Haseeb Ashfaq

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Anticipated Graduation Date: August 2026

EXPERIENCE

Google **May 2025 – August 2025**
Software Engineering Intern, Ph.D. California, USA

- Part of AI and Infrastructure organization, worked on improving robustness of ML infrastructure
- Developed a tool, *hstprof*, for profiling GPU/TPU workloads using high speed network telemetry
- *hstprof* enabled a fine grained view of the network traffic of ML jobs, reporting utilization at 100 microseconds timescale
- Used *hstprof* to analyze Gemini training clusters to investigate several regressions including packet drops and high latencies
- Found imbalance of packet queues across memory banks of switches which caused performance degradation

Nokia Bell Labs **June 2023 – August 2023**
Networking Research Intern New Jersey, USA

- Developed (in C++, Unix) a streaming service for AR/VR content for heterogeneous networks
- Implemented a resource-efficient transcoding mechanism for volumetric videos that achieved 75% CPU savings
- Developed an encoder/decoder for point cloud data that can tolerate packet losses in the network which enabled utilizing unreliable transport protocol (UDP) instead of TCP for point cloud streaming
- Implemented a mixed-reliability transmission protocol using QUIC streams and datagrams (with Cloudflare's Quiche)

Systems Group NYU **June 2022 – June 2023**
Graduate Research Assistant New York, USA

- Designed and implemented a special priority queue, LOQ, for cloud hosted financial exchanges, that enhances a matching engine's throughput by up to 150% and lowers latency by 90% while retaining fairness among market participants
- Developed a cloud-native multicast service for market data that achieves 50% lower latency and better scalability than AWS TGW-based multicast. Prototyped in C++ and evaluated on AWS and GCP.

PosterMyWall **June 2020 – August 2021**
Software Engineer (Full Time) Lahore, PK

- Designed and implemented, in PHP and JS, an access control system for internal tools of the company
- Setup CI/CD pipeline along with testing infrastructure using TeamCity and AWS
- Automated AWS-hosted development infrastructure, shortening the testing cycle time by more than 50%
- Secured the product website by eliminating critical vulnerabilities (XSS, CSRF, IDOR) and did backend development

EDUCATION

PhD and MS, Computer Science **Sept. 2021 – Aug. 2026**
New York University, New York, USA GPA: 4.0/4.0
Research Interests: Distributed Systems, Networks, Cloud Computing, Financial Technologies, AI Infrastructure

Bachelor of Science, Computer Science **Sept. 2016 – May 2020**
Lahore University of Management Sciences, Lahore, Pakistan GPA: 3.7/4.0
Courses: Algorithms, Data Structures, Distributed Systems, Computer Networks, Machine Learning

PUBLICATIONS

Network Support For Scalable And High Performance Cloud Exchanges
ACM SIGCOMM '25, Cited by **Jane Street** and **Google**
Haseeb Ashfaq, Jinkun Geng, Daniel D-Cavalcanti, Xiyu, Hao, Ulysses Butler, Radhika Mittal, Srinivas Narayana, Anirudh Sivaraman

ParserHawk: Hardware-aware parser generator using program synthesis
ACM SIGCOMM '25
Xiangyu Gao, Jiaqi Gao, Karan Kumar, **Haseeb** Ashfaq, Enan Zhai, Bili Dong, Joseph Tassarotti, Srinivas Narayana, Anirudh Sivaraman

Towards Efficient Transmission of 3D Point Clouds Via Adaptive Encoding and QUIC
Emerging Multimedia Systems (EMS)'25, a SIGCOMM workshop
Haseeb Ashfaq, Eugene Chai, Matteo Varvello

Codesign of Tensors Encoding And Transcoding
Networks for AI Computing (NAIC)'25, a SIGCOMM workshop
Revant Teotia, **Haseeb** Ashfaq

A Scalable and Fair Multicast for Financial Exchanges in the Cloud
A poster at SIGCOMM Demos & Posters '24 (Presented a poster in Sydney, Australia)
Haseeb Ashfaq, Jinkun Geng, Ulysses Butler, Xiyu Hao, Daniel D-Cavalcanti, Anirudh Sivaraman

Patent: A Method To Enable Fast Transmission And Processing Of 3D Telepresence Data Encoded As Octrees
Approved by Nokia's internal board, In submission to USPTO, Received monetary award from Nokia Bell Labs
Haseeb Ashfaq, Eugene Chai, Matteo Varvello

QuEST: Fast, Expressive, and Cheap Analytics for Distributed Traces Using Cloud Storage
CloudDB, a VLDB workshop
Jessica Berg, **Haseeb** Ashfaq, Haiming Chen, Yaojia Ju, Anirudh Sivaraman, Ravi Netravali and Srinivas Narayana

PROJECTS

Design and Implementation of a Scalable Cloud Exchange

- Implemented a low latency market data service that achieves less than 1-microsecond latency difference across receivers
- Utilized kernel bypass and zero-copy packet replication techniques to enable fast packet processing, implemented in C++
- Utilized eBPF/XDP and eBPF/TC for efficient packet processing when using Linux kernel

Codesign Of Tensors Encoding And Transcoding For Decentralized ML

- Designed and implemented a mechanism for packing tensors in network packets that enable a resource efficient transcoding (creating various bitrate versions) mechanism, akin to Scalable Video Codec but for tensors
- Enabled utilizing overlay multicast for distributing training data across geo-distributed heterogeneous clients
- Reduced memory utilization by 30% and increased throughput of data dissemination by 25%

INVITED TALKS

Google: How to build an ultra-fast and scalable financial exchange on the public cloud? 12/03/2024
Rutgers University: Network support for cloud hosted financial exchanges. 10/30/2024

AWARDS, FELLOWSHIPS AND SERVICES

Outstanding Student Research Award
Granted by Nokia Bell Labs during Global Student Program 2023

National Science Foundation (NSF) Travel Grant
Funds for traveling to ACM Sigcomm 2024 in Sydney, Australia

Reviewer for ACM Journal on Computing and Sustainable Societies (JCSS)
Served as a reviewer for research articles submitted to ACM JCSS

MacCracken Fellowship
Granted by New York University for a Ph.D. in Computer Science

SKILLS

C/C++, Python, PHP, SQL, Go, Javascript, React/React Native, Rust, AWS, Debugging, Testing, DPDK, eBPF, Linux, Kubernetes, Docker, Istio, Microservices, Congestion Signalling (CSig), High Frequency Network Telemetry, System Design

MISC.

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Available for full-time: September 2026