

# EFFAT FARHANA

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## CONTACT INFORMATION

3127A Shelby Center  
Auburn, AL 36832  
Phone: 334-844-6325

Website: <https://effat.github.io/>  
Email: e.farhana@auburn.edu

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## RESEARCH SUMMARY

- Designing Artificial Intelligence (AI), Machine Learning (ML), and Data Mining techniques addressing unique challenges in specific application domains, such as education and healthcare.
  - Empirical software engineering research, particularly mining software repositories to extract information that is useful for software engineers, educators, and researchers.
  - Publications in EAAI@AAAI, ICLR- Tiny Track, GECCO, ICSE, and top domain conferences, such as EDM and L@S. Reviewer for NeurIPS, EAAI@AAAI, ICLR, and AIED.
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## EDUCATION

- **Doctor of Philosophy (Ph.D.) in Computer Science, North Carolina State University** April 2021
    - “Science Reading Behavior of Middle School Students within a Digital Literacy Platform”
    - Committee: Dr. Collin F. Lynch (Advisor), Dr. James Lester, Dr. Noboru Matsuda, and Dr. Teomara Rutherford
  - **Bachelor of Science (B.Sc.) in Computer Science and Engineering** Feb 2011
    - Bangladesh University of Engineering and Technology, Dhaka, Bangladesh
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## AWARDS & HONORS

- **Rising Star in Data Science- Jan 2021, University of Chicago.**  
For my Ph.D. work. organized by the Center for Data and Computing (CDAC), University of Chicago.
- **Scholarship by ACM Richard Tapia Celebration of Diversity in Computing, 2020**  
To present a poster based on my Ph.D. work in ACM Student Research Competition.
- **Travel award**  
To attend the Women in Machine Learning (WiML) workshop, co-located with NeurIPS 2020 (virtual).
- **Travel award**  
CRA-WP Widening Participation Early and Mid Career Mentoring Workshop, 2020
- **Scholarship by Women in Computer Science (WiCS), NC State**  
To attend Grace Hopper Conference, 2018.
- **Dean’s List Award**  
Received this award for achieving academic excellence for six semesters during the Bachelor’s program in the Bangladesh University of Engineering and Technology.
- Attended Computer and Information Science and Engineering (CISE) CAREER Proposal Writing workshop Spring 2022

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## EMPLOYMENT HISTORY

- **Assistant Professor** August 2024 - Present  
Department of Computer Science and Software Engineering, Auburn University Auburn, AL
  - **Postdoctoral Research Scholar** Jul 2021 - May 2024  
Department of Computer Science, Vanderbilt University Nashville, TN
  - **Graduate Teaching Assistant / Research Assistant** Aug 2015 - May 2021  
Department of Computer Science, North Carolina State University Raleigh, NC
  - **Lecturer, Department of Computer Science** Apr 2011 - Dec 2014  
Ahsanullah University of Science and Technology Dhaka, Bangladesh
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## PUBLICATIONS

### Peer-Reviewed Journals and Conference Publications

1. **[ICDL 2024]** Standoff: A computational benchmark for investigating representation learning for nonverbal theory of mind tasks  
Joel Michelson, Deepayan Sanyal, James Ainooson, **Effat Farhana**, Maithilee Kunda. ICDL 2024 - The IEEE International Conference on Development and Learning . **Best Paper Award**.
2. **[L@S 2024]** SimPal: A Meta-Conversational Framework to Understand Teacher’s Instructional Goals for K-12 Physics.  
**Effat Farhana**, Souvika Sarkar, Ralph Knipper, Indrani Dey, Hari Narayanan, Sadhana Puntambekar and Shubhra Kanti Karmaker.  
The 2024 ACM Learning @ Scale Conference.
3. **[ICLR Tiny Paper23]** Rethinking Positional Embedding: A Case Study in Temporal Event Sequence Modelling  
**Effat Farhana**  
Co-located with the Eleventh International Conference on Learning Representations (ICLR) 2023.
4. **[EAAI@AAAI 22]** Predictive Student Modelling in an Online Reading Platform  
**Effat Farhana**, Teomara Rutherford, and Collin F. Lynch.  
The Twelfth AAAI Symposium on Educational Advances in Artificial Intelligence (EAAI-AAAI 2022).
5. **[ACS 22]** Framework for a multi-dimensional test of theory of mind for humans and AI systems  
Caoimhe Harrington Stack, Sarah Myers, **Effat Farhana**, Aviv Roskes, Xinyu Shen, Simeng Zhao, Angela Maliakal, Roxanne Rashedi, Joel Michelson and Maithilee Kunda  
The Tenth Annual Conference on Advances in Cognitive Systems (ACS 2022).
6. **[L@S 20]** Understanding Reading Behaviors of Middle School Students  
**Effat Farhana**, Teomara Rutherford, and Collin F. Lynch.  
Proceedings of the Seventh ACM Conference on Learning @ Scale (L@S 2020).
7. **[ICLS 20]** Associations Between Self-Regulated Learning Strategies and Science Assignment Score in a Digital Literacy Platform  
**Effat Farhana**, Teomara Rutherford, and Collin F. Lynch.  
*Proceedings of the International Conference of the Learning Sciences (ICLS 2020)*.
8. **[EDM 20]** Investigating Relations between Self-Regulated Reading Behaviors and Science Question Difficulty  
**Effat Farhana**, Teomara Rutherford, and Collin F. Lynch.  
*Proceedings of the 13th International Conference on Educational Data Mining (EDM 2020)*.
9. **[ICSE 20]** Gang of eight: A Defect Taxonomy for Infrastructure as Code Scripts  
Akond Rahman, **Effat Farhana**, Chris Parnin, and Laurie Williams.  
*Proceedings of the 42nd International Conference on Software Engineering, (ICSE 2020)*

10. [EMSE 20] The ‘as code’ Activities: Development Anti-patterns for Infrastructure as Code  
Akond Rahman, **Effat Farhana** and Laurie Williams.  
*Empirical Software Engineering*. 25, 3430–3467 (EMSE 2020).
11. [ICSME 19] Synthesizing Program Execution Time Discrepancies in Julia Used for Scientific Software  
**Effat Farhana**, Nasif Imtiaz and Akond Rahman,  
*IEEE International Conference on Software Maintenance and Evolution (ICSME 2019)*
12. [MSR 19] Challenges with Responding to Static Analysis Tool Alerts  
Nasif Imtiaz, Akond Rahman, **Effat Farhana** and L. Williams.  
*IEEE/ACM 16th International Conference on Mining Software Repositories (MSR 2019)*
13. [GECCO 17] Biogeography-based Rule Mining for Classification  
**Effat Farhana** and Steffen Heber.  
Proceedings of the Genetic and Evolutionary Computation Conference (GECCO 2017).
14. [Inf. Sci. 15] Constrained sequence analysis algorithms in computational biology  
**Effat Farhana**, and M. Sohel Rahman.  
*Information Sciences* 295 (2015).
15. [Inf. Process. Lett. 12] Doubly-constrained LCS and hybrid-constrained LCS problems revisited  
**Effat Farhana**, and M. Sohel Rahman.  
*Information Processing Letters* 112.13 (2012).
16. [SPIRE 15] Finite Automata Based Algorithms for the Generalized Constrained Longest Common Subsequence Problems  
**Effat Farhana**, Jannatul Ferdous, Tanaeem M. Moosa, M. Sohel Rahman.  
17th International Symposium of String Processing and Information Retrieval, (SPIRE 2010).

#### Peer-Reviewed Workshop, Poster Publications, and Others

1. [EDM 18] Predicting Post-College STEM Enrollment from Middle School Clickstream Data  
**Effat Farhana**, Maaz Saleem Kapadia, Wenjia Cao, and Collin F. Lynch.  
*Workshop on Scientific Findings from the ASSISTments Longitudinal Data Competition: (EDM 2018)*.
2. [GECCO 18] A Parallel Island Model for Biogeography-based Classification Rule Mining in Julia  
Samuel Ebert, **Effat Farhana**, and Steffen Heber.  
*Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO 2018)*.
3. [EDM 21] Feedback and Self-regulated Learning in Science Reading  
**Effat Farhana**, Andrew Potter, Teomara Rutherford, and Collin F. Lynch.  
*Proceedings of the 14th International Conference on Educational Data Mining (EDM 2021) (Poster)*.
4. [EDM 20] Self-Regulated Learning and Science Reading of Middle-School Students  
**Effat Farhana**, Teomara Rutherford, and Collin F. Lynch.  
*Doctoral Consortium. The 13th International Conference on Educational Data Mining (EDM 2020)*.

#### Preprints and Drafts In-preparation

1. WOMBAT: A Framework for Characterizing Visuospatial Cognition in Neurodivergent Individuals  
**Effat Farhana**, James Ainooson, Deepayan Sanyal, Caoimhe Harrington Stack, Yejin Jeong, Raymond Yates, and Maithilee Kunda. To be submitted: Special Issue in Researches in Advanced Cognitive Systems (RACS).
2. A Cognitively-Inspired Neural Architecture for Visual Abstract Reasoning Using Contrastive Perceptual and Conceptual Processing  
Yuan Yang, Deepayan Sanyal, **Effat Farhana**, Joel P. Michelson, Maithilee Kunda.
3. Automated Question Generation for Science Education  
**Effat Farhana** et al.

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## GRANT PROPOSAL WRITING

- Collaborative Research: EAGER: AI-Assisted Just-in-Time Scaffolding Framework for Exploring Modern Computer Design  
PIs: Dr. Mohammad Alian, Dr. Md Tauhidur Rahman  
**Role: Senior Personnel.** I will collaborate with PIs to design AI-driven modules for personalized learning.  
Result: Awarded by the [National Science Foundation \(NSF\)](#), Award # 2327971.
- MD-ToM: Multi-domain assessment of theory of mind skills for adolescents on the autism spectrum.  
PI: Dr. Maithilee Kunda.  
**Role:** Designed and wrote the Data Analysis part under the Research Plan Section.  
Result: Submitted to the Institute of Education Science (IES) and declined.
- Data-driven Characterization of Neurodivergent People from an Online Block Design Platform.  
PIs: Dr. Maithilee Kunda and Dr. Tyler Derr.  
**Role:** Designed the technical part of the proposal.  
Result: To be submitted to the [NSF Developmental Sciences \(DS\) Program](#).

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## MENTORING

North Carolina State University.

- Samuel Ebert, CS undergraduate Aug 2017- Aug 2018  
Interpretable ML algorithm project at NC State. This work resulted in a student's lead author paper (GECCO 2018).

Vanderbilt University

- Jeannie Jeong, undergraduate in Cognitive Science and Psychology Fall 2021 - Summer 2022  
Project on visual-spatial skills in the workplace.  
Current position: Stanford Department of Medicine, Healthcare AI Applied Research Team.
- James Foglio, an undergraduate in CS Summer 2022  
Project on Block Design and ASD performance.
- Raymond Yates, MS intern at the Frist Center for Autism and Innovation Summer 2022  
Visualization on ASD project.

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## TEACHING EXPERIENCE

- **North Carolina State University** Fall 2016 - Spring 2020
  - Teaching Assistant (TA) for graduate level courses: Design and Analysis of Algorithm (~ 200 students), Software Engineering (~ 30 students), and Artificial Intelligence (~ 60 students).
  - Created assignments and exam questions, held office hours, and graded.
- **Ahsanullah University of Science and Technology** April 2011 - Dec 2014
  - Lecturer in Computer Science and Engineering
  - Instructor for undergraduate-level introductory programming language, design and analysis of the algorithm, and compiler courses.

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## INVITED TALKS AND SEMINARS

1. Machine Learning and Data Science for Social Good Spring 2022  
Florida International University
2. Theory-grounded Predictive Systems and Interpretability Spring 2023  
Auburn University

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## ACADEMIC SERVICE

### Organizing

Area co-chair for <a href="#">AI in Education Track in EAAI-2024</a>	2024
Area co-chair for the Main Track in EAAI-2025 <a href="#">EAAI @ AAAI 2025</a>	2025

### Program Committee

Neural Information Processing Systems (NeurIPS)	2023, 2024
International Conference on Learning Representations (ICLR)	2024, 2025
International Conference on Learning Representations (ICLR) Tiny Paper	2023, 2024
International Conference on Machine Learning (ICML)	2024, 2025
Annual AAAI Conference on Artificial Intelligence (AAAI)	2025
AAAI Symposium on Educational Advances in AI (EAAI) at AAAI	2023, 2024, 2025
International Conference on Educational Data Mining (EDM)	2024
International Conference on Artificial Intelligence in Education (AIED)	2022, 2023, 2024
Workshop: Innovative Use of NLP for Building Educational Applications (BEA)	2024, 2025
IEEE International Conference on Development and Learning (ICDL)	2024
Empirical Methods in Natural Language Processing (EMNLP)	2023
AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES)	2022
ACM Transactions on Computing Education (TOCE)	2022
Advances in Cognitive Systems (ACS)	2022

### Sub-reviewer/Shadow Program Committee

International Conference on Educational Data Mining	2021
Mining Software Repository (MSR)	2021

### Volunteering

Judge for VandyHacks (Vanderbilt's premier student hackathon)	2021
Ph.D. panel member at Doctoral Recruiting Day, NCSU	2020
NC State International Graduate Student Orientation	2017

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## PROFESSIONAL MEMBERSHIPS

- [Affiliate](#) at The Frist Center for Autism and Innovation, Vanderbilt University
- ACM Professional Member
- AAAI Member
- Research Fellow: [NSF AI Institute of Adult Learning and Online Education \(AL-ALOE\)](#)
- Member: [ACL SIGEDU Special Interest Group for Building Educational Applications](#)