

# Vaibhav Sharma, PhD

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Portfolio/Website

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## Professional Summary

Applied Scientist with 10+ years of experience in **Automated Reasoning, Symbolic Execution, and Software Security**. Proven track record of applying formal methods to secure large-scale cloud infrastructure (AWS), IoT ecosystems, and payment services. Published researcher in top-tier venues including FSE, CAV, and TACAS.

## Technical Skills

- **Core Domains:** Automated Reasoning, Formal Verification, Symbolic Execution, Binary Analysis, Program Synthesis, IoT Security, Static Analysis.
- **Languages:** Java, C, C++, Python, OCaml, Rust, LaTeX.
- **Tools & Frameworks:** FuzzBALL, KLEE, Java Pathfinder (JPF), WebKit, Git.

## Work Experience

- **Applied Scientist III, Amazon.com Services LLC** Feb 2022 – Present
  - Lead the application of **Automated Reasoning** to secure high-stakes Payment and IAM (Identity and Access Management) services.
  - Design and deploy formal verification tools to ensure the correctness of complex security policies, protecting critical cloud infrastructure and user data.
- **Applied Scientist II, Amazon Web Services (AWS)** Feb 2020 – Feb 2022
  - Developed automated reasoning solutions to verify correctness and security properties for **AWS IoT** customers.
  - Bridged the gap between academic formal methods and industrial-scale software systems.
- **Research Assistant, University of Minnesota** Sept 2015 – May 2019
  - Extended **FuzzBALL** (binary symbolic execution) for automated synthesis of binary wrapper code.
  - Implemented equivalence checking between functions to identify substitutable binary code.
- **Samsung Research India, Browser Development** June 2012 – June 2013
  - Engineered web page rendering modules in **WebKit2EFL** for the Tizen OS.
- **Bally Technologies, OS Development** March 2010 – June 2012
  - Integrated **WebKitGtk+** browser engine into slot machine operating systems.
- **Amdocs Development Center India** Aug 2007 – March 2010
  - Maintained **Tuxedo-based** backend systems for global telecommunication order management.

## Education

- **University of Minnesota** **2015 – 2020**
  - *PhD, Computer Science and Engineering (GPA: 3.93/4)* *Minneapolis, USA*
- **Michigan State University** **2013 – 2015**
  - *M.S., Computer Science and Engineering (GPA: 3.95/4)* *East Lansing, USA*
- **Mumbai University** **2003 – 2007**
  - *B.E., Computer Engineering* *Mumbai, India*

## Selected Publications & Patents

- **Patent:** "IoT event detector correctness verification", US12093160B1, Granted Sep 2024.
- "State Merging with Quantifiers in Symbolic Execution", *FSE* 2023.
- "Automated Analysis of IoT Event Monitoring Systems", *CAV* 2023.
- "Java Ranger: Statically Summarizing Regions For Efficient Symbolic Execution", *FSE* 2020.
- "Finding Substitutable Binary Code by Synthesizing Adaptors," *IEEE TSE* 2019.

## Professional Service

- **Program Committee:** ICST (2026, 2024), RE (2024, 2023), ESEC/FSE (2022, 2021), ASE (2021, 2020), JPF (2022), ICTAC (2022).
- **Reviewer/Jury:** IEEE Transactions on Software Engineering (2025), SV-COMP Jury (2020), ISSTA/ASE Artifact Evaluation (2020).