Shanto Rahman

Ph.D. Student in Electrical and Computer Engineering
The University of Texas at Austin
Cockrell School of Engineering
U.S. Permanent Resident (EB-2)

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Research Interests

My research interest is at the intersection of **Software Engineering** and **Artificial Intelligence** with a focus on Software Testing to make software system reliable.

Education

Ph.D. Electrical and Computer Engineering — Aug 2021–Present
University of Texas at Austin (UT Austin)

M.S Software Engineering — Jan 2015–July 2016
University of Dhaka (DU)

B.S Software Engineering — Jan 2011–Dec 2014
University of Dhaka (DU)

Publications

Publications include top-tier software engineering venues such as **ICSE**, **ASE**, **OOPSLA** and **ICST**. >840 citations.

15. **Shanto Rahman**, Saikat Dutta, and August Shi. Understanding and Improving Flaky Test Classification. In *Object-oriented Programming, Systems, Languages, and Applications (**OOPSLA**)*, Singapore, 2025.
14. **Shanto Rahman**, Sachit Kuhar, Berk Cirisci, Pranav Garg, Shiqi Wang, Xiaofei Ma, Anoop Deoras, and Baishakhi Ray. UTFix: Change Aware Unit Test Repairing using LLM. In *Object-oriented Programming, Systems, Languages, and Applications (**OOPSLA**)*, Singapore, 2025. **Evaluated and Adopted by AWS
13. **Shanto Rahman**, Bala N Chanumolu, Suzzana Rafi, August Shi, and Wing Lam. Ranking Relevant Tests for Order-Dependent Flaky Tests. In *International Conference on Software Engineering (**ICSE**)*, Ottawa, Canada, 2025.
12. Talank Baral, Emirhan Oğul, **Shanto Rahman**, August Shi, and Wing Lam. OptCD: Optimizing Continuous Development. In *International Conference on Software Engineering (**ICSE**) Demo*, Ottawa, Canada, 2025.
11. **Shanto Rahman**, Abdelrahman Baz, Sasa Misailovic, and August Shi. Quantizing Large-Language Models for Predicting Flaky Tests. In *International Conference on Software Testing, Verification and Validation (**ICST**)*, Toronto, Canada, 2024.
10. **Shanto Rahman**, Aaron Massey, Wing Lam, August Shi, and Jonathan Bell. Automatically Reproducing Timing-Dependent Flaky-Test Failures. In *International Conference on Software Testing, Verification and Validation (**ICST**)*, Toronto, Canada, 2024.
9. **Shanto Rahman** and August Shi. FlakeSync: Automatically Repairing Async Flaky Tests. In *International Conference on Software Engineering (**ICSE**)*, Lisbon, Portugal, 2024.
8. Talank Baral, **Shanto Rahman**, Bala Naren Chanumolu, Basak Balci, Tuna Tuncer, August Shi, and Wing Lam. Optimizing Continuous Development By Detecting and Preventing Unnecessary Content Generation. In *International Conference on Automated Software Engineering (**ASE**)*, Kirchberg, Luxembourg, 2023.

7. **Shanto Rahman**, Chengpeng Li, and August Shi. TSVD4J: Thread-Safety Violation Detection for Java. In *International Conference on Software Engineering (**ICSE**) Demo*, Melbourne, Australia, 2023.

6. Nazneen Akhter, **Shanto Rahman**, and Kazi Abu Taher. An Anti-Pattern Detection Technique Using Machine Learning to Improve Code Quality. In *International Conference on Information and Communication Technology for Sustainable Development (**ICICT4SD**)*, Dhaka, Bangladesh, 2021.

5. **Shanto Rahman**, Md Mostafijur Rahman, and Kazi Sakib. A Statement Level Bug Localization Technique Using Statement Dependency Graph. In *International Conference on Evaluation of Novel Approaches to Software Engineering (**ENASE**)*, Porto, Portugal, 2017.

4. **Shanto Rahman** and Kazi Sakib. An Appropriate Method Ranking Approach for Localizing Bugs using Minimized Search Space. In *International Conference on Evaluation of Novel Approaches to Software Engineering (**ENASE**)*, Rome, Italy, 2016.

3. **Shanto Rahman**, Md Mostafijur Rahman, M. Abdullah-Al-Wadud, Golam Dastegir Al-Quaderi, and Mohammad Shoyaib. An Adaptive Gamma Correction for Image Enhancement. *EURASIP Journal on Image and Video Processing (**JIVP**)*, no. 1 (2016): 35. **Adopted by National Institutes of Health (NIH)

2. **Shanto Rahman**, Kishan Kumar Ganguly, and Kazi Sakib. An Improved Bug Localization Using Structured Information Retrieval and Version History. In *International Conference on Computer and Information Technology (**ICCIT**)*, Dhaka, Bangladesh, 2015.

1. Md Mostafijur Rahman, **Shanto Rahman**, Minhas Kamal, M. Abdullah-Al-Wadud, Emon Kumar Dey, and Mohammad Shoyaib. Noise Adaptive Binary Pattern for Face Image Analysis. In *International Conference on Computer and Information Technology (**ICCIT**)*, Dhaka, Bangladesh, 2015. **Best Paper Award

Submission Under Review

4. **Shanto Rahman**, Talank Baral, August Shi, and Wing Lam. Reproducing Timing-Dependent Flaky Test Failures via a Template-Guided LLM Pipeline. *Under Submission*, 2025.

3. Nandita Jayanthi, **Shanto Rahman**, and August Shi. FlakeSync: A Tool for Automatically Repairing Async Flaky Tests. *Under Submission*, 2025.

2. Mohammad Rifat Arefin, **Shanto Rahman**, and Christoph Csallner. Black-box Context-free Grammar Inference for Readable & Natural Grammars. *Under Submission*, 2025.

1. Suzzana Rafi, Md Mahmudul H Pious, **Shanto Rahman**, August Shi, and Wing Lam. Optimizing Search for Tests Relevant to Order-Dependent Flaky Tests. *Under Submission*, 2025.

Professional Experience

Graduate Research Assistant, University of Texas at Austin Aug 2021–Present
– Research on software testing to make reliable software system

Research Intern, Google May 2025–Aug 2025
– Worked on Changelist (CL) culprit prediction

Applied Scientist Intern, Amazon Web Services (AWS) May 2024–Sept 2024
– Worked on change aware unit test repair using LLM (Published in OOPSLA'25 [14])

Lecturer, Bangladesh University of Professionals (BUP) Sept 2017–Jan 2021
– Taught SE courses • Conducted SE research • Designing course materials

Senior Software Engineer, Samsung Research July 2016–July 2017
– Developed Android and Tizen apps in Java

Software Engineering Intern, Orion Informatics Ltd. Jan 2014–Aug 2014
– Worked on a project namely Browser Based Editing (BBE)

Teaching

University of Texas at Austin (UT Austin)

Teaching Assistant, Department of Electrical and Computer Engineering — Jan 2025–May 2025

- Course: ECE 422C, Software Design & Implementation II

Guest Lecturer, Department of Electrical and Computer Engineering — Sept 2025–Sept 2025

- Course: ECE 382V, Software Testing in the Era of Nondeterminism

Bangladesh University of Professionals (BUP) — Sept 2017–Jan 2021

Lecturer, Department of Information and Communication Technology (ICT)

- Taught Courses (total 10 courses)

  • ICE 2109: Object-Oriented Programming • ICE 2201: Data Structures • ICE 2203: Database Management System • ICE 3101: Analysis and Design of Algorithm • ICE 3103: Operating System • ICE 3207: Software Engineering • ICE 3206: Software Testing • ICE 4107: Artificial Intelligence

- Supervised undergraduate and graduate student research projects

Awards

- **MIT EECS Rising Stars**, MIT — Oct 2025
- **Honorably Invited to NextProf Nexus,** UC Berkeley — Sept 2025
- **Research Credit Award,** OpenAI — Aug 2025
- **CAPS Student Travel Award for ICSE**, ACM SIGSOFT — 2025
- **Temple Foundation Graduate Fellowship,** UT Austin — 2024-2025
- **Travel Award**, IEEECS Technical Committee of Software Engineering (TCSE) — 2024
- **UT Professional Development Award** — 2023
- **Cockrell School of Engineering Fellowship**, UT Austin — 2021-2022
- **Research Grant**, University Grants Commission (UGC), Bangladesh — 2019-2020
- **Research Grant**, University Grants Commission (UGC), Bangladesh — 2018-2019
- **Research Fellowship**, Ministry of Information and Communication Technology, Bangladesh — 2015-2016
- **Best Paper Award**, International Conf. on Computer and Information Technology (ICCIT), IEEE — Dec 2015
- **Merit Award (Top 2%)**, Kabi Sufia Kamal Hall, University of Dhaka, Bangladesh — 2016
- **Merit Scholarship**, Dhaka University Alumni Association — 2015

Services

- **Reviewer** - ACM Transactions on Software Engineering and Methodology (TOSEM) — July 2025
- **Reviewer** - Transactions on Software Engineering (TSE) — April 2025
- **PC member** - International Flaky Tests Workshop (FTW), co-located with ICSE — 2025
- **PC member** - Artifact Evaluation, ICSE — 2025
- **Shadow Reviewer** - ICSE, FSE, ASE, ISSTA — 2024, 2025
- **Amazon Campus Brand Ambassador** — 2025
- **Co-organizer** - Joint UT-Cornell Software Engineering Seminar — 2024
- **Judge** - Capital of Texas Undergraduate Research Conference — 2023
- **Reviewer** - Journal of Information and Software Technology — 2020
- **Committee Member** - Academic Curriculum Review Committee, BUP — 2020
  - Reviewed existing undergrad curriculum for the department of ICT and modified the syllabus based on the recent technology trends.

- **Mentor** - National Hackathon on Frontier Technologies Jan 2020–Feb 2020
  - Organized by Ministry of Posts, Telecommunications and Information Technology. One of my mentored teams won first place in the waste management category.
- **Mentor** - ACM ICPC, NCPC, NGPC Jan 2019–Jan 2021
  - Mentored and prepared for different programming contest
- **Moderator** - BUP Infotech Club (BUPITC) July 2019–Dec 2020
  - BUPITC is one of the leading clubs of BUP whose main focus is to arrange programming contest, hackathon, idea contest, workshop, and introduce new technologies to the students.
- **House Tutor** - BUP April 2020–Dec 2020
  - Student Counselling
- **Student Advisor** - Dept. of Information and Communication Technology (ICT), BUP Jan 2018–Dec 2020
  - Student Progress Monitoring • Student Counselling

Research Advising

- Jiaju Wang (MS, UT Austin)
  - Working on evaluating nondeterminism in LLM models
- Nandita Jayanthi (MS, UT Austin)
  - Co-authored ICSE Demo'2026 (Submitted)
- Bala Naren Chanumolu (MS, GMU); Current: Software Engineer, Amazon Web Services (AWS)
  - Co-authored ICSE'2024
- Emirhan Oğul (BS, GMU)
  - Co-authored ICSE Demo'2024
- Başak Balcı (BS, Özyeğin University); Current: MS, Technical University of Munich (TUM)
  - Co-authored ASE'2023
- Tuna Tuncer (BS, Özyeğin University); Current: MS, Technical University of Munich (TUM)
  - Co-authored ASE'2023
- Nazneen Akhter (MS, BUP; Current: Faculty at BUP)
  - Co-authored ICICT4SD'2021
- Sadia Khan Rupa (BS, BUP; Current: University of Applied Sciences Osnabrück)
  - Co-authored ICASERT'2019
- Zannatul Ferdous (BS, BUP)
  - Coached National Hackathon on Frontier Technologies
- Abir Munna (BS, BUP)
  - Coached National Hackathon on Frontier Technologies

Notable Open-Source Contributions

- International Dataset of Flaky Tests (IDoFT)
  - IDoFT is a public dataset for flaky-test research. I integrated **170 timing-dependent (TD)** flaky tests and **1,900+ order-dependent (OD) related tests**. IDoFT is available https://github.com/TestingResearchIllinois/idoft (My GitHub ID shanto-rahman)
- TSVD4J
  - I present TSVD4J, a Maven-plugin tool for detecting thread-safety violations in Java applications. TSVD4J integrates into any Maven project and executes the project's test suite, analyzing runtime behavior to surface conflicts. Evaluated on 12 applications, TSVD4J identified **55 conflicting pairs** indicative of thread-safety bugs. Compared to RV-Predict, TSVD4J detects more violations with similar runtime, largely due to its explicit tracking of field accesses. I presented at ICSE Demo'24; Repository: https://github.com/UT-SE-Research/TSVD4J.
- OPTCD
  - OptCD is a technique that dynamically identifies wasted work in CD pipelines by tracing build outputs and flagging unused artifacts. In evaluation, it enabled required changes for **72.0% of unused directories**. Presented at ICSE Demo'24; we submitted 26 GitHub pull requests to upstream projects (e.g., google/open-location-code, junit-team/junit4, JSQLParser/JSqlParser), with **12 accepted**. The repository is https://github.com/software-research/optCD-demo.

- FlakeSync
  - I present FlakeSync, a technique for automatically repairing async flaky tests by introducing synchronization for a specific test execution. The evaluation is on known flaky tests from a prior dataset shows that FlakeSync can automatically repair 83.75% of the async flaky tests. I presented this paper in ICSE'24. I submitted 10 pull requests based on FlakeSync's patches, with **3 accepted pull requests** and none rejected thus far.
- FlakeBench
  - I present FlakeBench, a dataset for identifying the root causes of flaky tests via fine-tuning a large language model (LLM). The dataset contains 8,574 tests: 280 flaky and 8,294 non-flaky. I presented this work at OOPSLA'25.
- Syn-Bench
  - We present SynBench, a dataset that is used for repairing change-induced test breakage. This SynBench consists of 352 unit tests with assertion failure and 369 unit tests with reduced code coverage due to changes in the focal methods from 44 projects. We presented this paper in OOPSLA'25.

Presentations (Selected)

Poster	Understanding and Improving Flaky Test Classification, EECS Rising Stars, *Massachusetts Institute of Technology (MIT)*, Cambridge, Oct 2025
Conference Talk	UTFix: Change Aware Unit Test Repairing using LLM, In *Object-oriented Programming, Systems, Languages, and Applications (**OOPSLA**)*, Singapore, Oct 2025
Conference Talk	Understanding and Improving Flaky Test Classification, In *Object-oriented Programming, Systems, Languages, and Applications (**OOPSLA**)*, UT Austin Singapore, Oct 2025
Guest Lecture	UTFix: Change Aware Unit Test Repairing using LLM, *Software Testing in the Era of Nondeterminism (ECE 382V)*, UT Austin, Sept 2025
Guest Lecture	Understanding and Improving Flaky Test Classification, *Software Testing in the Era of Nondeterminism (ECE 382V)*, UT Austin, Sept 2025
Invited Talk	Changelist (CL) culprit prediction in Google system, *Google PhD Intern Summit*, Mountain View, California, Aug 2025
Seminar Talk	UTFix: Change Aware Unit Test Repairing using LLM, *Columbia University*, New York, Aug 2025
Seminar Talk	Understanding and Improving Flaky Test Classification, *UT Cornell SE Seminar*, Austin, Texas, Aug 2025
Seminar Talk	UTFix: Change Aware Unit Test Repairing using LLM, *UT Cornell SE Seminar*, Austin, Texas, Aug 2025
Seminar Talk	Changelist culprit prediction in Google system, *Google*, Mountain View, California, July 2025
Invited Talk	FlakeSync: Automatically Repairing Async Flaky Tests, *Google TAP Research Meeting*, Mountain View, California, June 2025
Conference Talk	Ranking Relevant Tests for Order-Dependent Flaky Tests, In *International Conference on Software Engineering (**ICSE**)*, Ottawa, Canada, May 2025
Invited Talk	Ranking Relevant Tests for Order-Dependent Flaky Tests, *ECE Outstanding Student Lecture Series*, UT Austin, Feb 2025
Invited Talk	Reproducing Flaky Tests and its Mitigation, *George Mason University*, Virginia, Aug 2024
Seminar Talk	Change Aware Unit Test Repair, *Amazon Web Services*, New York, July 2024
Conference Talk	Quantizing Large-Language Models for Predicting Flaky Tests, In *International Conference on Software Testing, Verification and Validation (**ICST**)*, Toronto, Canada, May 2024
Conference Talk	Automatically Reproducing Timing-Dependent Flaky-Test Failures, In *International Conference on Software Testing, Verification and Validation (**ICST**)*, Toronto, Canada, May 2024
Conference Talk	FlakeSync: Automatically Repairing Async Flaky Tests, In *International Conference on Software Engineering (**ICSE**)*, Lisbon, Portugal, April 2024
Seminar Talk	FlakeSync: Automatically Repairing Async Flaky Tests, *UT Cornell SE Seminar*, Austin, Texas, April 2024
Poster	FlakeSync: Automatically Repairing Async Flaky Tests, *Graduate and Industry Networking (GAIN), UT Austin*, Jan, 2024
Invited Talk	FlakeSync: Automatically Repairing Async Flaky Tests, *ECE Outstanding Student Lecture Series*, UT Austin, Feb 2024

Conference Talk TSVD4J: Thread-Safety Violation Detection for Java, In *International Conference on Software Engineering (**ICSE**)*, Melbourne, Australia, May 2023

Invited Talk TSVD4J: Thread-Safety Violation Detection for Java, *GWGMC Research Symposium, UT Austin*, Feb 2023

Seminar Talk TSVD4J: Thread-Safety Violation Detection for Java, *UT Cornell SE Seminar*, Austin, Texas, Feb 2023

Conference Talk Appropriate Method Ranking Approach for Localizing Bugs using Minimized Search Space, In *International Conference on Evaluation of Novel Approaches to Software Engineering (**ENASE**)*, Rome, Italy, April 2016

Conference Talk An improved bug localization using structured information retrieval and version history, In *International Conference on Computer and Information Technology (**ICCIT**)*, Dhaka, Bangladesh, Dec 2015

Conference Talk Image enhancement in spatial domain: A comprehensive study, In *International Conference on Computer and Information Technology (**ICCIT**)*, Dhaka, Bangladesh, Dec 2014