Rishi Ranjan

rish9101 | Rishi Ranjan | rishiranjan@vt.edu | +1 (540) 824-0797

Interests

My interests lie in systems, security, compilers and automated software and hardware testing.

Education

Virgina Tech *August 2022 - Present*
M.S. Computer Science, Advisor: Dr. Matthew Hicks

Indian Institute of Technology, Roorkee *July 2018 - May 2022*
B.Tech. Computer Science and Engineering GPA : 9.1/10

Work Experience

Research Assistant | Virginia Tech August 2022 - Present

- Research Assistant working under Dr Matthew Hicks at the Computer Science Dept, Virginia Tech.
- My work focuses on system security and automated vulnerability testing research.
- My work has found 0-day bugs in popular software like **Linux Kernel's BPF library**, **GoPro's metadata parser** and other popular open-source projects like **c-blosc2** and **md4c**.

Security Research Intern | FoRTE Research, Virginia Tech October 2021 - February 2022

- Research Assistant working under Dr Matthew Hicks at the Computer Science Dept, Virginia Tech.
- Designed and implemented a state-of-the-art fuzzer for Windows.
- Our fuzzer found bugs in popular open-source software such as GoPro's metadata parser.
- Work published in the top security conference **USENIX Security 2023**.

Security Research Intern | HexHive, Summer@EPFL May 2021 - October 2021

- Selected among 10,000 applicants for a research internship at École Polytechnique Fédérale de Lausanne under Dr Mathias Payer in collaboration with Huawei.
- Worked on a project for designing a stateful network protocol fuzzer, designed and implemented a new structured input generator for the fuzzer.

Student Developer @AFLplusplus | Google Summer of Code May 2020 - August 2020

- Google Summer of Code is a global internship program focused on bringing student developers into open source software development.
- Designed and implemented the initial version of famous multithreaded scalable library for fuzzing called LibAFL in C. (Paper in ACM CCS 2022).

Projects

False-nine - A Compile-time memory optimisation project | Virginia Tech Github

- Implemented a compiler pass to automatically free dead memory objects on the heap.
- Reduces both the average and peak memory usage of a program significantly.
- Tech stack includes C++, LLVM and cmake.

TMTO Attack on Light weight cipher | IIT Roorkee

– TMTO Attack is a cryptanalysis method to brute-force the key of a Feistel network efficiently.

– Proposed and implemented a solution to mounting an attack on ciphers with keyspace larger than ciphertext space.

Content Management System | IMG, IIT Roorkee IITR Website

– As Chief Technical Coordinator of Information Management Group, IIT Roorkee, I designed and developed a modular Content Management System for IIT Roorkee's official website of 10,000 pages.

– The tech stack includes Scala, Django, NextJS and PostgreSQL.

Predicting Popularity of Reddit posts | IIT Roorkee

– As part of the Machine Learning course, worked with a team on designing and implementing a machine learning model for Reddit post upvote prediction.

– Implemented Sentiment Analysis for Reddit posts and GloVe embeddings calculation for the preprocessing phase and integrated with existing machine learning models.

Publications

Leo Stone, **Rishi Ranjan**, Matthew Hicks and Stefan Nagy. No Linux, No Problem: Fast and Correct Windows Binary Fuzzing via Target-embedded Snapshotting - ***USENIX Security 2023***

Acheivements

CSAW CTF 2019	Ranked **2nd** in India and **13th** globally as part of InfoSecIITR.
CSAW CTF 2020	Ranked **2nd** in India and **14th** globally as part of InfoSecIITR.
CISCO SecCon A&D CTF 2020	Ranked **1st** overall as a part of InfoSecIITR.
AISS 2020 CTF	Ranked **2nd** is India as part of team inv4sion
WhiteHat CTF 2020	Qualified for finals in Vietnam.
James Thomason Scholarship Awardee	Ranked among the top candidates selected at IIT Roorkee.
Joint Entrance Examination 2018 (Advanced)	Ranked in top 0.3 percentile with a rank of **280** among 150,000 candidates.

Skills

Computer languages	C, C++, Python, Scala, Javascript, Bash, x86 Assembly language
Software Packages	LLVM, Ghidra, AFLplusplus, LibAFL, Angr, Django, REST framework, Docker, Git