

Mehrad Haghshenas

PHD, UNIVERSITY OF WATERLOO

Canada

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Research Interests

Formal Verification

Automated Theorem Proving

Programming Languages

Static Analysis

Compilers

Functional Programming

Education

University of Waterloo

Canada

PH.D. IN COMPUTER SCIENCE (MEMBER OF THE CRYSP LAB)

Expected: Jan. 2029

- Cumulative GPA: **94.00 / 100.00**.
- Working on a *Semantics-Directed Conformance Testing using SMT-based Program Synthesis*. The work contains developing a Rust-based transpiler that converts programs into SMT-LIB formulas. It is used to model the While interpreter, synthesize error-triggering programs using SMT solvers & detect conformance errors across different interpreter implementations (enumerative testing). The project is supervised by Dr. Meng Xu.

Utrecht University

Netherlands

COMPUTING SCIENCE

Graduation: Jan. 2024

- Cumulative GPA: **3.94 / 4.00** (*Summa cum laude*).
- Thesis: *Automated Verification of Hoare Triples: A Comparative Study on Static Inference of Loop Invariants* – Grade: **4.00 / 4.00**, supervised by Dr. S.W.B. Wishnu Prasetya and Prof. dr. ir. Frank van der Stappen.

Awards

2025 **International Doctoral Student Award (IDSA)**, Awarded by the University of Waterloo.

Canada

2023 **Scholarship**, Awarded by Utrecht University.

Netherlands

Work Experience

Shopify

Canada

SOFTWARE DEVELOPER INTERN

Jan. 2026 - May 2026

- Offer Accepted.

ABN AMRO

Netherlands

FULL-TIME MAINFRAME DEVELOPER

Mar. 2024 - Dec. 2024

- Reviewed and refactored legacy COBOL code. Investigated automated testing frameworks (*Topaz for Total Test*). Updated technical documentation. Collaborated in Agile teams following Scrum methodologies.

Hudson Dynamics B.V.

Netherlands

EMBEDDED SOFTWARE ENGINEER INTERN

Jun. 2023 - Dec. 2023

- Worked on the development of automated vehicles. Programmed the robotic arm of an electric loader to ensure precise vertical lift path control. Designed its control system using Parker IQAN software. Modeled the arm's search space with Denavit–Hartenberg notation and applied forward and inverse kinematic analysis.

Volunteering Activities

Artifact Evaluation Committee

PoPETs

PROGRAM COMMITTEE MEMBER

Oct. 2025

- Served on the committee for the Proceedings on Privacy Enhancing Technologies symposium, reviewing the *ReporTor: Facilitating User Reporting of Issues Encountered in Naturalistic Web Browsing via the Tor Browser* artifact to ensure reproducibility.
- Contributed to the open science mission by providing feedback to authors on artifact quality, completeness, and reusability.

Hack the North

University of Waterloo

PARTICIPANT

12 – 14 Sep. 2025

- We developed *CodeMind*, a local-first, searchable timeline tool that documents AI coding sessions. The tool uses a custom Model Context Protocol (MCP) server to ingest sessions from Cursor/Claude, and an OpenAI-based LLM to extract and index key information.

Rust Z3 bindings

GitHub

OPEN-SOURCE CONTRIBUTOR TO THE [Z3 Rust API](#).

Sep. 2025

- Contributed feature enhancements including floating-point NaN constructors, Int–Real mixed arithmetic, 128-bit integer support, string comparison, sequence utilities, and rounding-mode APIs. Implemented correctness fixes such as improved handling of *Probe::lt* arguments and model retrieval documentation. Authored the [Rust bindings guide](#), published on the official Z3 project website.

Stanford University Code in Place

VOLUNTEER TUTOR

- Volunteer tutor for Stanford's Code in Place (2023, 2024, 2025), mentoring 15 students over 6 weeks each year.

Online

Apr.–May 2023, 2024, & 2025

Formal Methods Europe

MEMBER

- An organization that promotes research in formal methods to improve software and hardware systems.

Europe

Oct. 2023 – Present

Utrecht University Hackathon

PARTICIPANT

- Co-hosted by SUE Co., the event focused on the applications of AI in Software Development, GitHub Copilot, and AWS.

Netherlands

24 – 25 May 2023

TEDx Organizing Committee

ORGANIZING COMMITTEE VOLUNTEER, TEDx EVENT.

- Served on the organizing committee for a TEDx event focused on the themes Fight or Flight and Sustainability.

Netherlands

15 Apr. 2023

Teaching Assistant

Software and Systems Security

CS 453 / 698 @ UNIVERSITY OF WATERLOO

- Authored Assignment 2 for CS 453/698, designed to teach students fuzzing, differential testing, and reducing test cases via delta debugging.

Canada

May 2025 - Aug. 2025

Introduction to Computer Science 2

CS 116 @ UNIVERSITY OF WATERLOO

- Graded assignments on the fundamentals of programming.

Canada

Jan. 2025 - May 2025

Summer School

Queen Mary University of London

THREE-WEEK COURSE: *Business and Society: The Changing World of Work*

- 15 UK credits (7.5 ECTS); grade: **A** (75.6/100).

England

Jul. 2022–Aug. 2022

Utrecht University

ONE-WEEK COURSE ON *Advanced Functional Programming in Haskell* (DR. WOUTER SWIERSTRA)

- No exam was administered.

Netherlands

Jul. 2022

Miscellaneous

Languages

English (**IELTS 8.5**, taken on Nov. 3, 2023), Persian (native), French (A1).

Programming

Rust, Coq, C, Python, Haskell, Java, COBOL, MATLAB, JavaScript, R, SQL, C#.

Relevant Courses

Software & Systems Security, Languages & Compilers, Functional Programming, Software Testing & Verification, Logic for Computer Science, Operating Systems, Software Verification Using Proof Assistants.