

# 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 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 Mobillex 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

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## 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`