

# Sara Baradaran

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## EDUCATION

**Ph.D. in Computer Science, GPA: 4.0/4.0**

University of Southern California

Aug 2023–Present

Los Angeles, USA

**B.Sc. in Computer Engineering, GPA: 19.49/20 (or 4.0/4.0)**

Isfahan University of Technology

Sep 2017–Feb 2022

Isfahan, Iran

– **Thesis Title:** Automatic detection of stack-based buffer overflow vulnerability in binary executables

## RESEARCH INTERESTS

Software Security

Program Analysis

Software Testing and Verification

Binary Code Analysis

Automated Reasoning

ML/AI for Software Engineering

## RESEARCH EXPERIENCE

**Research Assistant at Program Reasoning Lab**

University of Southern California

Aug 2023–Present

Los Angeles, USA

- **Project Title:** Probabilistic Bayesian reasoning about code
- Proposed an approach that probabilistically views the fault localization task. It models error propagation as Bayesian networks and combines it with counterfactual program reasoning techniques.

**Research Assistant at Intelligent Mobile Networks Lab**

Isfahan University of Technology

Nov 2022–Feb 2023

Isfahan, Iran

- **Project Title:** Design and implementation of a testbed for intelligent 5G networks

**Research Assistant at Software Security Lab**

Isfahan University of Technology

Dec 2020–Oct 2022

Isfahan, Iran

- **Project Title:** Automatic detection of software vulnerabilities using binary analysis and ML techniques
- Particularly worked on memory corruption vulnerabilities in executable code of C/C++ programs
- Proposed an approach that uses static analysis to extract vulnerability specifications + targeted symbolic execution for generating appropriate function inputs that reach vulnerable code in a vulnerable function + curve fitting to approximate the relation between function inputs and program inputs to generate global inputs causing vulnerability activation.

## PUBLICATIONS

- [1] **S. Baradaran**, Y. Huang, W. Le, and M. Raghothaman, “Prosecutor: Bayesian Counterfactual Fault Localization”, *In Submission*, 2025.
- [2] S. Ganji, S. Behnaminia, A. Ahangarpour, E. Mazaheri, **S. Baradaran**, Z. Zali, M. R. Heidarpour, A. Rakhshan, and M. F. Shoyari, “CN2F: A Cloud-Native Cellular Network Framework”, *Cluster Computing*, vol. 28, p. 493, 2025. DOI: 10.1007/s10586-025-05155-w.
- [3] **S. Baradaran**, L. Huang, M. Raghothaman, and W. Wang, “Reusing Legacy Code in WebAssembly: Key Challenges of Cross-Compilation and Code Semantics Preservation”, 2024. DOI: 10.48550/arXiv.2412.20258.
- [4] **S. Baradaran**, M. Heidari, A. Kamali, and M. Mouzarani, “A Unit-based Symbolic Execution Method for Detecting Memory Corruption Vulnerabilities in Executable Codes”, *Int. J. Inf. Secur.*, vol. 22, pp. 1277–1290, 2023. DOI: 10.1007/s10207-023-00691-1.
- [5] M. Mouzarani, A. Kamali, **S. Baradaran**, and M. Heidari, “A Unit-based Symbolic Execution Method for Detecting Heap Overflow Vulnerability in Executable Codes”, in *Tests and Proofs*, L. Kovács and K. Meinke, Eds., Cham: Springer International Publishing, 2022, pp. 89–105. DOI: 10.1007/978-3-031-09827-7\_6.

## ACADEMIC SERVICE

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- Journal Reviewer: Transactions on Software Engineering and Methodology (TOSEM 2025)
- Artifact Evaluation Committee: The Annual Computer Security Applications Conference (ACSAC 2025)

## TEACHING EXPERIENCE

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### Teaching Assistant

University of Southern California

Los Angeles, USA

- Introduction to Operating Systems
- Security Systems

Spring 2025

Fall 2024

### Teaching Assistant

Isfahan University of Technology

Isfahan, Iran

- Advanced Programming Lab
- Operating Systems Lab
- Fundamentals of Computer Security
- Compiler Design
- Algorithm Design and Analysis
- Discrete Mathematical Structures
- C Programming Lab

Spring 2023

Fall 2021, Fall 2022

Spring 2021

Spring 2020, Fall 2020, Spring 2022

Spring 2020, Spring 2022

Spring 2019

Fall 2018, Spring 2019

## HONORS AND AWARDS

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- **Ranked 1st** in the Electrical and Computer Engineering Department of Isfahan University of Technology, among more than 280 undergraduate students 2017–2022
- **Ranked top 0.5%** in the National Entrance Exam for B.Sc. of Iran, among more than 148,000 students in the field of Mathematics and Physics Aug 2017
- **Scored 2nd** place of junior soccer open weigh league in the RoboCup IranOpen International Competitions Apr 2015

## SKILLS

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- **Programming Languages:** Python, C, C++, Java, MATLAB, R, JavaScript
- **Database Languages:** SQL, Datalog
- **Assembly Languages:** MIPS, x86/x64, WebAssembly, AVR
- **Frameworks and Libraries:** Angr, Soot, Doop, Beautiful Soup, Scikit, PyTorch, TensorFlow, Keras, Scapy, Selenium, Qt
- **Tools:** LLVM, GDB, Docker, Git, Burp Suite, Wireshark, Nmap, Cisco Packet Tracer, Flex, Bison, Microsoft SQL Server
- **Operating Systems:** Linux, Windows, macOS
- **Technical Skills:** Program Analysis, Software Testing, Machine Learning, Web Security Analysis, Binary Analysis

## REFERENCES

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### Dr. Mukund Raghothaman

Assistant Professor of Computer Science  
University of Southern California  
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### Dr. Weihang Wang

Assistant Professor of Computer Science  
University of Southern California  
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### Dr. Wei Le

Associate Professor of Computer Science  
Iowa State University  
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