Bishwamittra Ghosh

Postdoctoral Researcher
MPI-SWS, Germany
✉ *bghosh@mpi-sws.org*
bishwamittra.github.io
scholar, dblp

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 Ciampiconi, Bishwamittra Ghosh, Jonathan Scarlett, Kuldeep S. Meel

ECAI-20 Classification Rules in Relaxed Logical Form
Bishwamittra Ghosh, Dmitry Malioutov, Kuldeep S. Meel

AIES-19 IMLI: An Incremental Framework for MaxSAT-Based Learning of Interpretable Classification Rules
Bishwamittra Ghosh, Kuldeep S. Meel

VLDB-18 The Flexible Socio Spatial Group Queries
Bishwamittra Ghosh, Mohammed Eunus Ali, Farhana M. Choudhury, Sajid Hasan Apon, Timos Sellis, Jianxin Li

Journal Papers

JAIR-22 Efficient Learning of Interpretable Classification Rules
Bishwamittra Ghosh, Dmitry Malioutov, Kuldeep S. Meel

TSAS-21 Social-Spatial Group Queries with Keywords
Sajid Hasan Apon, Mohammed Eunus Ali, Bishwamittra 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 Talks ICLR (25), FAccT (23), AAAI (22, 21, 20), ECAI (20), CP (19), VLDB (19), IJCAI (19), AIES (19)

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: gummadi@mpi-sws.org

- **Kuldeep S. Meel**
  Associate Professor
  School of Computer Science
  Georgia Institute of Technology, USA
  Email: send.Meel.50BA24C00F@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
  Aalborg University, Denmark
  Email: send.Khan.A8C7FAA819@interfoliodossier.com