Rishi Ranjan

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INTERESTS

My interests lie in systems, security 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.

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 novel fuzzing execution mechanism for Windows operating system based targets.

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 generation tool 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 popular multithreaded scalable library for fuzzing called LibAFL in C. (Paper).

PROJECTS

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

Omniport | IMG, IIT Roorkee

– Developed and maintained the intranet student and faculty portal for IIT Roorkee.
– Tech stack includes Python, Django, Django REST, ReactJS, Redux.

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.

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 (UNDER REVIEW)

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

ACHEIVEMENTS

CSAW CTF 2020	Ranked 2nd in India and 14th globally as part of InfoSecIITR
WhiteHat CTF 2020	Qualified for finals in Vietnam
CSAW CTF 2019	Ranked 2nd in India and 13th globally as part of InfoSecIITR
CyBrics CTF 2019 (Final)	Ranked 6th in India as a part of InfoSecIITR
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	Ghidra, AFLplusplus, LibAFL, Angr, Django, REST framework, Docker, Git, WSL