Mohsen EsfandyariDoulabi

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SUMMARY

Ph.D. student focused on optimizing LLM agents, building agentic/LLM-driven testing pipelines, triaging crashes and minimizing reproducers for LLVM, GCC and WebAssembly runtimes, resulting in **190+** bug reports across LLVM, GCC, WebAssembly runtimes and deep learning libraries. Five prior years in industry: software engineering, systems programming, and security engineering.

EDUCATION

North Carolina State University — Ph.D. Computer Science | GPA 3.7 | Advisor: Prof. Marcelo d'Amorim — Aug 2024 – present
North Carolina State University — M.S. Computer Science (en route) | GPA 3.7 — Aug 2024 – Sep 2026
Azad University — B.Sc. Computer Engineering | GPA 3.7 | Tehran, Iran — Nov 2017 – Apr 2022

RESEARCH EXPERIENCE

Research Assistant — SWAT Lab, North Carolina State University — Jan 2025 – present

- Built a run-level failure-prediction framework for LLM agents, after showing the field's standard metric tracks task difficulty rather than whether a given run will fail; the budget-allocation design reaches 3.1× throughput.
- Built a containerized evaluation harness over SWE-bench Verified isolating agent-skill exposure as the sole treatment, turning a widely held assumption about community agent skills into a controlled result.
- Drive compiler fuzzing with coverage guidance and agentic AI across Clang/LLVM and GCC, replacing hand-written test cases with agent-driven synthesis.
- Fuzz four WebAssembly runtimes (Wasmtime, WAMR, WasmEdge, Wasmer), JAX and PyTorch with differential-testing pipelines — **190+** bug reports in total, with fixes contributed upstream.

PUBLICATIONS

1. **Predicting the Run, Not the Task: Failure Prediction for LLM Agents. M. EsfandyariDoulabi**, M. d'Amorim. FSE 2027 — under review
2. **Left Behind, Not Forgotten: Reusing Regression Tests to Find Bugs in WebAssembly Runtimes.** I. Hayat, **M. EsfandyariDoulabi**, G. Merabishvili, M. d'Amorim. IEEE TSE 2027
3. **Demystifying Coverage-Guided Compiler Fuzzing. M. EsfandyariDoulabi**, I. Hayat, L. Liu, M. d'Amorim. ICSE 2027 — under review
4. **MetaGlitch: Physics-Grounded Metamorphic Testing for Video Game Testing.** G. Merabishvili, **M. EsfandyariDoulabi**, M. d'Amorim. ICSE 2027 — under review
5. **Adaptive Ensemble Learning for Software Defect Prediction. M. EsfandyariDoulabi**, A. EsfandyariDoulabi, J. Khaligh. *ICCKE 2025*

INDUSTRY EXPERIENCE

System Developer — Behin Afzar, Tehran, Iran — Feb 2024 – Jul 2024

- Engineered a firewall in C for IPv4, TCP/UDP, DNS and HTTP traffic, with a domain/CIDR rule engine that compiles matches into iptables policies and emits structured audit trails for compliance review.

Security Engineer — ShahrDI, Tehran, Iran — Jun 2021 – Feb 2024

- Automated vulnerability management end to end in Python and Bash including CVE tracking and patch-compliance verification, with anomaly detection and audit-grade logging relied on in regulatory review; led production hardening and ran secure-coding training for development teams.

SIEM Engineer — APK Group, Tehran, Iran — May 2020 – Jun 2021

- Detection engineering for a security operations center: authored SIEM use cases, IOC extraction parsers and analyst dashboards in Python, plus correlation logic across heterogeneous log sources that suppressed false positives and reconstructed complete attack chains.

Network Engineer — Shatel, Tehran, Iran — Apr 2019 – May 2020

- Managed Linux and Windows server estates and core network services (DNS, DHCP, VPN) for ISP subscribers, with scripted diagnostics and repeatable incident playbooks that cut escalation volume.

TEACHING

Teaching Assistant — NC State: CSC 216 Software Development Fundamentals, CSC 326 Software Engineering, CSC 474 Network Security, CSC 574 Computer & Network Security (2024–26). Azad University: Operating Systems, Artificial Intelligence, Internet Engineering (2019–22).

TECHNICAL SKILLS

Languages: C, C++, Python, Go, Assembly, Bash
Testing & Analysis: Fuzzing, differential testing, static & dynamic analysis, WebAssembly runtime analysis, SWE-bench Verified
AI & Agents: LangChain, Hugging Face, agentic frameworks, LLM-powered test generation, JAX, PyTorch
Systems, Cloud & Web: Linux (RHEL/Debian), Windows Server, Docker, AWS, VMware, QEMU, Git, JavaScript, PHP, REST, GraphQL

REFERENCE

Prof. Marcelo d'Amorim — North Carolina State University · mdamori@ncsu.edu · +1 (919) 515-3644