Anna Fariha

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Research Interests

My research focuses on three key aspects of data system democratization: *enhancing usability* of data systems for both non-experts and experts, *providing explanation frameworks* to enable understanding of system behavior, and *achieving trust and fairness* in data-driven machine learning.

- *Data systems usability*: query by example, data summarization, discovery, wrangling, evolution.
- *Metadata management and its applications*: data constraints, data drift, data cleaning.
- *Systems for machine learning and AI:* Large language models for data management, trusted machine learning, fair machine learning, explainable AI, personalized text summarization.
- *Causal reasoning and explanation frameworks*: software debugging, automatic program repair, data debugging, explaining data non-conformance, causal insights.

Education

Doctor of Philosophy in Computer Science 2021
Manning College of Information and Computer Sciences *University of Massachusetts, Amherst, MA*

- Dissertation: Enhancing Usability and Explainability of Data Systems
- Advisor: Alexandra Meliou
- Committee members: Emery Berger, Peter Haas, Suman Nath
- CGPA: 4.00 out of 4.00

Master of Science in Computer Science 2020
Manning College of Information and Computer Sciences *University of Massachusetts, Amherst, MA*

- CGPA: 4.00 out of 4.00

Master of Science in Computer Science and Engineering 2011
Department of Computer Science and Engineering *University of Dhaka, Bangladesh*

- Thesis: A New Approach for Frequent Human Interaction Pattern Mining in Meeting Databases
- Advisor: Suraiya Pervin
- CGPA: 4.00 out of 4.00

Bachelor of Science in Computer Science and Engineering 2010
Department of Computer Science and Engineering *University of Dhaka, Bangladesh*

- Thesis: An Algorithm for Graph Mining using Efficient Graph Indexing for Evolving Database
- Advisor: Chowdhury Farhan Ahmed
- CGPA: 3.83 out of 4.00

Employment History

University of Utah 7/2023 – present
Assistant Professor Salt Lake City, UT, USA
Kahlert School of Computing

Microsoft 6/2021 – 5/2023
Researcher Redmond, WA, USA
PROSE research and engineering team for AI-assisted programming
Managers: Gustavo Soares, Sumit Gulwani

Microsoft 5/2019 – 11/2019
Research Intern Bellevue, WA, USA
PROSE research and engineering team for AI-assisted programming
Mentor: Ashish Tiwari
Project: Conformance constraints and trusted machine learning

Microsoft Research 5/2018 – 8/2018
Research Intern Redmond, WA, USA
Data Management, Exploration and Mining (DMX)
Mentor: Suman Nath
Project: Adaptive interventional debugging for finding root causes of nondeterministic software bugs

University of Massachusetts 9/2016 – 5/2021
Research Assistant Amherst, MA, USA
Data Systems Research for Exploration, Analytics, and Modeling (DREAM) Lab
Manning College of Information and Computer Sciences
Supervisor: Alexandra Meliou

Lalmatia Women's College 1/2015 – 4/2015
Guest Lecturer Dhaka, Bangladesh
Department of Business Administration

University of Dhaka 5/2014 – 8/2016
Lecturer Dhaka, Bangladesh
Department of Computer Science and Engineering

United International University 5/2012 – 4/2014
Lecturer Dhaka, Bangladesh
Department of Computer Science and Engineering

University of Liberal Arts 10/2011 – 1/2012
Competitive Programming Trainer Dhaka, Bangladesh
Coach for competitive programming in preparation for ACM ICPC Programming Contests

Structured Data Systems Limited 9/2011 – 5/2012
Software Engineer Dhaka, Bangladesh
Android and Blackberry mobile applications

University of Asia Pacific 10/2010 – 10/2010
Competitive Programming Trainer Dhaka, Bangladesh
Coach for competitive programming in preparation for ACM ICPC Programming Contests

Honors, Awards, & Achievements

SIGMOD Distinguished PC member	2024
SIGMOD Distinguished PC member	2023
SIGMOD Distinguished PC member	2022
SIGMOD Comprehensive Reproducibility Award	2022
VLDB Best Demonstration Runner-up Award	2020
Jim Gray Scholarship, CICS, UMass Amherst	2016
Special Achievement Award: Bangladesh ICT Journalist Forum	2012
Special Achievement Award: Bangladesh Bangladesh Women in IT	2012
University Scholarship for result in Bachelors of Science, U of Dhaka	2012
Special Achievement Award for outstanding performances in programming contests, U of Dhaka	2011
Dean's Honor Award (top 1%), Faculty of Engineering, U of Dhaka	2011
Dean's Award, Faculty of Engineering, U of Dhaka	2010
Fatema-Iqbal Trust Scholarship, U of Dhaka	2008

Travel and Accommodation Scholarships

Invited Participant, CRA Career Mentoring Workshop, Washington, DC	2024
Invited Participant with Accommodation Support, Logic and Algebra for Query Evaluation – Simons Institute for the Theory of Computing, Berkeley, California	2023
Invited Participant with Travel & Accommodation Support, CRA-WP Career Mentoring Workshop – Chicago, Illinois	2023
CRA-W Grad Cohort Workshop Travel and Accommodation Award, Washington DC	2017

Programming Contests

Rank 5, ACM International Collegiate Programming Contest, Dhaka (Team: DU Resonance)	2011
Rank 1, Islamic University of Technology ICT Fest Programming Contest (Team: DU Resonance)	2011
Rank 1, Dhaka University National Collegiate Programming Contest (Team: DU Resonance)	2011
Rank 1, Dhaka University National Collegiate Programming Contest [Women] (Team: DU Felicity)	2011
Rank 2, SUST National Collegiate Programming Contest (Team: DU Resonance)	2010
Rank 6, ACM International Collegiate Programming Contest, Amritapuri (Team: DU Resonance)	2010
Rank 4, ACM International Collegiate Programming Contest, Dhaka (Team: DU Resonance)	2010
Rank 3, ACM International Collegiate Programming Contest, Dhaka (Team: DU Ouranos)	2009
Rank 515, Google Code Jam, (Individual, id: chorui12)	2009
Rank 4, AUST National Collegiate Programming Contest (Team: DU Resonance)	2009

Grants

1. **One Utah Data Science Hub Seed Grant Award:** *Explaining Data Evolution* [PI]. Total award amount: $50,000. Award duration: Mar 2024–Feb 2025.
2. **CIRC: ENS/Grand. NSF CNS 2346555:** *POWDER-ENS - Enhancing and Sustaining the POWDER Platform* [Co-PI, PI: Jacobus Van Der Merwe, other co-PIs: Aditya Bhaskara, Eric Eide]. Total award amount: $4,999,980. Award duration: Oct 2024–Sep 2028.
3. **CRA-WP Distributed Research Experiences for Undergraduates (DREU):** *Summer support for two students*. Total award amount: $14,000. Award duration: Summer 2024.
4. **USHE: Computer Science Targeted Workforce Application:** *Training the Next Generation of Database Engineers: Responsible, User-Centric, and Efficient Data Management* [led by Jeff Phillips]. Teaching grant for developing a new course: *Human-centered Data Management*. Academic year: 2023–2024.
5. **Microsoft Research Dissertation Grant**. Total award amount: $25,000. Academic year 2020–2021.

Publications

Journal and Conference Publications

[1] Zifan Liu, Shaleen Deep, Anna Fariha, Fotis Psallidas, Ashish Tiwari, and Avrilia Floratou. Rapidash: Efficient Detection of Constraint Violations. *Proc. VLDB Endow.*, 17(8):2009–2021, 2024

[2] Anjali Singh, Anna Fariha, Christopher Brooks, Gustavo Soares, Austin Z. Henley, Ashish Tiwari, Chethan M, Heeryung Choi, and Sumit Gulwani. Investigating Student Mistakes in Introductory Data Science Programming. In *SIGCSE*, pages 1258–1264. ACM, 2024

[3] Rohan Bavishi, Harshit Joshi, José Cambronero, Anna Fariha, Sumit Gulwani, Vu Le, Ivan Radicek, and Ashish Tiwari. Neurosymbolic Repair for Low-code Formula Languages. *Proc. ACM Program. Lang.*, 6(OOPSLA2):1093–1122, 2022

[4] Sainyam Galhotra, Anna Fariha, Raoni Lourenço, Juliana Freire, Alexandra Meliou, and Divesh Srivastava. DataPrism: Exposing Disconnect between Data and Systems. In *SIGMOD*, pages 217–231. ACM, 2022

[5] Maliha Tashfia Islam, Anna Fariha, Alexandra Meliou, and Babak Salimi. Through the Data Management Lens: Experimental Analysis and Evaluation of Fair Classification. In *SIGMOD*, pages 232–246. ACM, 2022

[6] Anna Fariha, Ashish Tiwari, Arjun Radhakrishna, Sumit Gulwani, and Alexandra Meliou. Conformance Constraint Discovery: Measuring Trust in Data-Driven Systems. In *SIGMOD*, pages 499–512. ACM, 2021 (Comprehensive Reproducibility Award)

[7] Anna Fariha, Suman Nath, and Alexandra Meliou. Causality-Guided Adaptive Interventional Debugging. In *SIGMOD*, pages 431–446. ACM, 2020

[8] Anna Fariha and Alexandra Meliou. Example-Driven Query Intent Discovery: Abductive Reasoning using Semantic Similarity. *Proc. VLDB Endow.*, 12(11):1262–1275, 2019

[9] Anna Fariha, Chowdhury Farhan Ahmed, Carson K. Leung, Md. Samiullah, Suraiya Pervin, and Longbing Cao. A New Framework for Mining Frequent Interaction Patterns from Meeting Databases. *Eng. Appl. Artif. Intell.*, 45:103–118, 2015

[10] Amit Mandal, Mehedi Hasan, Anna Fariha, and Chowdhury Farhan Ahmed. GSCS - Graph Stream Classification with Side Information. In *APWeb*, pages 389–400, 2015

[11] Md. Samiullah, Chowdhury Farhan Ahmed, Anna Fariha, Md. Rafiqul Islam, and Nicolas Lachiche. Mining frequent correlated graphs with a new measure. *Expert Syst. Appl.*, 41(4):1847–1863, 2014

[12] Shafaet Ashraf, Sheikh Muhammad Sarwar, Md. Abeed Hassan, Saifuddin Md. Tareeq, and Anna Fariha. An Efficient Method for Extracting Subtrees against Forest Query. In *IMCOM*, pages 98:1–98:7. ACM, 2015

[13] Anna Fariha, Chowdhury Farhan Ahmed, Carson Kai-Sang Leung, S. M. Abdullah, and Longbing Cao. Mining Frequent Patterns from Human Interactions in Meetings Using Directed Acyclic Graphs. In *PAKDD*, pages 38–49, 2013

[14] Md. Samiullah, Chowdhury Farhan Ahmed, Manziba Akanda Nishi, Anna Fariha, S. M. Abdullah, and Md. Rafiqul Islam. Correlation Mining in Graph Databases with a New Measure. In *APWeb*, pages 88–95, 2013

[15] Shariful Islam, Anna Fariha, Chowdhury Farhan Ahmed, and Byeong-Soo Jeong. EGDIM: Evolving Graph Database Indexing Method. In *ICUIMC*, pages 56:1–56:10, 2012

Short, Demonstration, and Workshop Papers

[16] Ankita Sharma, Jaykumar Tandel, Xuanmao Li, Lanjun Wang, Anna Fariha, Liang Zhang, Syed Arsalan Ahmed Naqvi, Irbaz Bin Riaz, Lei Cao, and Jia Zou. DataMorpher: Automatic Data Transformation based on Large Language Models. *ICDE*, 2025

[17] Whanhee Cho and Anna Fariha. UTOPIA: Automatic Pivot Table Assistant. *Proc. VLDB Endow.*, 2024

[18] Bhavya Chopra, Anna Fariha, Sumit Gulwani, Austin Z. Henley, Daniel Perelman, Mohammad Raza, Sherry Shi, Danny Simmons, and Ashish Tiwari. CoWrangler: Recommender System for Data-Wrangling Scripts. In *SIGMOD*. ACM, 2023

[19] El Kindi Rezig, Anshul Bhandari, Anna Fariha, Benjamin Price, Allan Vanterpool, Andrew Bowne, Lindsey McEvoy, and Vijay Gadepally. Examples are All You Need: Iterative Data Discovery by Example in Data Lakes. In *CIDR*, 2022

[20] El Kindi Rezig, Anshul Bhandari, Anna Fariha, Benjamin Price, Allan Vanterpool, Vijay Gadepally, and Michael Stonebraker. DICE: Data Discovery by Example. *Proc. VLDB Endow.*, 14(12):2819–2822, 2021

[21] Nishant Yadav, Matteo Brucato, Anna Fariha, Oscar Youngquist, Julian Killingback, Alexandra Meliou, and Peter Haas. SUBSUME: A dataset for subjective summary extraction from Wikipedia documents. pages 131–141, November 2021

[22] Anna Fariha, Ashish Tiwari, Alexandra Meliou, Arjun Radhakrishna, and Sumit Gulwani. CoCo: Interactive Exploration of Conformance Constraints for Data Understanding and Data Cleaning. In *SIGMOD*, pages 2706–2710. ACM, 2021

[23] Anna Fariha, Ashish Tiwari, Arjun Radhakrishna, and Sumit Gulwani. ExTuNe: Explaining Tuple Non-conformance. In *SIGMOD*, pages 2741–2744. ACM, 2020

[24] Anna Fariha, Matteo Brucato, Peter J. Haas, and Alexandra Meliou. SuDocu: Summarizing Documents by Example. *Proc. VLDB Endow.*, 13(12):2861–2864, 2020 (Best Demonstration Runner Up Award)

[25] Anna Fariha, Sheikh Muhammad Sarwar, and Alexandra Meliou. SQuID: Semantic Similarity-Aware Query Intent Discovery. In *SIGMOD*, pages 1745–1748. ACM, 2018

[26] Quazi Marufur Rahman, Anna Fariha, Amit Mandal, Chowdhury Farhan Ahmed, and Carson K. Leung. A Sliding Window-Based Algorithm for Detecting Leaders from Social Network Action Streams. In *IEEE/WIC/ACM WI-IAT*, pages 133–136, 2015

PhD Thesis

[27] Anna Fariha. *Enhancing Usability and Explainability of Data Systems*. PhD thesis, University of Massachusetts Amherst. `https://scholarworks.umass.edu/dissertations_2/2311/`

Software and Educational Content

- UTOPIA: Automatic Pivot Table Assistant. Link
- SQuID: Semantic similarity-aware Query Intent Discovery. Link
- Conformance Constraints Discovery: Measuring Trust in Data-Driven Systems (Winner of the ACM SIGMOD 2022 Most Reproducible Paper Award). Link
- SubSumE Dataset for Subjective Document Summarization. Link
- A Data Management Perspective on Fair Classification: An Experimental Analysis and Evaluation. Link
- Educational video on "Research in Computer Science (Databases/Data Management Track)". Link

Panels and Invited Talks

- Panelist – Northwest Database Society Annual Meeting: Panel on AI and Data Management — February, 2024
- Panelist – NSF Information and Intelligent Systems division (IIS) — 2023
- Panelist – NSF's CSGrad4US Panel: "What I wish I knew before I started graduate school" — October, 2023
- Panelist – SIGMOD New Researcher Symposium — June, 2022
- Round Table Chair – VLDB: Interactive Querying and Visualization for Large Data — August, 2021
- *Explaining Data Evolution*
  - DELPHI Data Science Symposium, University of Utah — November, 2024
- *Recent Trends in Scalable and Human-centric Data Systems*
  - Research Challenges in Computing Seminar Series, University of Utah — October, 2023
- *Through the Data Management Lens: Experimental Analysis and Evaluation of Fair Classification*
  - Bias, Ethics and Trustworthiness in Data Science and AI event, University of Utah — September, 2023
- *Blame the data, not the system: how data constraints can help in trustworthy machine learning and explain causes of data-system malfunction*
  - Data Science Lecture Series, University of Utah — September, 2023
  - University of Washington, Northwest Database Society — November, 2021
- *Blame the data, not the system: How data profiles can help explain causes of data-system malfunction*
  - Northwest Database Society (NWDS) Annual Meeting — May, 2023
- *Enhancing usability and explainability of data systems*
  - Database Seminar, University of California San Diego (virtual) — April, 2023
  - Cornell University — April, 2022
  - Georgia University of Technology — April, 2022
  - University of California, Santa Barbara — March, 2022
  - University of Minnesota (virtual) — March, 2022
  - University of Waterloo (virtual) — March, 2022
  - University of Utah — February, 2022
  - University of Toronto (virtual) — February, 2022
  - Pennsylvania State University (virtual) — February, 2022
  - EPIC meeting, University of California, Berkeley (virtual) — February, 2022
  - Ohio State University (virtual) — January, 2022

- CSAIL, Massachusetts Institute of Technology (virtual) October, 2021
- Microsoft (virtual) January, 2021
- Megagon Labs (virtual) February, 2021
- University of Pennsylvania (virtual) February, 2021
- DATA Lab, Northeastern University (virtual) January, 2021

Teaching

- **University of Utah**
  - CS 6959/3960 - Human-Centered Data Management (graduate + undergraduate) Spring 2025
  - CS 5353/6353 - Deep Learning (graduate + undergraduate) Fall 2024
  - CS 6959/3960 - Human-Centered Data Management (graduate + undergraduate) Spring 2024
  - CS 5353/6353 - Deep Learning (graduate + undergraduate) Fall 2023
- **University of Dhaka, Bangladesh**
  - CSE 1201 - Fundamentals of Programming (undergraduate) Spring 2014
  - CSE 1211 - Fundamentals of Programming Lab (undergraduate) Spring 2014
  - CSE 1102 - Discrete Mathematics (undergraduate) Fall 2014
  - CSE 2101 - Data Structures and Algorithms (undergraduate) Spring 2015
  - CSE 2111 - Data Structures and Algorithms Lab (undergraduate) Spring 2015
  - CSE 3113 - Microprocessor and Assembly Language Lab (undergraduate) Fall 2015
  - CSE 1111 - Fundamentals of Computer and Computing Lab (undergraduate) Fall 2015
  - CSE 2112 - Object Oriented Programming Lab (undergraduate) Spring 2016
  - CSE 2212 - Design and Analysis of Algorithms Lab (undergraduate) Spring 2016
  - CSE 4111 - Artificial Intelligence Lab (undergraduate) Spring 2016
- **United International University, Bangladesh**
  - CSI 219 - Discrete Mathematics (undergraduate)
  - CSI 121 - Structured Programming Language (undergraduate)
  - CSI 122 - Structured Programming Language Laboratory (undergraduate)
  - CSI 228 - Algorithms Laboratory (undergraduate)
  - CSI 233 - Theory of Computing (undergraduate)
  - CSI 341 - Artificial Intelligence (undergraduate)
  - CSI 342 - Artificial Intelligence Laboratory (undergraduate)

Student Supervision

PhD Advisor

- Whanhee Cho (2nd year PhD) Fall 2023–present
- Chetan Bajaj (1st year PhD) Spring 2025–present
- Shiyi He (2nd year PhD) Fall 2023–Fall 2024

Thesis Committee Member

- Anirudh Kamath (MS) Spring 2025
- Kutay Eken (MS) Spring 2025

Masters & Undergraduate

- University of Utah
  - Shreya Raj, UMass Amherst Summer 2024 – Present
  - Kuangfei Long, Boston University Summer 2024 – Present
  - Tal Blau, Technion - Israel Institute of Technology Spring 2024 – Present
  - Vijaysurya Vempati (MS) Fall 2024

  - William Erignac — Summer 2024
  - Ziming Wang — Fall 2024
  - Holden Ellsworth (MS) — Summer 2024
  - Bhavya Chopra, University of California, Berkeley — Summer 2024
  - Yuqing Wang, University of Wisconsin-Madison (DREU by CRA, Project Report [28]) — Summer 2024
  - Rania Saber, University of California-Riverside (DREU by CRA, Project Report [29]) — Summer 2024
  - Qiaoyi Cai — Fall 2023
- University of Dhaka
  - Quazi Marufur Rahman (MS) — 2015
  - Amit Mandal — 2015
  - Mehedi Hasan — 2015
  - Nitish Ranjan Bhowmik — 2015
  - Kazi Mazbah Uddin — 2015

Mentorship

- Microsoft
  - Bhavya Chopra (Predoctoral Research Fellow) [PhD student at UC Berkeley] — 2022–2023
  - Yang Shi (Research Intern) [Assistant Professor at Utah State University] — 2022
  - Chethan Mahadevaswamy (Predoctoral Research Fellow) [Data Scientist at Microsoft] — 2021–2022
- University of Massachusetts Amherst
  - Maliha Islam (PhD) [Now at Microsoft] — 2020–2021
  - Hasnain Heickal (PhD) — 2021–2022
  - Oscar Youngquist (MS) — 2021–2022
  - Julian Killingback (MS) — 2021
  - Kanchi Masalia (MS) — 2020
  - Lucy Cousins (MS) — 2019–2021
  - Genglin Liu (Undergrad) — 2020
  - Armand Asnani (Undergrad) — 2019–2020
  - Nischal Dave (Undergrad) — 2019
  - Zoey (Jingyi) Sun (Undergrad from Smith College) — 2018
  - Lauren Beryl Larson (REU) (Undergrad from Wellesley College) — 2017
  - Michael Satanovsky (High-school Intern from Hopkins School) — 2017

Professional Services

Internal Service

- Member, Faculty Recruiting Committee, KSoC — 2025
- Graduate Admission Committee, KSoC — 2025
- Member, Research Support/Opportunities Committee, KSoC — 2024
- Panelist, Graduate Student Mentoring Panel on "How to get a job in industry?", KSoC — 2024
- Founder and Advisor, Grad-CS Women, KSoC (`gradcswomen-utah.github.io`) — 2024–present
- Graduate Admission Committee, KSoC — 2024
- Faculty Advisor, Women in Computing (`wic.utahclubs.org`) — 2023–present
- Mentor of 1st Year PhD Student (Ishrat Jahan Eliza), KSoC — 2023
- Co-founder of UtahDB Research Center (`mod.cs.utah.edu`) — 2022–present

External Service

Program Committee and Workshop Organization

- ACM SIGMOD International Conference on Management of Data (research track) — 2026
- Workshop Chair, Data-AI Systems (DAIS), co-located with ICDE (`dais-workshop-icde.github.io`) — 2025

- IEEE International Conference on Data Engineering (ICDE) (research track) 2025
- International Conference on Very Large Databases (VLDB) (research track, rapid response reviewer) 2025
- ACM SIGMOD International Conference on Management of Data (demonstration track) 2025
- ACM SIGMOD International Conference on Management of Data (research track) 2025
- GUIDE-AI: ACM SIGMOD Workshop on Governance, Understanding, and Integration of Data for Effective and Responsible AI 2024
- IEEE International Conference on Data Engineering (ICDE) (demonstration track) 2024
- ACM SIGMOD International Conference on Management of Data (demonstration track) 2024
- ACM SIGMOD International Conference on Management of Data (research track) 2024
- IEEE International Conference on Data Engineering (ICDE) (Ph.D. Symposium) 2023
- ACM SIGMOD International Conference on Management of Data (research track) 2023
- International Conference on Very Large Databases (VLDB) (research track) 2023
- ACM SIGMOD International Conference on Management of Data (research track) 2022
- International Conference on Very Large Databases (VLDB) (research track) 2022
- International Conference on Extending Database Technology (EDBT) (demonstration track) 2022
- ACM SIGMOD International Conference on Management of Data (research track) 2021
- International Conference on Extending Database Technology (EDBT) (demonstration track) 2021
- International Conference on Very Large Databases (VLDB) (demonstration track) 2021

Other Reviewing and Community Service

- Mentor of Xuan Luo (Simon Fraser University) at New Researcher Symposium, SIGMOD 2024
- Reviewer of the TKDE Journal 2024
- Reviewer of the VLDB Journal 2023
- Reviewer of the VLDB Journal 2021
- Reviewer of User Interface Software and Technology (UIST) 2021
- Session chair at International Conference on Extending Database Technology (EDBT) 2021
- External reviewer of ACM CHI Conference on Human Factors in Computing Systems 2021
- External reviewer of ACM SIGMOD International Conference on Management of Data 2018–2020

Problem Setter & Judge of Competitive Programming Contests

- State University Bangladesh Inter-University Programming Contest, Bangladesh 2015
- SAARC Programming Contest, Bangladesh University, Bangladesh 2014
- Islamic University of Technology ICT Fest, Bangladesh 2014
- SAARC Programming Contest, Bangladesh University, Bangladesh 2013
- Bangladesh Informatics Olympiad, National Round, Bangladesh 2013
- North South University Inter-University Programming Contest, Bangladesh 2013
- ACM International Collegiate Programming Contest, Dhaka, Bangladesh 2012