ALI SHOKRI

Ph.D. in Computing and Information Sciences
Postdoctoral Associate | Systems Software Research Group, Bradley dept. of ECE, Virginia Tech, VA, USA

http://a-shokri.github.io
http://linkedin.com/in/a-shokri
ashokri@vt.edu | alishok62@gmail.com

My research advances automated software engineering and security, with an emphasis on program analysis, synthesis, and formally verified LLM-based methods. Drawing on extensive industry experience, I address practical challenges in software engineering. My Ph.D. work received a first-place award at ASE'21 for an innovative inter-procedural program synthesis approach, and my papers have been accepted at top venues, including ICSE, OOPSLA, ASE, ICSA, and ICPC. Currently, my postdoctoral research focuses on the combination of formal verification and LLMs with applications in software productivity and quality. My goals include ML-supported program synthesis, large-scale code repair, and self-reconfigurable software. Alongside academic contributions, I have submitted grant proposals as PI and co-PI, reflecting my commitment to impactful research.

Education

Ph.D. Computing and Information Sciences (Jan 2018 – Jun 2023)

Rochester Institute of Technology (RIT) - NY, USA

- Topic: Inter-procedural Program Synthesis
- Advisor: Dr. Mehdi Mirakhorli

M.Sc. Information Technology Engineering (Feb 2011 – Jan 2014)

Tarbiat Modares University (TMU) - Tehran, Iran

- Topic: Path Planning in Modular Robots
- Advisor: Dr. Ellips Masehian

B.Sc. Software Engineering (Sep 2001- Sep 2007)

University of Tehran (UT) - Tehran, Iran

- Topic: Software Development Life Cycle
- Advisor: Dr. Khansari

Awards

Research Competition

ASE'21, an A* conference in Software Engineering (2021)

- First-place Award Winner

Research Scholarship

Data61, a world leader in Data Science research (2018)

- Prestigious Research Scholarship

Admission and Fellowship

University of Melbourne, ranked 30th worldwide (2018)

- Ph.D. Admission and Fellowship

Iran Nation-wide University Exam

- Among the top 0.1% of participants (B.Sc.) (2001)

Publications

Inventions and Patents

- ”A method for deriving mathematical models from embedded code using a modified genetic algorithm to perform a symbol-to-variable mapping”, Registration date: June 24, 2022, filed as a US Patent.
- ”An SMT-based approach for extracting mathematical models from binaries”, Registration date: June 24, 2022, On its way to being filed as a US Patent.

Conference Papers (Accepted/Under review)

- Verbeek, F**., Shokri, A.**, Engel, D., Ravindran, B., Formally Verified Binary-level Pointer Analysis. 2025 IEEE/ACM 47th International Conference on Software Engineering (ICSE).
- Santos, J. C. S., Mirakhorli, M., & **Shokri, A.** (2024). Seneca: Taint-Based Call Graph Construction for Java Object Deserialization. Proc. ACM Program. Lang., 8 (OOPSLA1).
- **Shokri, A.**, Mujhid, IJ, Mirakhorli, M., IPSynth: Interprocedural Program Synthesis for Software Security Implementation (2024).
- **Shokri, A.**, Perez, A., Chowdhury, S., Zeng, C., Kaloor, G., Matei, I., ... & Rane, S. (2023). CONSTRUCT: A Program Synthesis Approach for Reconstructing Control Algorithms from Embedded System Binaries in Cyber-Physical Systems. arXiv preprint arXiv:2308.00250.
- Okutan, **A., Shokri**, A., Koscinski, V., Fazelinia, M., & Mirakhorli, M. (2023). A Novel Approach to Identify Security Controls in Source Code. arXiv preprint arXiv:2307.05605.
- **Shokri, A.**, “A Program Synthesis Approach for Adding Architectural Tactics to An Existing Code Base”, In 2021 36th IEEE/ACM International Conference on Automated Software Engineering (ASE) (pp. 1388-1390). IEEE.
- **Shokri, A.** and Mirakhorli, M., 2021. DepRes: A Tool for Resolving Fully Qualified Names and Their Dependencies. arXiv preprint arXiv:2108.01165.
- **Shokri, A.** and Mirakhorli, M., “ArCode: A Tool for Supporting Architectural Concerns Comprehension and Implementation”, In 2021 29th IEEE/ACM International Conference on Program Comprehension (ICPC) (pp. 485-489). IEEE.
- **Shokri, A.**, Santos, J.C. and Mirakhorli, M., 2021, March. ArCode: Facilitating the Use of Application Frameworks to Implement Tactics and Patterns. In 2021 IEEE 18th International Conference on Software Architecture (ICSA) (pp. 138-149). IEEE.

- Santos, J.C., **Shokri, A.** and Mirakhorli, M., 2020, October. Towards Automated Evidence Generation for Rapid and Continuous Software Certification. In 2020 IEEE International Symposium on Software Reliability Engineering Workshops (ISSREW) (pp. 287-294). IEEE.
- **Shokri, A.** and Masehian, E., 2015, October. A meta-module approach for cluster flow locomotion of modular robots. In 2015 3rd RSI International Conference on Robotics and Mechatronics (ICROM) (pp. 425-431). IEEE.
- **Shokri, A.** Hashemi, S., Akbaripour, H., Amin-naseri, M., 2013, Overcrowding Detection and Management in Emergency Department using Expert System. In 11th Iranian Conference on Intelligent Systems (ICIS2013).
- Kazemi Tabar, J., **Shokri, A.**, Jenadeleg, M., Optimized Job Shop scheduling as Constraint Satisfaction Problem using Genetic Algorithms. In 2007 12th Conference of Computer Society of Iran (CSICC 2007).

Journal Papers

- Hashemi, S., **Shokri, A.**, Amin Naseri, M. and Akbaripour, H., 2014. Designing an expert system for management of crowding and overcrowding in emergency departments. Advances in Industrial Engineering, 48(2), pp.281-292.

Grant Proposals

PI/Co-PI

- Submitted: Office of Naval Research (ONR) “CodeLiftingAI: LLM Compute Platform for Code Lifting", Proposed period: 12/1/25 –11/30/26, Dr. Binoy Ravindran (PI), Dr. Hyeonjoong Cho (Co-PI), Dr. Zhoulai Fu (Co-PI), Dr. Ali Shokri (**co-PI**)
- Submitted: DARPA (DARPA-PS-24-20) “Translating All C TO Rust (TRACTOR)” – Ali Shokri (**co-PI**), from Virginia Tech with the contributions of co-PIs from Penn State, State University of New York-Stony Brook (SUNY), and Korea University (2024).
- Submitted: DARPA (HR001123S0039) “Intelligent Generation of Tools for Security (INGOTS)” – Ali Shokri (**PI**), from Hawksbill Co. with the contributions of co-PIs from University of Notre Dame and SRI International (2023).

Major Contribution

- Grant proposal submissions to NSF, DARPA, and DoE as a contributor (e.g., ideas, write-ups, meetings) to the technical sections (2019-2022).

Teaching

Co-Instructor

- Compiler Optimizations (ECE/CS-5544) [Graduate level course] - Virginia Tech (Spring 2024-2025)

Guest Lecturer

- Modern Binary Exploitation (ECE-5984) [Graduate level course] - topic: “LLM-based Type Recovery from Binaries” - Virginia Tech (2024)
- Foundation of Software Engineering (SWEN-610) [Graduate level course] - topic: “An Introduction to Program Synthesis” - RIT (2021)

Teaching in Industry

- Software Design Patterns and Java Programming - Melat Insurance Co. (2012-2015)
- Java Programming (introductory/advanced) - Raydana Co. (2009-2010)

Invited Talks

- PhD Colloquium (RIT): “Inter-procedural Program Synthesis for Automatic Architectural Tactic Implementation” (2023)
- Palo-Alto Research Center (PARC): “Code-based Model Synthesis Platform for re-Constructing Control Algorithms” (2022)
- CHAAT Talks (RIT): “Towards a Program Synthesis Approach for Adding Architectural Tactics to An Existing Code Base” (2021)

Student Mentorship

Ph.D. Students

- Yuanzhuo Zhang: Ph.D. student in ECE at Virginia Tech (2024-present)
- Mohamad Fazelinia: Ph.D. student in CS at RIT (2021-2023).

Master’s Students

- Shubham Tiwari: M.Sc. student in ECE at Virginia Tech (2024-present)
- Priyatam Annambhotla: M.Sc. student in ECE at Virginia Tech (2024-present)
- Chinmay Singh: M.Sc. student in CS at RIT, currently at Salesforce (2022-2023)
- Lorena Mendes: M.Sc. student in CS visiting RIT as a research student, currently at GoTo (2022)
- Ishika Prasad: M.Sc. student in CS at RIT, currently at Motive (2019-2020)
- Viral Parmar: M.Sc. student in CS at RIT, currently at Microsoft (2019)

Bachelor’s Student

- Denis Zhenilov: A software developer from Budapest, Hungary, joined RIT as an undergraduate researcher (2020).

Work Experience

Postdoctoral Associate – Virginia Tech (August 2023 –Present)

- Location: Blacksburg, VA, USA
- Projects: Binary Program Analysis, Formal Methods, Software Security

- Responsibilities: Research, Presentation and Talks, Software Development, Grant Proposals

Graduate Research Assistant – RIT **(Jan 2018 – Jun 2023)**

- Location: Rochester, NY, USA
- Projects: Software Synthesis, Program Analysis, Program Comprehension, Software Certification, Security Tactics
- Responsibilities: Research, Writing Paper, Presentation, Software Development, Grant Proposal

Research Intern – Google **(August 2022 – December 2022)**

- Location: Mountain View, CA, USA
- Projects: Program Synthesis | AIDA (AI-based Developer Assistant)
- Responsibilities: Research, Design, Writing Paper, Presentation, Software Development

Research Intern – Palo Alto Research Center (PARC) **(Feb 2022 – May 2022)**

- Location: Palo Alto, CA, USA
- Projects: ReMath (Software Synthesis)
- Responsibilities: Research, Writing Papers, Presentation, Software Development

Senior Software Engineer **- Samen Ertebat Asr (SEA) (Oct 2016 – Jan 2018)**

- Location: Tehran, Iran
- Projects: Banking System
- Responsibilities: Software Architecture, Software Design, Software Development

Senior Software Engineer - IIN Groups **(Aug 2016 – Oct 2016)**

- Location: Tehran, Iran
- Projects: Scientific Content Provider
- Responsibilities: Software Architecture, Software Design, Leading a Team

Senior Software Engineer - Melat Insurance **(Dec 2011 – Aug 2016)**

- Location: Tehran, Iran
- Projects: Insurance System, Banking System, Global Distribution System (GDS)
- Responsibilities: Leading a Team, Project Management, Software Architecture, Software Design, Software Development

Co-Founder & Team Lead - Rayan Narm Fan **(Nov 2006 – Nov 2010)**

- Location: Tehran, Iran
- Projects: Qeshm Entrance-Exit Control System
- Responsibilities: CEO, Leading a Team, Software Design, Software Development

Software Engineer - Paliz CT **(Dec 2006 – Jun 2007)**

- Location: Tehran, Iran
- Projects: Tehran Municipality System

- Responsibilities: Requirement Analysis, Software Design, Software Development

Software Engineer - Raydana **(Sep 2005 – Feb 2012)**

- Location: Tehran, Iran
- Projects: Enterprise Resource Planning (ERP) System
- Responsibilities: Leading a Team, Project Management, Software Design, Software Development

Professional Activities and Services

Reviewer

- Reviewer for the IEEE Transactions on Software Engineering (TSE)
- Reviewer for the IEEE Software Journal (IEEE Softw.)
- Reviewer for the Journal of Systems and Software (JSS)
- Reviewer for the e-Informatica Software Engineering Journal (EISEJ)
- Sub-reviewer for ACM Transactions on Software Engineering and Methodology (ToSEM)
- Sub-reviewer at the 42nd International Conference on Software Engineering (ICSE'20)

PC Member

- 41st IEEE International Conference on Software Maintenance and Evolution ICSME'25)- Research Track
- 11th LangSec Workshop at IEEE Security & Privacy (LangSec'25)
- 18th European Conference on Software Architecture (ECSA'24) - Research Track
- 33rd USENIX Security Symposium (USENIX'24) - Research Track
- 31st IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER'24) - Research Track
- 17th IEEE International Conference on Software Testing, Verification and Validation (ICST'24) - Tool Track
- 20th International Conference on Mining Software Repositories (MSR'23) – Junior PC
- 45th International Conference on Software Engineering (ICSE'23) – Student Research Competition
- 31st ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA'22) – Tool Demo
- 22nd IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM'22) – Research track
- 30th International Conference on Program Comprehension (ICPC'22) – Research track
- 43rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'22) – Research Artifact
- 38th IEEE/ACM International Conference on Software Maintenance and Evolution (ICSME'22) – Tool Demo

- 37th IEEE/ACM International Conference on Automated Software Engineering (ASE'22) – Student Research Competition
- 37th International Conference on Software Maintenance and Evolution (ICSME'21) – Tool Demo
- 35th European Conference on Object-Oriented Programming (ECOOP'21) – Research Artifact