Huzaifah Nadeem

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Education

Ph.D. in Computer Science (Ph.D. Candidate) August 2022 – Present (Expected 2027)
University of Pittsburgh Pittsburgh, PA, USA

- Dissertation (in progress): *Improving Resilience in Control Systems Using Reconfiguration.*
- Advisor: Dr. Amy Babay.
- Research areas: distributed systems, control systems, cyber-physical systems, and quantum networks.

B.S. in Computer Science, Minor in Mathematics 2018 – 2022
Lahore University of Management Sciences (LUMS) Lahore, Pakistan

- Graduated with High Merit; CGPA 3.4/4.0, Major GPA 3.7/4.0; Dean's Honour List.

Research Experience

Graduate Student Researcher September 2024 – August 2026
Cyber Energy Center, University of Pittsburgh Pittsburgh, PA

- Project: *Intrusion Tolerance using Cyber Digital Twins.*
- Investigating how cyber digital twins can strengthen intrusion tolerance in critical-infrastructure control systems, with a particular focus on using them as an upgrade path for legacy systems.

Graduate Student Researcher September 2022 – August 2023
School of Computing and Information, University of Pittsburgh Pittsburgh, PA

- Project: *Severe Impact Resilience: Framework for Adaptive Compound Threats.*
- Studied how to improve control-system resilience against "compound threats," in which cyberattacks are timed to follow a natural hazard (e.g., a hurricane) that has already significantly, though temporarily, degraded the system.

Honors and Awards

Best Paper Award 2024
43rd International Symposium on Reliable Distributed Systems (SRDS 2024)

- For the paper "Tolerating Compound Threats in Critical Infrastructure Control Systems."

SRDS Ph.D. Forum Award 2024
43rd International Symposium on Reliable Distributed Systems (SRDS 2024)

- For the PhD Forum paper on routing protocols for reliable distributed quantum systems.

DSN Student Travel Award 2025
55th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2025)

- Merit-based award supporting participation in the conference.

Publications

*In the author lists below, my name appears in **bold**; * denotes equal contribution.*

Peer-Reviewed Conference Papers

[C-2] **Tolerating Compound Threats in Critical Infrastructure Control Systems**
Sahiti Bommareddy*, Maher Khan*, **Huzaifah Nadeem***, Benjamin Gilby, Imes Chiu, John W. van de Lindt, Omar Nofal, Mathaios Panteli, Linton Wells II, Yair Amir, and Amy Babay. In *Proceedings of the 43rd International Symposium on Reliable Distributed Systems (SRDS)*, Charlotte, North Carolina, September 2024, pp. 66–79. **Best Paper Award.**
DOI: 10.1109/SRDS64841.2024.00017

[C-1] **SoK: A Tale of Reduction, Security, and Correctness – Evaluating Program Debloating Paradigms and Their Compositions**
Muaz Ali, Muhammad Muzammil, Faraz Karim, Ayesha Naeem, Rukhshan Haroon, Muhammad Haris, **Huzaifah Nadeem**, Waseem Sabir, Fahad Shaon, Fareed Zaffar, Vinod Yegneswaran, Ashish Gehani, and Sazzadur Rahaman. In *Proceedings of the 28th European Symposium on Research in Computer Security (ESORICS)*, The Hague, Netherlands, September 2023.
DOI: 10.1007/978-3-031-51482-1_12

Workshop Papers, Forums, and Other Peer-Reviewed Publications

[W-2] **Using Digital Twins as an Upgrade Path for Critical Infrastructure Control Systems**
Huzaifah Nadeem and Amy Babay. In *1st International Workshop on Digital Twins for Dependability, Resilience and Security (DT4DRS), at the IEEE/IFIP International Conference on Dependable Systems and Networks Workshops (DSN-W)*, Naples, Italy, June 2025, pp. 168–175.
DOI: 10.1109/DSN-W65791.2025.00057

[W-1] **PhD Forum: Evaluating and Designing Routing Protocols for Reliable Distributed Quantum Systems**
Huzaifah Nadeem. In *Proceedings of the 43rd International Symposium on Reliable Distributed Systems (SRDS)*, Charlotte, North Carolina, September 2024, pp. 330–333. **SRDS Ph.D. Forum Award.**
DOI: 10.1109/SRDS64841.2024.00041

TEACHING

Teaching Credentials

Achievement in Pedagogy (AiP) Badge
University Center for Teaching and Learning, University of Pittsburgh — Pittsburgh, PA

- Graduate pedagogy credential earned across three concentrations: Pedagogy, Educational Technology, and Online Teaching.

Instructional Experience

Co-Instructor (with Dr. Amy Babay) — Fall 2025
School of Computing and Information, University of Pittsburgh — Pittsburgh, PA

- CS 2520 / TELCOM 2321: Wide Area Networks (graduate), covering fundamentals and recent research results.

Guest Lecturer (for Dr. Amy Babay) — Spring 2025, 2026
School of Computing and Information, University of Pittsburgh — Pittsburgh, PA

- Multiple guest lectures and lab sessions for CS 1652: Data Communication and Computer Networks (undergraduate) and TELCOM 2310: Applications of Networks (graduate), including a lab on socket programming.

- For CS 1652: Data Communication and Computer Networks (undergraduate) and TELCOM 2310: Applications of Networks (graduate). Topics: "Attack-Resilient Application Architectures" and "Advanced Routing".

Teaching Assistant (and *Recitation Instructor) Fall 2023 – Summer 2024
Department of Computer Science, University of Pittsburgh Pittsburgh, PA

- *Fall 2023:* CS 2510 Computer Operating Systems; CS 2520 Wide Area Networks (created two month-long course projects, described below).
- *Spring 2024:* *CS 1613 Quantum Computation, also serving as Recitation Instructor (OMET teaching score 4.50/5.00).
- *Summer 2024:* CS 1657 Privacy in the Electronic Society; CS 0007 Introduction to Computer Programming; CMPINF 401 Intermediate Programming.

Undergraduate Teaching Assistant Fall 2020 – Spring 2022
Department of Computer Science, LUMS Lahore, Pakistan

- Teaching Assistant for CS 100 Computational Problem Solving, CS 200 Introduction to Programming, CS 340 Databases, and CS 300 Advanced Programming.
- Prepared and graded labs, assignments, projects, and quizzes, and held office hours and tutorial sessions.

Course Materials Developed

Course Projects for CS 2520 / TELCOM 2321: Wide Area Networks
Developed with Dr. Longfei Shangguan, University of Pittsburgh Pittsburgh, PA

- *Comparison of Congestion Control Algorithms:* students implement TCP Reno and TCP CUBIC and compare them against BBR on real network nodes (FABRIC testbed) under emulated network conditions to study the trade-offs in their designs.
- *Exploring Video Streaming Pipelines:* students build simple server and client applications that stream video over emulated network conditions, investigating how factors such as packet delay, drop rate, client-side buffering, and adaptive resolution/bitrate affect perceived "video smoothness."

SERVICE

Conference and Workshop Program Committees & Service

Reviewer 2026
37th IEEE International Symposium on Software Reliability Engineering (ISSRE 2026)

Shadow Technical Program Committee (SPTC) Member 2026
ACM Internet Measurement Conference (IMC 2026)

Demo Program Committee Member 2026
ACM Conference on Computer and Communications Security (CCS 2026)

Program Committee Member 2026
Workshop on Digital Twins for Dependability, Resilience and Security (DT4DRS) at DSN 2026

Conference Artifact Evaluation Committee

Member 2026
56th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2026)

Member 2026
ACM Conference on Computer and Communications Security (CCS 2026)

Member 2026
Network and Distributed System Security (NDSS) Symposium 2026

Misc. Conference Support

Student Volunteer 2025
55th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2025)

- Supported the conference by assisting with registration and helping coordinate sessions and social events.

University Service

Graduate Student Representative, Academic Council Academic Year 2023–2024
School of Computing and Information, University of Pittsburgh Pittsburgh, PA

- Served a one-year term providing graduate-student input on school matters, including the approval of or changes to curricula, academic programs, degree requirements, and admissions policies.