and Programs in Bio-medicine Update, 2021. [\[Paper\]](#) [\[Code\]](#)
- [J1] **Deep Propensity Network using a Sparse Autoencoder for Estimation of Treatment Effects**  
**Shantanu Ghosh**, Jiang Bian, Yi Guo, Mattia Prosperi  
Journal of the American Medical Informatics Association (**JAMIA**), **IF:4.7**, 2021. [\[Paper\]](#) [\[Code\]](#)

## Peer reviewed workshops

- [W3] **Distributionally robust self-supervised learning for tabular data**  
**Shantanu Ghosh**, Tiankang Xie, Mikhail Kuznetsov  
Table Representation Learning Workshop (**TRL**), NeurIPS, 2024. [\[Paper\]](#) [\[Code\]](#)
- [W2] **Tackling Shortcut Learning in Deep Neural Networks: An Iterative Approach with Interpretable Models**  
**Shantanu Ghosh**, Ke Yu, Forough Arabshahi, Kayhan Batmanghelich  
Workshop on Spurious Correlations, Invariance and Stability (**SCIS**), ICML, 2023. [\[Paper\]](#) [\[Poster\]](#)
- [W1] **Bridging the Gap: From Post Hoc Explanations to Inherently Interpretable Models for Medical Imaging**  
**Shantanu Ghosh**, Ke Yu, Forough Arabshahi, Kayhan Batmanghelich  
Workshop on Interpretable Machine Learning in Healthcare (**IMLH**), ICML, 2023. [\[Paper\]](#) [\[Poster\]](#)

## Research Experience

### Boston University

Graduate Research Assistant

Boston, Massachusetts, USA

Advisor(s): **Dr. Kayhan Batmanghelich**

Jan 2023 – Present

- Developed a slice discovery and mitigation algorithm using vision language (VLM) models and LLMs to reason and fix the classifier's mistakes [C8]. **Accepted at ACL, 2025 (Findings)**
- Developed first vision language foundation model for 2D mammograms [C6]. **Accepted at MICCAI, 2024 (top 11%)**
- Applied the mixture of interpretable models for efficient transfer learning to an unseen domain with limited training data [C5]. **Accepted at MICCAI, 2023 (top 14%)**.

## University of Pittsburgh

Graduate Student Researcher

Pittsburgh, Pennsylvania, USA

Advisor(s): **Dr. Kayhan Batmanghelich**, **Dr. Forough Arabshahi**

Aug 2021 – Dec 2022

- Developed an iterative algorithm to extract a mixture of interpretable models from a Blackbox, each specializing in a different subset of data to provide instance-specific First-order logic-based explanations using human-understandable concepts. [C4]. **Accepted at ICML, 2023.**
- Localized Pneumonia and Pneumothorax from **MIMIC-CXR** dataset by leveraging the anatomical landmarks (weak labels) using the **Stanford RadGraph NLP pipeline** [C2, J3]. **Accepted at MICCAI, 2022 and RAD: AI, 2024.**

## University of Florida

Graduate Research Assistant

Gainesville, Florida, USA

Advisor(s): **Dr. Kevin Butler**, **Dr. Jiang Bian**, **Dr. Mattia Prosperi**

Jan 2020 – Jul 2021

- Developed a novel deep learning framework to (1) generate the counterfactual outcomes based on treatment using a Generative Adversarial Network with **information-theoretic** regularization; (2) utilized the counterfactual outcomes to estimate the individual treatment effect (ITE) using **doubly robust optimization** for faster convergence [C1]. **Accepted at AMIA Symposium (Oral), 2022.**
- Designed a novel algorithm using a Generative Adversarial Network to generate synthetic treated samples to remove imbalance within an observational dataset for **Propensity score matching** [J2]. **Accepted at Computer Methods and Programs in Bio-medicine Update.**
- Developed a **sparse autoencoder** to reduce the dimensionality of the covariates of the patients to calculate the **Propensity score** in an efficient way to estimate the average treatment effect (ATE) of the treatment [J1]. **Accepted at JAMIA.**

## Industry Experience

### Amazon

Applied Scientist Intern

Pasadena, California, USA

AWS Optimus. Mentor: **Dr. Ankan Bansal**

May 2024 – Aug 2025

- Detecting and mitigating biases the Multi-modal LLM Agents.

### Amazon

Applied Scientist Intern

NYC, New York, USA

AWS, Security Analytics and AI Research (SAAR). Mentor: **Dr. Mikhail Kuznetsov**

Jun 2024 – Sep 2024

- Developed a framework to learn robust representations to fix systematic errors in pre-trained self-supervised models for tabular data. Publication at **TRL@NeurIPS 2024.**

### Lexmark International India Pvt Ltd

Software Engineering Professional II

Kolkata, India

Oct 2016 – Jul 2019

- Developed the ISP component of the product **Publishing Platform for Retail (PPR)**.

### Cognizant Technology Solutions India Pvt Ltd

Associate, Projects

Kolkata, India

Mar 2013 – Sep 2016

- Developed **WCF** web services in the Contract First Approach using Service Oriented Architecture.

## Skills

- Languages.** Python, C/C++, Java, C#/.Net, Javascript, HTML/CSS
- Machine Learning.** TensorFlow, PyTorch, Scikit-learn
- Web Development.** Angular, Node.js, WCF
- Database.** MySQL, Oracle 9i/10g, MS SQL Server, DB2

## Graduate Courses

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▪ Fundamentals of Machine Learning   ▪ Machine Learning   ▪ Advanced Machine Learning   ▪ Deep Learning for Computer Graphics   ▪ Causal Inference and Machine Learning   ▪ Visual Learning and Recognition   ▪ Mathematics for Intelligent Systems   ▪ Fundamentals of Probability   ▪ Numerical Optimization   ▪ Analysis of Algorithms   ▪ Advanced Data Structures

## Honors & Awards

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- **Achievement Award** of 4500 USD during the admission of graduate studies at UF in Fall 2019.
- **Star Employee** award in Q4, 2013 and Q4, 2015 in Cognizant Technology Solutions.
- **Outstanding reviewer** in NeurIPS 2024, conference registration waived.

## Academic Service

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### Journal Review

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Transactions on Machine Learning Research (TMLR), IEEE Transactions on Medical Imaging (IEEE-TMI), Journal of Biomedical Informatics (JBI), Medical Image Analysis (MedIA), Journal of the American Medical Informatics Association (JAMIA), Journal of Computer Methods and Programs in Biomedicine (CMPB), Biometrical Journal, Information Fusion

### Conference Review

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WACV (2025), ICCV (2025), ICML (2025), ICLR (2024, 2025, 2026), AAI (2024, 2025, 2026), AISTATS (2025), NeurIPS (2023, 2024, 2025), MICCAI (2024, 2025), CVPR (2024, 2025, 2026), CLeaR (2024, 2025), ACM BCB (2022)

### Workshop Review

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SRW@ACL (2025), SCSL@ICLR (2025), GenAI4Health@NeurIPS (2024, 2025, 2026), CRL@NeurIPS (2023), SCIS@ICML (2023), IMLH@ICML (2023)

## Teaching Experience

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- Introduction to Software Engineering (EC 327) - Fall 2023
- Deep Learning (EC 523) - Fall 2024

## Student Mentoring

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- [Rayan Syed](#), Undergraduate Student, Boston University
- [Abhishek Varshney](#), Masters Student, Boston University
- [Akshat Gurbuxani](#), Masters Student, Boston University

## Talks

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- *DR-VIDAL for Counterfactual Prediction and Treatment Effect Estimation*, Oral Talk, AMIA 2022 Annual Symposium, Nov 2022 [\[Talk\]](#) [\[Slides\]](#)
- *Divide and Conquer: Carving Out Concept-based Models out of BlackBox for More Efficient Transfer Learning*
  - Fall ISP AI Forum, University of Pittsburgh, Nov 2023 [\[Talk\]](#) [\[Slides\]](#)
  - MedAI Group, Stanford University, Oct 2024 [\[Talk\]](#) [\[Slides\]](#)