

# HARSHA SHARMA

<https://harshasharma.in>

harshasharmaitr@gmail.com , hsharma@ph.iitr.ac.in

## EDUCATION

---

**Indian Institute of Technology Roorkee, Roorkee**

*July 2016 - Present*

Bachelor of Technology, Engineering Physics

**Maheshwari Girls Public School, Jaipur**

*2014-2016*

Senior Secondary Education, CBSE.

Percentage: 95.2

## INTERNSHIPS

---

**Tsinghua University, Beijing**

7th May 2019 - 30th July 2019

*Project: Symbolic Execution for network functions with time-driven logic [Paper]*

- Created a symbolic execution engine (NF-SE) to verify network function models including time-driven logic for multiple packet execution.
- Used Z3 SMT(satisfiability modulo theory) solver C++ API to implement NF-SE.
- Paper submitted to SOSR 2020.
- Important usecases include PAN firewall, rate limiter, SYN flood detection and heavy hitter detection.

**Google Summer of Code Student Developer**

14th May, 2018 - 14th August 2018

*Project - Netfilter (Linux Kernel Network Firewalling)*

- Implemented addition, deletion and listing of connection tracking timeout objects and assignment of timeout policy via nftables rule.
- Provides fine-grained control of timeout values for different layer 4 protocol states.

**Technical University of Munich, Munich**

14th May, 2018 - 27th July, 2018

*Project: Checkpoint and restore mechanism in genode and L4 fiasco microkernel [Report]*

- Worked on checkpointing and restoring executing tasks in real time in genode and L4 fiasco microkernel
- Reverse engineering and debugging for comparing capability map in Genode and capability space in kernel before checkpointing and after restoring states.
- Implemented custom Interrupt Request Line (IRQ) session for signal handler session to checkpoint and restore missing IRQ capabilities.

**Linux Kernel Intern in Outreachy**

5th Dec 2017 - 5th March 2018

*Project - Nftables*

- Implemented unique handles for tables, chains and all objects
- Added support for lookup and deletion of objects via handles in nftables and netfilter subsystem of linux kernel.
- Worked on improving test infrastructure for nftables and fixed some self-assigned and known outstanding software issues.

## PROJECTS

---

**Design Automation for MEDA based DMF biochips**

20th August 2018 - May 2019

*PROF. SUDIP ROY, CS DEPT., IITR*

- Compiler to generate actuation sequences using Biocoder protocol for application specific MEDA-DMF (Micro-Electrode-Dot-Array) chips.

- Designed and implemented algorithms to modify bioassay directed acyclic graphs to satisfy module constraints such as volume constraints on mixing module.

### **Nano Photonic Non-volatile Memory**

15th May 2017 - 15th July 2017

*PROF. RAJESH KUMAR, PHYSICS DEPT., IITR*

- Worked on designing and analysis of nano photonic non volatile memory using GeSbTe.
- Aimed at optimizing memory architecture to find most efficient waveguide configuration.

### **Backdoor, <https://backdoor.sdslabs.co>**

July 2017 - September 2017

*SDSLabs, IITR*

- Information security platform for practice and organizing regular internationally-well known CTF contests.
- Written in PHP based on MVC architecture and uses Memcache for caching.

### **Beast, Automated Containerized Challenge Deployment**

October 2017

*SDSLabs, IITR*

- Docker based tool to automate deployment of challenge containers spawned individually for each user.
- Used for deploying web, binary and miscellaneous challenges for Backdoor platform.

## **SKILLS**

---

- C • C++ • Python • Fortran • GDB • IDA • Autotools • Parsers • Cmake • Vim • Matlab
- P4 programming • Openflow • Mininet • Click language
- Linux Kernel Development • Genode Framework • L4 Fiasco Microkernel • Llmv
- PHP • Mysql • HTML • CSS

## **FIELDS OF INTEREST**

---

- Networked Systems
- Software Defined Networking & Network Function Virtualization
- Real-time Operating Systems

## **ACTIVITIES**

---

Presented work on implementing connection tracking timeout policies in **NFWS18** (Netfilter Conference), Berlin.

Speaker at **How to crack GSOC and Outreachy** talk in IIT Roorkee.

Executive member of **Software Development Section , IIT Roorkee**

Member of official **Choreography and Dance Section , IIT Roorkee**

Voluntary work with **National Service Scheme , IIT Roorkee** for one year