

# Mehrad Haghshenas

PHD, UNIVERSITY OF WATERLOO

Canada

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## Research Interests

Formal Verification

Automated Theorem Proving

Programming Languages

Static Analysis

Logic

Functional Programming

## Education

### University of Waterloo

Canada

PH.D. IN COMPUTER SCIENCE

Exp Graduation: Jan. 2029

- **Supervisor:** Dr. Meng Xu.
- *Currently working on developing a Rust-based transpiler and DSL that converts Rust programs and specifications into SMT-LIB formulas for automated formal verification of program semantics.*

### 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**.
- **Supervisors:** Dr. S.W.B. Wishnu Prasetya, Prof. dr. ir. Frank van der Stappen.

## Awards

2025 **International Doctoral Student Award (IDSA)**, From *University of Waterloo*.

Canada

2023 **Granted Scholarship**, From *Utrecht University*.

Netherlands

## Work Experience

### ABN AMRO

Netherlands

MAINFRAME DEVELOPER

Mar. 2024 - Dec. 2024

- As a full-time mainframe developer, I had the following responsibilities:
  - Reviewed and refactored legacy COBOL code to align with modern standards.
  - Investigated automated testing frameworks for mainframe applications.
  - Worked in Agile teams, following Scrum methodologies.
  - Wrote and maintained technical documentation.

### Hudson Dynamics B.V.

Netherlands

EMBEDDED SOFTWARE ENGINEER INTERN

Jun. 2023 - Dec. 2023

- This company works in the field of automated vehicles. I had the following responsibilities:
  - Programming the robotic arm of an electric loader to ensure precise vertical lift path control.
  - Modeling the search space of the arm using the Denavit-Hartenberg Notation and employing forward and inverse kinematic analysis.
  - Designing the control system using Parker IQAN Software for optimal performance.

## Volunteering Activities

### Rust bindings for the Z3 SMT solver

GitHub

OPEN-SOURCE CONTRIBUTOR

2025

- Contributed pull requests to the [Z3 Rust API](#).
- Authored the [Rust binding guide](#), published on the Z3 project website.

### Rust bindings for the Z3 SMT solver

GitHub

OPEN-SOURCE CONTRIBUTOR

2025

- Contributed pull requests to the [Z3 Rust API](#) repository.

### Stanford University

Online

A VOLUNTEER TUTOR IN STANFORD UNIVERSITY CODE IN PLACE

Apr. – May 2023, 2024, & 2025

- Organized by Stanford, I served as a volunteer tutor in 2023, 2024, & 2025, mentoring 15 students over a 6-week online period.

### Formal Methods Europe (FME)

Europe

MEMBER

6 Oct. 2023 - Present

- An organization encouraging the research of formal methods for the improvement of software and hardware systems.

## **Utrecht University**

HACKATHON

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

Netherlands

24, 25 May 2023

## **TEDx Organizing committee**

A VOLUNTEER FOR ORGANIZING A TEDx EVENT

- I volunteered at a TEDx event centered around the theme *Fight or Flight* and *sustainability*.

Netherlands

15 Apr. 2023

# Teaching Assistant

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## Software and Systems Security

Canada

CS 453 / 698 @ UNIVERSITY OF WATERLOO

May 2025 - Aug. 2025

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

## Introduction to Computer Science 2

Canada

CS 116 @ UNIVERSITY OF WATERLOO

Jan. 2025 - May 2025

- Grading assignments on the fundamentals of programming.

# Summer School

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## Queen Mary University of London

England

THREE WEEK COURSE ON BUSINESS AND SOCIETY: THE CHANGING WORLD OF WORK.

Jul. 2022 - Aug. 2022

- 15 UK Credits (7.5 ECTS), A (75.6 / 100.00).
- Final Project on *Artificial Intelligence in Business and Society*.

## Utrecht University

Netherlands

1 WEEK COURSE BY DR. WOUTER SWIERSTRA ON ADVANCED FUNCTIONAL PROGRAMMING IN HASKELL.

Jul. 2022

- No exam was administered.

# Miscellaneous

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### Languages

English (**IELTS: 8.5**, taken on 3<sup>rd</sup> of Nov. 2023), Persian (Native).

### 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.