

# Haseeb Ashfaq

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Anticipated Graduation Date: January 2027

## EXPERIENCE

### Google

Software Engineering Intern, Ph.D.

May 2025 – August 2025

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 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

Networking Research Intern

June 2023 – August 2023

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

Graduate Research Assistant

June 2022 – June 2023

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%.
- 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

Software Engineer (Full Time)

June 2020 – August 2021

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
- A recommendation letter from my manager describing me as an exceptional engineer is available on [LinkedIn](#)

## EDUCATION

### PhD and MS, Computer Science

New York University, New York, USA

Sept. 2021 – Jan. 2027

GPA: 4.0/4.0

Research Interests: Distributed Systems, Networks, Cloud Computing, Financial Technologies, AI Infrastructure

### Bachelor of Science, Computer Science

Lahore University of Management Sciences, Lahore, Pakistan

Sept. 2016 – May 2020

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** in their [research paper](#), [\[Link\]](#)

**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, [\[Link\]](#)

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 [\[Link\]](#)

**Haseeb** Ashfaq, Eugene Chai, Matteo Varvello

## **A Scalable and Fair Multicast for Financial Exchanges in the Cloud**

A poster at SIGCOMM Demos & Posters '24 (Presented a poster in Sydney, Australia) [[Link](#)]

**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, [[Link](#)]*

**Haseeb** Ashfaq, Eugene Chai, Matteo Varvello

## **QuEST: Fast, Expressive, and Cheap Analytics for Distributed Traces Using Cloud Storage**

*CloudDB, a VLDB workshop [[Link](#)]*

Jessica Berg, **Haseeb** Ashfaq, Haiming Chen, Yaojia Ju, Anirudh Sivaraman, Ravi Netravali and Srinivas Narayana

## **Using Application Layer Banner Data To Automatically Identify IoT Devices**

*ACM Sigcomm CCR 2020 [[Link](#)]*

Talha Javed, **Haseeb** Ashfaq, Muhammad Abdullah, Mobin Javed

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## **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 dissemination 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%

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## **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

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## **AWARDS, FELLOWSHIPS AND SERVICES**

### **National Science Foundation (NSF) Travel Grant**

Funds for traveling to ACM Sigcomm 2024 in Sydney, Australia

### **Outstanding Student Research Award**

*Granted by Nokia Bell Labs during Global Student Program 2023*

### **HotNets Travel Grant**

*Funds for traveling to ACM HotNets in Boston, United States*

### **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*

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## **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

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## **MISC.**

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**GitHub:** <https://github.com/HaseebLUMS>

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**Available for internship:** May 2026