

Bishwamittra Ghosh

Research Interests

My research applies formal methods to machine learning, with a focus on advancing the foundational understanding of large language models and improving the trustworthiness of machine learning systems through enhanced fairness and interpretability.

Appointment

- Since 04.24 **Postdoctoral Researcher**, *Max Planck Institute for Software Systems*, Germany.
Advisor: Dr. Krishna P. Gummadi
- 06.23 – 03.24 **Scientist**, *Institute of High Performance Computing (IHPC)*, A*STAR, Singapore.
- 01.18 – 06.23 **Graduate Research Assistant**, *National University of Singapore (NUS)*, Singapore.
- 10.17 – 01.18 **Lecturer**, *Department of CSE, United International University (UIU)*, Bangladesh.

Education

- 01.18 – 09.23 **PhD in Computer Science**, *National University of Singapore (NUS)*, Singapore.
Thesis: Interpretability and Fairness in Machine Learning: A Formal Methods Approach
Advisor: Dr. Kuldeep S. Meel
- 02.13 – 09.17 **BSc in Computer Science and Engineering**, *Bangladesh University of Engineering and Technology (BUET)*,
Bangladesh, CGPA: 3.83 out of 4 (with Honours).
Thesis: The Flexible Socio Spatial Group Queries
Advisor: Dr. Mohammed Eunus Ali

Publications (reverse chronological order)

Conference Papers

- ICLR-25 Logical Consistency of Large Language Models in Fact-checking
Bishwamittra Ghosh, Sarah Hasan, Naheed Anjum Arafat, Arijit Khan
- AAAI-25 Active Fourier Auditor for Estimating Distributional Properties of ML Models
Ayoub Ajarra, Bishwamittra Ghosh, Debabrota Basu
- WSDM-25 Towards Reliable Latent Knowledge Estimation in LLMs: Zero-Prompt Many-Shot Based Factual Knowledge Extraction
Qinyuan Wu, Mohammad Aflah Khan, Soumi Das, Vedant Nanda, Bishwamittra Ghosh, Camila Kolling, Till Speicher, Laurent Bindschaedler, Krishna P. Gummadi, Evimaria Terzi
- ECAI-25 History-Aware and Dynamic Client Contribution in Federated Learning
Bishwamittra Ghosh, Debabrota Basu, Huazhu Fu, Yuan Wang, Renuga Kanagavelu, Jin Peng Jiang, Yong Liu, Rick Siow Mong Goh, Qingsong Wei
- CAI-24 Split Learning of Multi-Modal Medical Image Classification
Bishwamittra Ghosh, Yuan Wang, Huazhu Fu, Wei Qingsong, Yong Liu, Rick Goh
- FAccT-23 “How Biased are Your Features?”: Computing Fairness Influence Functions with Global Sensitivity Analysis
Bishwamittra Ghosh, Debabrota Basu, Kuldeep S. Meel
- VLDB-23 Neighborhood-based Hypergraph Core Decomposition
Naheed Anjum Arafat, Arijit Khan, Arpit Kumar Rai, Bishwamittra Ghosh
- AAAI-22 Algorithmic Fairness Verification with Graphical Models
Bishwamittra Ghosh, Debabrota Basu, Kuldeep S. Meel
- AAAI-21 Justicia: A Stochastic SAT Approach to Formally Verify Fairness
Bishwamittra Ghosh, Debabrota Basu, Kuldeep S. Meel
- AAAI-20 A MaxSAT-based Framework for Group Testing
Lorenzo Ciampconi, Bishwamittra Ghosh, Jonathan Scarlett, Kuldeep S. Meel

- ECAI-20 Classification Rules in Relaxed Logical Form
Bishwamitra Ghosh, Dmitry Malioutov, Kuldeep S. Meel
- AIES-19 IMLI: An Incremental Framework for MaxSAT-Based Learning of Interpretable Classification Rules
Bishwamitra Ghosh, Kuldeep S. Meel
- VLDB-18 The Flexible Socio Spatial Group Queries
Bishwamitra Ghosh, Mohammed Eunus Ali, Farhana M. Choudhury, Sajid Hasan Apon, Timos Sellis, Jianxin Li

Journal Papers

- JAIR-22 Efficient Learning of Interpretable Classification Rules
Bishwamitra Ghosh, Dmitry Malioutov, Kuldeep S. Meel
- TSAS-21 Social-Spatial Group Queries with Keywords
Sajid Hasan Apon, Mohammed Eunus Ali, Bishwamitra Ghosh, Timos Sellis

Professional Experiences

Tutorials

- IJCAI-23 Auditing Bias of Machine Learning Algorithms: Tools and Overview

Talks

- Invited Talks Towards Foundational Understanding and Trustworthiness of Machine Learning: A Formal Methods Approach
 - MPI-SP (25), Dagstuhl Seminar (25), IIT-Delhi AD (25)
Trustworthy Machine Learning: A Formal Methods Approach
 - Microsoft Research (24), University of Michigan, Dearborn (23), MPI-SWS, Germany (22), INRIA, France (22), IHPC, Singapore (22)
- Conference ICLR (25), FAccT (23), AAAI (22, 21, 20), ECAI (20), CP (19), VLDB (19), IJCAI (19), AIES (19)
Talks

Program Committee

AAAI (26, 25)

Reviewer

NeurIPS, ICML, AAAI, TMLR, KDD, JAIR, AIES, CAV, TNNLS, TMI, TKDE

Research Visit

- 03.23 – 05.23 Max Planck Institute For Software Systems, Saarbrücken, Germany
- 11.21 – 02.22 INRIA, Lille-Nord, France
- 06.21 – 08.21 Goldman Sachs, Bangalore, India
- 03.20 – 06.20 Max Planck Institute For Software Systems, Kaiserslautern, Germany

Teaching Service

- 06.18 – 06.21 CS2030: Programming Methodology II, *NUS*
- 06.20 – 12.20 CS3243: Introduction to Artificial Intelligence, *NUS*
Fall'17 Numerical Methods, *UIU*
Fall'17 Data Communication, *UIU*

Awards and Honors

- 2025, 2026 Invited for Dagstuhl Seminar, Schloss Dagstuhl - Leibniz Center for Informatics, Germany
- 2025 KDD 2025 Outstanding reviewer (top 10% of reviewers)
- 2021 Moblilex Scholarship, Université de Lille, France
- 2018 – 2023 NUS Research Scholarship, Singapore
- 2013 – 2017 University Deans List, BUET, Bangladesh

2011, 2012 National Math Olympiad winner, Bangladesh
2012 National Chemistry Olympiad winner, Bangladesh

References

- **Krishna P. Gummadi**
Scientific Director
Max Planck Institute for Software Systems (MPI-SWS), Germany
Email: send.Gummadi.446C4DDBE7@interfoliodossier.com
- **Kuldeep S. Meel**
Associate Professor
School of Computer Science
Georgia Institute of Technology, USA
Email: send.Meel.50BA24C00F@interfoliodossier.com
- **Evimaria Terzi**
Professor and Associate Chair for Academics
Computer Science Department MCS 280
Boston University, USA
Email: send.Terzi.29518881C7@interfoliodossier.com
- **Debabrota Basu**
Faculty (equivalent of Associate Professor)
Scool Team
INRIA at Université de Lille and CNRS, France
Email: send.Basu.97FB75E1B5@interfoliodossier.com
- **Arijit Khan**
Associate Professor
Department of Computer Science
Bowling Green State University, USA
Email: send.Khan.A8C7FAA819@interfoliodossier.com