

# Maleeha Masood

*Ph.D. Candidate*

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📄 <https://maleehamasood.github.io>

## Interests

Multi-Agent Workflows, Large Language Models, Vision Language Models, Short Video Streaming, Recommender Systems, Content Distribution Networks, Satellite Networks, Distributed Systems

## Education

2021 – **Ph.D. in Computer Science**, University of Illinois Urbana-Champaign  
Advisors: Profs. Indranil Gupta and Deepak Vasisht

2017 – 2021 **BS in Computer Science**, Lahore University of Management Sciences  
Advisors: Profs. Ihsan Ayyub Qazi and Zafar Ayyub Qazi  
GPA: 3.96/4.0, On Dean's Honor List

## Publications

- Ongoing Using Small Language Models in Closed-World Environments  
**Maleeha Masood**, Deepak Vasisht, Indranil Gupta
- Ongoing Balancing Cost, Quality, and Latency in Multi-Agent Workflow Design  
**Maleeha Masood**, Sanjeev Malhotra, Ryan Beckett, Ganesh Ananthanarayanan
- Under Review Designing CDNs for Short Video Delivery Systems  
**Maleeha Masood**, Shreya Kannan, Om Chabra, Deepak Vasisht, Indranil Gupta
- CHI 2026 Counting How the Seconds Count: Understanding Algorithm-User Interplay in TikTok via ML-driven Analysis of Video Content  
**Maleeha Masood**, Shreya Kannan, Zikun Liu, Deepak Vasisht, Indranil Gupta
- SIGCOMM StarCDN: Moving Content Delivery Networks to Space  
2025 William X. Zheng, Aryan Taneja, **Maleeha Masood**, Anirudh Sabnis, Ramesh Sitaraman, Deepak Vasisht
- MobiCom Transmitting, Fast and Slow: Scheduling Satellite Traffic through Space and Time  
2023 Bill Tao, **Maleeha Masood**, Indranil Gupta, Deepak Vasisht
- JMIR 2021 Technology, Privacy, and User Opinions of COVID-19 Mobile Apps for Contact Tracing: Systematic Search and Content Analysis  
Mahmoud Elkhodr, Omar Mubin, Zainab Iftikhar, **Maleeha Masood**, Belal Alsinglawi, Suleman Shahid, Fady Alnajjar

## Internships

Summer 2025 **Microsoft Research**  
Systems and Foundations Group (Mentor: Ganesh Ananthanarayanan)

## Research Experience

### Microsoft Research

#### 2025 – **Automatic Multi-Agent Workflow Planner**

Designed a learning-based multi-agent planner that optimizes latency, cost, and accuracy tradeoffs in AI workflows

Used ground-truth examples to define objective functions and evaluation metrics for workflow efficiency

Evaluated planner performance under varying workload and resource constraints

### University of Illinois Urbana-Champaign

#### 2024 – **Systems for Large Language Models**

Fine-tuned sub-8B LLMs for deployment on resource-constrained edge devices, optimizing latency and memory usage.

Studied deployment failures and performance bottlenecks in real IoT environments using telemetry from Home Assistant.

#### 2022 – **Short Video Delivery Applications and Systems**

Identified new insights regarding recommended videos in short video delivery systems to build a specialized CDN design focused on improving cache hit rate and reducing midgress

Conducted a user study in-person and online via Prolific to get user engagement scores from video sessions and build user profiles for experimentation

Design a new system of analyzing video content that does not rely on user provided descriptions and CV models, and instead uses LLMs that can understand videos

Conducted behaviour analysis on real TikTok users by analyzing the videos they see

User analysis components of this work are published at CHI 2026. The system design work is Under Review

#### 2021 – 2025 **LEO Satellites**

Designed a distributed CDN architecture that allows for quick delivery of content to users via LEO satellite constellations; published at SIGCOMM 2025

Analyzed earth imagery via satellites to design a new downlinking strategy that performs better than the state-of-the-art greedy approach; published at MobiCom 2023

#### 2021-2023 **Mobile Models**

Explored the splitting of several ML models across heterogeneous GPUs

### Lahore University of Management Sciences

#### 2021 – 2021 **Social Acceptance of Agricultural Innovation**

Analyzed local Pakistani farmers on Social Media Platforms adopting a new method of agriculture to obtain information about social acceptance of innovative techniques

2020 – 2021 **COVID-19 Contact Tracing Apps**

Built a database of different contact tracing apps across the globe; published at JMIR 2021

2019 – 2021 **Heterogenous and Inclusive Federated Learning**

Modified models using reduction techniques to facilitate the participation of slow and heterogenous devices in the Federated Learning Framework

## **Awards**

2021 – Sohaib and Sara Abbasi Computer Science Fellowship

2024 Fall 2024 Outstanding Teaching Assistant Award

2023, 2024 Travel Grant to SOSP

2024 Attendee at the 2024 CRA-WP Grad Cohort for Women

2023 N2 Women Travel Grant to Mobicom

2023 Travel Grant to NSDI

2022 Travel Grant to OSDI

2021 Erasmus Mundus Joint Master Degrees Student Scholarship (received but declined)

2018 – 2021 LUMS Merit Scholarship

2017 – 2021 Dean's Honor List

2017 100 Best Applications to LUMS

2017 Outstanding Cambridge Learner Award

## **Teaching Experience**

### **University of Illinois Urbana-Champaign**

Spring 2025 CS425 Distributed Systems (Radhika Mittal)

Fall 2024 Lead Coursera TA of CS425 Distributed Systems (Indranil Gupta)

Spring 2024 CS438 Communication Networks (Deepak Vasisht)

Fall 2023 Lead Coursera TA of CS425 Distributed Systems (Indranil Gupta)

### **Lahore University of Management Sciences**

Spring 2021 Head TA of CS382 Network-Centric Computing (Zafar Ayyub Qazi)

Fall 2020 CS334 Principles and Techniques of Data Science (Ihsan Ayyub Qazi)

Spring 2020 CS202 Data Structures (Ihsan Ayyub Qazi)

Fall 2019 CS210 Discrete Mathematics (Imdad Ullah Khan)

## **Selected Course Projects**

### **University of Illinois Urbana-Champaign**

Spring 2022 Block Devices – CS598 Cloud Storage Systems  
Worked with block storage devices to improve write latency in ext4 file system

## Service

External Reviewer 2024: ACM Transactions on Autonomous and Adaptive Systems  
Program Committee 2023: ACM S3 Workshop  
Mentorship 2023 - 2024: Shreya Kannan (UIUC Undergraduate)  
2023 - 2024: Colin Lane (UIUC Undergraduate, now UIUC Masters Student)  
2023: Eric Magutu (UIUC iCAN Student)  
2023: Sarah Tanveer (LUMS Undergraduate, now UW-Madison Masters Student)  
2023: Ananya Anand (UIUC Undergraduate)  
Community Nov 2025: Organized and Moderated Faculty Session at the SysNet Retreat at UIUC  
May 2024 - present: Graduate Student Volunteer at SysNet Women @ UIUC  
Nov 2023: Organized and Moderated Faculty Session at the SysNet Retreat at UIUC  
May 2023: Organized and Moderated Student Session at the SysNet Retreat at UIUC  
May 2019 - 2021: Batch Representative at LUMS Student Council