Negar Fathi

Phone: +1 (402) 326-5374 **Email:** negarfathi@outlook.com
Webpage | LinkedIn | GitHub | Google Scholar

Profile

Ph.D. candidate in Computer Science at the University of Nebraska–Lincoln focused on formal methods, program analysis, and software testing to improve software reliability and correctness. I have also begun exploring AI techniques, including large language models, for software engineering.

Education

Ph.D. in Computer Science *2023–Present*
University of Nebraska–Lincoln, Lincoln, NE, USA
GPA: 3.87/4.00
Research Focus: *Applying formal methods and program analysis techniques to verify safety and liveness properties, with a particular emphasis on termination and non-termination reasoning.*
Advisor: Dr. Rahul Purandare

M.Sc. in Computer Science *2023–2026*
University of Nebraska–Lincoln, Lincoln, NE, USA
GPA: 3.94/4.00
Completed a course-based M.Sc. alongside Ph.D. studies with a focus on advanced computer science coursework.

M.Sc. in Computer Engineering (Software) *2018–2021*
Iran University of Science and Technology, Tehran, Tehran, Iran
GPA: 18.69/20.00 (*Ranked 1st*)
Thesis: *Development of a Constraint Solver to Determine the Domain for Complex Data Types*
Advisor: Dr. Saeed Parsa

B.Sc. in Computer Engineering (Software) *2013–2017*
Babol Noshirvani University of Technology, Babol, Mazandaran, Iran
GPA: 17.29/20.00 (*Ranked 1st*)
Final Project: *Study and Investigation of Routing Protocols in Wireless Sensor Networks*
Advisor: Dr. Mojtaba Mansouri

Skills

Program Verification & Analysis Tools: Roslyn, LLVM/Clang, SeaHorn, Frama-C, DG, KLEE, Z3
Software Testing & Fuzzing: AFL, NUnit, IntelliTest
Programming Languages: C/C++, C#, Python
Frontend Development: HTML, CSS, JavaScript
Backend Development: Entity Framework Core, ASP.NET Core (Web API, MVC)
Databases: Microsoft SQL Server, PostgreSQL
Systems & Development Tools: Docker, Git

Publications

Published and Accepted

- N. Fathi, H. Unno, T. Terauchi, and R. Purandare, "Sound Termination and Non-Termination Analysis of C Programs with Bit-Precise Bounded Semantics and Advanced Constructs," accepted to appear in *Proceedings of the ACM International Conference on the Foundations of Software Engineering (FSE)*, 2026.
- A. Kalaee, S. Parsa, and N. Fathi, "COSMOS: A Comprehensive Framework for Automatically Generating Domain-Oriented Test Suite," *Information and Software Technology*, vol. 154, p. 107091, Feb. 2023, doi: 10.1016/j.infsof.2022.107091.

Preprints and Under Review

- Anonymized Manuscript on Hybrid Analysis of Program Termination and Non-Termination through Program Refinement, under review, 2026.
- N. Fathi, "EDFNet: Early Fusion of Edge and Depth for Thin-Obstacle Segmentation in UAV Navigation," *arXiv preprint* arXiv:2604.09694, under review at *Machine Vision and Applications*, 2026.

Experience

Teaching Assistant *Aug. 2025–Present*
University of Nebraska–Lincoln, Lincoln, NE, USA

- Assisted in teaching undergraduate and graduate computer science courses, supported students with course material, graded assignments and exams, and held office hours.
- Courses: CSCE 322 (Programming Language Concepts); CSCE 423/823 (Design and Analysis of Algorithms).

Graduate Research Assistant *Aug. 2023–Jul. 2025*
University of Nebraska–Lincoln, Lincoln, NE, USA
Advisor: Dr. Rahul Purandare

- Applied formal methods and program analysis techniques to verify safety and liveness properties, with a particular emphasis on termination and non-termination reasoning.

Selected Projects

- **Athena** Developed a sound framework for termination and non-termination analysis of C programs with bit-precise bounded semantics and support for advanced constructs.
- **FocusTNT** Developed a lightweight preprocessing framework for termination and non-termination analysis of C/C++ programs using loop-based slicing and input-driven concretization.
- **COSMOS** Developed a framework for automatically generating domain-oriented test inputs from program path constraints.
- **CleanCode** Developed a Roslyn-based static analysis tool for checking naming, method-structure, and complexity-related clean-code practices in C# programs.
- **SoftModules** Developed a software modularization and architecture recovery tool based on class-level dependency analysis.
- **ModelTests** Developed an object-oriented C# project with interface-based design, stubs, and NUnit-based unit testing.
- **EDFNet** Developed an early-fusion semantic segmentation framework for thin-obstacle detection in UAV navigation using RGB, depth, and edge cues on the DDOS dataset.
- **TaxiClusters** Developed a spatial trajectory analysis project using preprocessing and DBSCAN clustering on large-scale taxi data.
- **WarehouseDB** Developed a warehouse management system integrating PostgreSQL, SQL procedures/functions, and a C# Windows Forms application.
- **SyncAsync** Developed a client-server project comparing synchronous and asynchronous communication using a WCF service and Windows Forms clients.
- **HospitalFlow** Developed a hospital workflow modeling and improvement project for analyzing current processes and proposing future operational workflows.

Certifications

- Oregon Programming Languages Summer School (OPLSS): Types, Logic, and Formal Methods, University of Oregon, *Jun. 2025*
- Oregon Programming Languages Summer School (OPLSS): Types, Semantics, and Applications, Boston University, *Jun. 2024*

- ASP.NET MVC, Information Technology Learning Lab (LAITEC), Sharif University of Technology, *Nov. 2020*
- ASP.NET, Information Technology Learning Lab (LAITEC), Sharif University of Technology, *Oct. 2019*
- C# Programming, Information Technology Learning Lab (LAITEC), Sharif University of Technology, *Jan. 2019*

Honors & Awards

- Othmer Fellowship, University of Nebraska–Lincoln, *2023–2026*
- Ranked 1st among M.Sc. students in Computer Engineering, Iran University of Science and Technology, *2021*
- Ranked 1st among B.Sc. students in Computer Engineering, Babol Noshirvani University of Technology, *2017*

Languages

Persian (Native), English (Fluent)

Last updated: April 23, 2026