

Harsha Sharma

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Education

Massachusetts Institute of Technology

PHD STUDENT

Cambridge, USA

Sept 2022 - Present

Indian Institute of Technology Roorkee (IITR)

BACHELOR OF TECHNOLOGY IN ENGINEERING PHYSICS (GPA: 8/10)

Roorkee, India

July 2016 - July 2020

Publications

- USENIX** **Optimizing Network Provisioning through Cooperation** | [PDF](#), Harsha Sharma, Parth Thakkar, Sagar Microsoft Research
NSDI'22 Bharadwaj, Ranjita Bhagwan, Venkat Padmanabhan, Yogesh Bansal, Vijay Kumar, Kathleen Voelbel India
IEEE **Symbolic Execution for Network Functions with Time-Driven Logic** | [PDF](#), Harsha Sharma, Wenfei Wu, Tsinghua University
MASCOTS'20 Bangwen Deng

Research Experience

Microsoft Research

RESEARCH FELLOW - [DR. VENKAT PADMANABHAN](#)

Bangalore, India

July 2020 - Present

- Worked on optimizing inter-datacenter capacity provisioning with the Azure Networking Team
- Used demand differentiation and also trained a data-driven link failure model
- Capacity savings up to 40% and projected cost savings of 200 million USD

Tsinghua University

RESEARCH INTERN - [PROF. WENFEI WU](#)

Beijing, China

May 2019 - July 2019

- Worked on extending Network Function (NF) modeling language to support timer logic
- Verified 14 NFs using symbolic execution
- Important use-cases include PAN firewall, rate limiter, SYN flood detector, and heavy hitter detector

Technical University of Munich

RESEARCH INTERN - [PROF. UWE BAUMGARTEN](#)

Munich, Germany

May 2018 - July 2018

- Worked on a real-time checkpoint and restore (RTCR) mechanism in Genode and L4 fiasco microkernel
- Allows checkpointing executing tasks and migrating and restoring them to another ECU when the current ECU fails

Open-Source Contributions

ns-3 Summer of Code Student

Remote

WORKING ALONGSIDE [DR. TOM HENDERSON](#), AFFILIATED WITH UNIVERSITY OF WASHINGTON

June 2020 - Oct 2020

- Implemented flent application in ns-3 which offers an API similar to the flent tool for conducting easily reproducible experiments
- Compared ns-3 simulation results with real network results for different congestion control algorithms and AQMs

Google Summer of Code Student

Remote

NETFILTER (LINUX KERNEL NETWORK FIREWALLING) - [PABLO NEIRA AYUSO](#)

May 2018 - August 2018

- Added custom connection tracking timeout infrastructure in nftables
- Expires and deletes the existing connections preventing the connection tracking table from overflowing

Outreachy Internship

Remote

NETFILTER (LINUX KERNEL NETWORK FIREWALLING) - [PABLO NEIRA AYUSO](#)

Dec 2017 - March 2018

- Worked on improving the test infrastructure for nftables
- Implemented an easy way for lookup and deletion of objects via unique handles

Other Projects

Design Automation for MEDA DMF biochips

Roorkee, India

WORKING ALONGSIDE [PROF. SUDIP ROY](#), CS DEPT., IITR

August 2018 - May 2019

- Built a compiler that generates 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

Backdoor

SDSLABS, IITR

- Information security platform for practice and organizing regular internationally-well known CTF contests
- Worked on the back-end which is written in PHP based on MVC architecture and uses Memcache for caching

Roorkee, India

July 2017 - September 2017

Beast, Automated Containerized Challenge Deployment

SDSLABS, IITR

- Built a docker tool to automate the deployment of challenge containers spawned individually for each user
- Used for deploying web, binary and miscellaneous challenges for the Backdoor platform

Roorkee, India

October 2017

Activities

EXECUTIVE MEMBER OF SOFTWARE DEVELOPMENT SECTION (SDSLABS), IITR

Jan 2017 - Feb 2020

- Managed deployment of CTF competitions which saw participation of more than 2000 users including top international CTF player teams
- Delivered multiple talks on open-source development, research internship experiences and Linux kernel attended by hundreds of students

MENTOR UNDER STUDENT MENTORSHIP PROGRAM, IITR

August 2019 - May 2020

- Mentored two groups of 5 students each
- Provided them guidance on academic courses and building a career in research

VOLUNTEER AT NATIONAL SERVICE SCHEME (NSS), IITR

August 2016 - May 2017

- Gave lessons on high-school science and mathematics to school students from a nearby village