

Mohammad Jalili Torkamani

Computer Science Ph.D. Candidate | AI4SE Researcher | AI Software Engineer

✉ mjt2024@gmail.com – 🌐 MJalili.com

🐙 github.com/MJaliliT – 🔗 linkedin.com/in/MJaliliT

EDUCATION

PhD, Computer Science

Jan 2024 – Exp. Dec 2028

University of Nebraska–Lincoln (UNL)

GPA: 3.9/4.0

Dissertation: Automated generation of program assertions and verification conditions using generative AI and search-based techniques

Master of Science, Computer Science

Jan 2024 – Dec 2025

University of Nebraska–Lincoln (UNL)

GPA: 4.0/4.0

Dissertation: LLM-assisted CWE identification, severity assessment, and vulnerability description generation

Bachelor of Science, Computer Engineering

Sep 2016 – Sep 2020

K. N. Toosi University of Technology (KNTU)

GPA: 3.2/4.0

SKILLS

Programming: Python, Java, C/C++, Bash

Software Engineering: Git, Docker, CI/CD, System Design, Program Analysis, Static Code Analysis, Dafny, OOP, Algorithm design, Data structures, Scalable System Design, Program Comprehension, Software Documentation

AI & Large Language Models: PyTorch, LangChain, Fine-Tuning, Prompt Engineering (Few-shot, CoT/ToT), RAG, Model Training, Feature Engineering, Inference Pipelines, Model Deployment

Backend: FastAPI, REST APIs, Microservices, JWT, Nginx

Distributed Systems: AWS, Kafka, Redis, Celery, Asynchronous Programming

Software Security: API Security, Vulnerability Analysis

Software Testing & Reliability: Unit Testing, Test-Driven Development (TDD), Test automation, Debugging, Profiling

Databases & Storage: PostgreSQL, MySQL, MongoDB, Redis, Schema Design, Data Modeling

OS: Linux Ubuntu, Windows, Macintosh

ACADEMIC EXPERIENCE

Research Assistant

Jun 2026 – Present

University of Nebraska–Lincoln

- Engineered Python- and Java-based frameworks for mining, classifying, and analyzing production assertions across +500 open-source Java repositories.
- Designed scalable program-analysis and repository-mining pipelines for extracting, classifying, and analyzing production assertions across Java repositories.
- Fine-tuned and evaluated large language models for production assertion generation, program comprehension, and software vulnerability understanding.
- Automated assertion validation and evaluation workflows by integrating static analysis, compilation, statistical analysis, and reproducible experimentation pipelines.
- Produced reproducible AI4SE research artifacts supporting empirical studies on software quality and developer productivity.

Teaching Assistant

Jan 2026 – May 2026

University of Nebraska–Lincoln

- Course:** Introduction to Computer Engineering (CSCE-164)
- Guided laboratory sessions covering binary number systems, Boolean algebra, digital logic, combinational and sequential circuits, and computer engineering fundamentals.
- Mentored students in Arduino programming, embedded system development, circuit implementation, debugging, and hardware–software integration.
- Evaluated laboratory assignments, programming projects, quizzes, and examinations while providing technical feedback during office hours.

Research Assistant

Jan 2024 – Dec 2025

University of Nebraska–Lincoln

- Developed Python- and Java-based frameworks for automated software vulnerability identification, CWE classification, CVSS severity prediction, and vulnerability report generation using large language models.
- Designed scalable data-processing pipelines for CVE, CWE, and CVSS datasets, enabling empirical software security studies across thousands of vulnerability records.
- Fine-tuned and benchmarked open-source and API-based LLMs for vulnerability understanding, CWE prediction, and severity estimation under multiple prompting and input configurations.
- Automated benchmarking and evaluation pipelines for statistical analysis, model comparison, and reproducible vulnerability prediction experiments.
- Collaborated with interdisciplinary research teams on AI-driven software security, vulnerability, and program analysis research.

Teaching Assistant

Sep 2017 – Jan 2018

K. N. Toosi University of Technology

- **Course:** Advanced Programming
- Assisted in teaching object-oriented programming concepts using Java through laboratory sessions and office hours.
- Mentored students in Java programming, debugging techniques, object-oriented design, and software development best practices.
- Evaluated programming assignments, projects, and examinations while providing constructive technical feedback.

Teaching Assistant

Jan 2017 – Jun 2017

K. N. Toosi University of Technology

- **Course:** Fundamentals of Computer Programming
- Assisted in teaching fundamental programming concepts using C/C++, including variables, control structures, functions, arrays, pointers, and basic data structures.
- Guided students through programming laboratories, debugging techniques, and problem-solving strategies while providing technical support during office hours.
- Evaluated programming assignments, laboratory exercises, and examinations, providing timely and constructive feedback to enhance student learning.

INDUSTRY EXPERIENCE

Software Engineer

Apr 2022 – Jul 2022

Arzyaban Salamat Pars Company

- Led the design and development of a production-grade internal web application supporting organizational workflows.
- Implemented backend business logic, relational database models, and RESTful services for internal operations.
- Collaborated with cross-functional teams on deployment, testing, and release activities to improve software reliability.

Software Engineer

Oct 2018 – May 2020

Medreek (Ayandeh Sazan) Publication

- Developed an AI-assisted Android application for personalized study planning targeting high-school students.
- Implemented recommendation logic and mobile application features using Java and Android SDK.
- Optimized application usability to improve the student learning experience.

Founding Software Engineer

Oct 2016 – Oct 2019

SeedS/Lexen Software Startup

- Led hands-on workshops on neural networks, introducing 10+ undergraduate students to machine learning concepts and practical model development.
- Designed and delivered Android application development workshops using Java for approximately 20 undergraduate students.
- Mentored students in software design, debugging, and mobile application development through project-based learning.

Software Engineering Internship

Jul 2019 – Sep 2019

Sarmad Insurance

- Developed an Android application for calculating insurance premiums based on business rules provided by Sarmad Insurance.
- Implemented premium calculation logic and intuitive user interfaces using Java and Android SDK.
- Worked closely with company engineers to validate business rules and application functionality.

SELECTED PROJECTS

ASSERTION STUDY – Empirical Study of Production Assertions in Open-Source Java Software

- Designed a large-scale empirical study to investigate how production assertions are distributed, written, maintained, and used across open-source Java repositories.
- Built Python and Java mining pipelines to extract, classify, and analyze production assertions from hundreds of repositories using program-analysis and repository-mining techniques.
- Conducted developer-centered analysis through a human survey to understand why developers write assertions, how they perceive assertion usefulness, and what challenges they face when using them in production code.

CASEY – LLM-assisted CWE identification, severity assessment, and vulnerability description generation

- Engineered a Python-based framework for automated software vulnerability understanding, including CWE classification, CVSS severity prediction, and vulnerability report generation using large language models.
- Benchmarked open-source and closed-source LLMs across fine-tuning strategies, and source-code granularity levels for software vulnerability analysis.
- Designed modular, reusable pipelines for automated vulnerability analysis, evaluation on thousands of vulnerabilities, and reproducible experimentation.

ASSERTIFY – LLM-Based Production Code Assertion Generator

- Designed an automated framework for generating production assertions from Java source code using large language models and structured prompting.
- Integrated JavaParser-based static analysis, compilation, and automated test execution into a unified assertion validation pipeline.
- Implemented reusable Python and Java components supporting reproducible AI-assisted software quality workflows.

KAJAL – AI-Assisted Source Code Grammar Extraction and Program Understanding

- Designed an LLM-based framework that automatically infers source-code grammars from software repositories to support program comprehension and software analysis.
- Developed modular Python pipelines for analyzing software artifacts and generating structured representations suitable for downstream software engineering tasks.
- Investigated the use of large language models to support software comprehension, documentation, and AI-assisted program analysis.

SELECTED PUBLICATIONS

- **M.J. Torkamani**, A. Sharma, N. Mehrotra, R. Purandare, "Automatic Generation of Java Production Assertions Using Large Language Models.", *ACM Transactions on Software Engineering and Methodology*, (Under Review)
- **M.J. Torkamani**, N. Mehrotra, M. Rashedul Hasan, H. Bagheri, B. Sharif, R. Purandare, "The Impact of Code Granularity on LLM-Based Vulnerability Understanding: CWE Identification, Severity Assessment, and Description Generation.", *IEEE Transactions on Software Engineering*, (Under Submission)
- **M.J. Torkamani**, J. NG, N. Mehrotra, M. Chandramohan, P. Krishnan, R. Purandare, "Streamlining security vulnerability triage with large language models.", arXiv preprint, 2501.18908.
- K. Kiashemshaki, **M.J. Torkamani**, N. Mahmoudi, "Secure coding for web applications: Frameworks, challenges, and the role of LLMs.", arXiv preprint, 2507.22223.
- **M.J. Torkamani**, N. Mahmoudi, K. Kiashemshaki, "LLM-Driven adaptive 6G-ready wireless body area networks: Survey and framework.", arXiv preprint, 2508.08535.
- K. Kiashemshaki, EN. Chukwuani, **M.J. Torkamani**, N Mahmoudi, "Secure and scalable blockchain voting: A comparative framework and the role of large language models.", arXiv preprint, 2508.05865.
- **M.J. Torkamani**, A. Sharma, N. Mehrotra, R. Purandare, "ASSERTIFY: Utilizing large language models to generate assertions for production code.", arXiv preprint, 2411.16927.
- K. Kiashemshaki, **M.J. Torkamani**, N. Mahmoudi, M.S. Bilehsavar, "Simulating a bias mitigation scenario in large language models.", arXiv preprint, 2509.14438.
- **M.J. Torkamani**, "Kajal: Extracting grammar of a source code using large language models.", arXiv preprint, 2412.08842.

SERVICE & OUTREACH

Volunteer Coding Mentor — SoC CLICKS | *University of Nebraska–Lincoln, 2026*

- Mentored middle-school students in Python programming, computational thinking, and problem-solving activities.
- Supported university-led outreach initiatives promoting computer science and STEM education among K–12 students.

Coding for Kids Outreach Volunteer | *University of Nebraska–Lincoln, 2025*

- Guided children under age 10 through interactive, game-based coding activities introducing basic programming concepts.
- Assisted participants with problem-solving tasks and beginner-friendly computational thinking exercises.

HONORS & AWARDS

- **Ranked in the top 1%** among 162,000+ participants for undergraduate entrance.
- **Awarded full graduate funding** during graduate studies.
- **Awarded full merit-based scholarship** during undergraduate studies.
- Currently participating in the **National Science Foundation (NSF) I-Corps entrepreneurship Program** in Lincoln, NE.

CERTIFICATIONS

- CITI Program: Social/Behavioral Research Investigators and Key Personnel (Valid: 2026–2029).
- National Science Foundation (NSF) I-Corps Entrepreneurship Program (In Progress), 2026.
- Neural Networks and Deep Learning, Coursera, 2023.
- AI for Everyone, Coursera, 2022.
- Python for AI, Development, and Data Science, Coursera, 2022.

REFERENCES

Will be provided upon request.