ALI SHOKRI, PhD

Assistant Professor

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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 quality and productivity.

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

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).
- Sim, H., Cho, H., Go, Y., Fu, Z., **Shokri, A.**, & Ravindran, B. (2025). Large Language Model-Powered Agent for C to Rust Code Translation. *arXiv preprint arXiv:2505.15858*.
- 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

Instructor

- Programming Languages and Paradigms (COSC 4315) – University of Houston (Fall 2025)

Co-Instructor

- Compiler Optimizations (ECE/CS-5544) - Virginia Tech (Spring 2025)

Guest Lecturer

- Modern Binary Exploitation (ECE-5984) – Virginia Tech, topic: "LLM-based Type Recovery from Binaries" - (Fall 2024)

- Foundation of Software Engineering (SWEN-610) – Rochester Institute of Technology, topic: “An Introduction to Program Synthesis” - (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

- Irek Mukhametzhanova: PhD. student in CS at Virginia Tech (2025-present)
- 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

Assistant Professor – University of Houston **(Summer 2025 –Present)**

- Location: Houston, TX, USA

Postdoctoral Associate – Virginia Tech **(August 2023 –Present)**

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

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

- Location: Rochester, NY, USA
- Software Synthesis, Program Analysis, Software Architecture, Program Comprehension, Software Certification, Security Tactics

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

- Location: Mountain View, CA, USA
- Program Synthesis | AIDA (AI-based Developer Assistant)

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

- Location: Palo Alto, CA, USA
- Reconstruction of Software Binary Code as Mathematical Representation (ReMath) (Software Synthesis)

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

- Location: Tehran, Iran
- Banking System R&D

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

- Location: Tehran, Iran
- SCP System Software Architect and Team Lead

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

- Location: Tehran, Iran
- Insurance System, Banking System, and Global Distribution System (GDS) Software Architect, Team Lead, and Project Manager

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

- Location: Tehran, Iran
- City Vehicle Entrance-Exit Control System, CEO, Team Lead, and Software Architect

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

- Location: Tehran, Iran
- Tehran Municipality System, Software Requirement Analyzer, Software Designer and Developer

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

- Location: Tehran, Iran
- Enterprise Resource Planning (ERP) System Software Designer and Developer, Team Lead, and Project Manager

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