

Farideh Khalili

Ph.D. Candidate in Computer Science

Khouri College of Computer Sciences ▪ Northeastern University ▪ Boston, MA



Research Overview & Interests

My research focuses on advancing **Automated Software Engineering** through **AI-assisted and agentic techniques** that analyze, test, transform, and improve software systems. I develop methods that integrate **program analysis**, **software testing**, **empirical evaluation**, and large language models to automate software engineering tasks while preserving software correctness and software reliability. My recent work emphasizes end-to-end autonomous software engineering workflows for performance optimization, **program transformation**, test generation, and repair.

Artificial Intelligence for Software Engineering (AI4SE) ▪ Automated Software Engineering (ASE) ▪ Empirical Software Engineering ▪ Software Testing ▪ Program Analysis
▪ Program Transformation

Research Experience

2023–Present **Research Assistant**, *Khouri College of Computer Sciences, Northeastern University*

2025–2026 **LLMutantKiller: Using Large Language Models to Generate Tests That Kill Mutants**
Led the design, implementation, and empirical evaluation of a feedback-directed LLM-based technique for improving software test suites through mutation-guided test generation. The approach uses scenario-specific iterative feedback from compiler diagnostics and test execution to iteratively refine generated tests for surviving mutants. Implemented in the open-source LLMutantKiller tool, the approach was evaluated on 915 surviving mutants from 13 open-source JavaScript/TypeScript applications, killing up to 95.3% of non-equivalent surviving mutants and substantially outperforming a state-of-the-art LLM-based baseline. Accepted at ISSTA 2026; conference forthcoming October 2026 (see Publications).

2023–2026 **RRR: Remediating Superfluous Re-Rendering in React Applications**
Led the design, implementation, and empirical evaluation of an approach for improving the performance of React applications through static program transformation. The approach identifies five common React anti-patterns and applies static analysis and automated refactoring to eliminate unnecessary rendering operations. A survey of 7,758 React repositories established the prevalence of these anti-patterns. In an evaluation of 23 open-source applications, the proposed transformations preserved application behavior in all but one case, reduced rendering operations by 33.3% on average, and reduced rendering time by 20.5%, with additional experiments demonstrating improved responsiveness as application size increased. Published at ICSE 2026 (Distinguished Paper Award; see Publications).

2020–2022 **M.Sc. Student Researcher**, *Sharif University of Technology*
Research Collaboration / PI: Mauro Pezzè.

2020–2023 **Automated GUI Test Migration via Semantic Matching**

Designed and conducted empirical studies on semantic matching techniques for automated GUI test reuse across Android applications. Contributed to the development of large-scale research infrastructure, including a Google Play crawler and application corpora, and investigated Natural Language Processing (NLP) techniques—including domain-specific word embeddings, topic models, and semantic similarity methods—for identifying functionally equivalent GUI events. The resulting studies characterized the effectiveness and trade-offs of semantic matching techniques for automated cross-application GUI test migration and generation, informing the design of more effective test reuse approaches. Resulted in publications at ICPC 2022 and Empirical Software Engineering (2024).

Publications

- ISSTA'26 **F. Khalili**, A. Domondon, H. Garg, and F. Tip. "LLMutantKiller: Using Large Language Models to Generate Tests That Kill Mutants". In: *Proceedings of the ACM on Software Engineering* 3, ISSTA, ISSTA007 (Oct. 2026). Article ISSTA007. **Acceptance rate: 23.6%** (210/888). DOI: [10.1145/3832098](https://doi.org/10.1145/3832098).
• [Article](#) • [Artifact](#).
- ICSE'26 **F. Khalili**, S. Gokhale, A. Turcotte, D. Xu, and F. Tip. "Remediating Superfluous Re-Rendering in React Applications". In: *Proceedings of the 48th IEEE/ACM International Conference on Software Engineering (ICSE)* (Rio de Janeiro, Brazil, Apr. 12–18, 2026). **Distinguished Paper Award**. ACM Artifacts Available and Artifacts Evaluated–Reusable badges. **Acceptance rate: 21.9%** (321/1,469). 2026. DOI: [10.1145/3744916.3773235](https://doi.org/10.1145/3744916.3773235) • [Artifact](#).
- EMSE'24 **F. Khalili**, L. Mariani, A. Mohebbi, M. Pezzè, and V. Terragni. "Semantic Matching in GUI Test Reuse". In: *Empirical Software Engineering* 29, 3, 70 (2024). DOI: [10.1007/s10664-023-10406-8](https://doi.org/10.1007/s10664-023-10406-8) • [Artifact](#).
- ICPC'22 **F. Khalili**, A. Mohebbi, V. Terragni, M. Pezzè, L. Mariani, and A. Heydarnoori. "The Ineffectiveness of Domain-Specific Word Embedding Models for GUI Test Reuse". In: *Proc. of the 30th IEEE/ACM Int'l Conf. on Program Comprehension (ICPC)*. 2022, pp. 560–564. DOI: [10.1145/3524610.3527873](https://doi.org/10.1145/3524610.3527873) • [Artifact](#).

Education

- 01/23–Present **Ph.D. in Computer Science**, *Northeastern University*, Boston, MA
Advisor: Frank Tip, Programming Research Laboratory (PRL). Expected completion: May 2029.
- 01/23–04/26 **M.S. in Computer Science**, *Northeastern University*, Boston, MA
Earned en route to the Ph.D.
- 09/19–06/22 **M.Sc. in Computer Engineering (Software Engineering)**, *Sharif University of Technology*, Tehran, Iran, GPA: 19.52/20
Advisor: Abbas Heydarnoori. Thesis: *Test Reuse in GUI-Based Applications Using Word Embedding*.
- 09/14–02/19 **B.Sc. in Computer Engineering (Information Technology)**, *University of Tehran*, Tehran, Iran

Honors & Awards

- 2026 **Distinguished Paper Award**, *ICSE 2026*; for "Remediating Superfluous Re-Rendering in React Applications".
- 2019 **Ranked 3rd** by GPA in Sharif's 2019 M.Sc. Computer Engineering cohort (**top 10%**).
- 2019 **Ranked 4th (top 1%)** in Iran's 2019 M.Sc. Computer Engineering entrance exam.
- 2016–2017 **Faculty of Engineering Top Student Certificate (third rank)**, *University of Tehran*.
- 2014 **Ranked 655th nationally** of **191,000+** candidates in Iran's B.Sc. entrance examination.

Professional Activities

- Oct. 2026 **Student Volunteer (accepted; conference forthcoming)**, *ACM SIGPLAN OOPSLA 2026*
- Sept. 2023 **Program Committee Member**, *Software Day 2023, Northeastern University*

Teaching Experience

Northeastern University

09/24–12/24 Head Teaching Assistant, Fundamentals of Software Engineering

09/23–12/23 Teaching Assistant, Fundamentals of Software Engineering

Sharif University of Technology

09/20–02/21 Teaching Assistant, Semantic Web

02/20–02/21 Teaching Assistant, Database

University of Tehran

02/18–02/19 Teaching Assistant, Computer Networks

Technical Skills

Languages JavaScript, TypeScript, Python, Bash

Libraries React, scikit-learn, pandas, NumPy

Analysis static analysis (CodeQL), dynamic analysis, data analysis, performance profiling

Testing Jest, Appium, StrykerJS, mutation testing

AI & agents LLM integration, prompt engineering, agentic software-engineering workflows

Tools Docker, Git, Linux, Visual Studio Code, Jupyter