ERTZA WARRAICH

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Ann Arbor, MI (765)-233-2644

RESEARCH INTERESTS

Large-Scale Distributed Systems, Network Optimization for AI/ML, Edge Cloud Computing

EDUCATION & ACADEMIC AFFILIATIONS

University of Michigan, Ann Arbor, USA *Aug 2025 – Present*
Academic Affiliate, Department of Computer Science and Engineering
– Mentoring Ph.D. students in systems, networking, and ML infrastructure research

Purdue University, USA *Jan 2020 – Dec 2025*
Ph.D. in Computer Science GPA: 4.0/4.0
– Advisor: Prof. Muhammad Shahbaz
– Thesis: Rethinking Zero-Loss in AI Datacenters

National University of Sciences and Technology (NUST), Pakistan
M.S. in Computer Science *Sept 2017 – June 2019*
– Advisor: Prof. Syed Taha Ali GPA: 3.65/4.0
– Thesis: Intelligent Botnet That Uses AI for Evasion

B.E. in Software Engineering *Sept 2012 – June 2016*
– Advisor: Prof. Muhammad Waseem Iqbal GPA: 3.64/4.0
– Thesis: An Autonomous Network-Monitoring Tool

HONORS & AWARDS

Broadcom Research Award	2025
Google Research Scholar Award	2024
The Honor Society of Phi Kappa Phi	2024
SRC JUMP 2.0 Research Scholar	2023
Bachelor's Gold Medalist (1 of 150 students)	2016
Overall Best Student, NUST (1 of 800 students)	2016

PUBLICATIONS

Under Submission OptiNIC: A Resilient and Tail-Optimal RDMA NIC for Distributed ML Workloads. *Ertza Warraich*, Ali Imran, Annus Zulfiqar, Shay Vargaftik, Sonia Fahmy, Muhammad Shahbaz. Dec 2025

IEEE CAL 2025. Reimagining RDMA Through the Lens of ML. *Ertza Warraich*, Ali Imran, Annus Zulfiqar, Shay Vargaftik, Sonia Fahmy, Muhammad Shahbaz. Oct 2025

NSDI 2025. OptiReduce: Resilient and Tail-Optimal AllReduce for Distributed Deep Learning in the Cloud. *Ertza Warraich*, Omer Shabtai, Khalid Manaa, Shay Vargaftik, Yonatan Piasetzky, Matty Kadosh, Lalith Suresh, Muhammad Shahbaz. Philadelphia, PA. April 2025

IEEE S&P 2022. FuzzUSB: Hybrid Stateful Fuzzing of USB Gadget Stacks. Kyungtae Kim, Taegyu Kim, *Ertza Warraich*, Byoungyoung Lee, Kevin Butler, Antonio Bianchi, Dave Tian. San Francisco, CA. May 2022

OSDI 2022 (Poster). Ultima: Robust and Tail-Optimal All-Reduce for Distributed Deep Learning. *Ertza Warraich*, Leonard Liu, Omer Shabtai, Yonatan Piasetzky, Shay Vargaftik, Matty Kadosh, Lalith Suresh, Muhammad Shahbaz. Carlsbad, CA. July 2022

SIGCOMM 2021 (Poster). Constructing the Face of Network Data. *Ertza Warraich*, Muhammad Shahbaz. Virtual Online. August 2021

INVITED TALKS & RESEARCH PRESENTATIONS

OptiNIC: A Resilient and Tail-Optimal RDMA NIC for Distributed ML Workloads
Open Compute Project (OCP) Time Appliances Project (TAP) — Feb 2026
DARPA/SRC ACE Center for Evolvable Computing (Industry Liaison Meeting) — Dec 2025

Ultra–Low-Latency CDN Edge Applications
Microsoft Research, Intelligent Networked Systems Group — July 2025
Microsoft Azure, Azure Front Door Team — July 2025

OptiReduce / Ultima: Tail-Optimal Collective Communication for Distributed ML Workloads
DARPA/SRC CUBIC Center for Ubiquitous Connectivity (Invited Presentation) — Oct 2025
DARPA/SRC ACE Center for Evolvable Computing (Industry Liaison Meeting) — July 2025
DARPA/SRC ACE Center for Evolvable Computing (All-Hands Meeting) — May 2024
IBM AI Compute Symposium (AICS '23) — Nov 2023
FABRIC KNIT 7 Workshop — Sept 2023

LLM Parallelism and Communication: Deployment-Aware Design Choices
Networking and Distributed Systems Lab, Hewlett Packard Enterprise — Sept 2023

RoCE vs. InfiniBand Performance Analysis for Large-Scale ML
Mellanox Networking Group, NVIDIA — Sept 2022

ACADEMIC & PROFESSIONAL SERVICE

Program Committee Member
- APNet, ICNP, NetFabAI — 2026

Pre-review Task Force
- USENIX NSDI — 2025

Undergraduate Research Expo Judge
- Purdue University — 2023

INDUSTRY EXPERIENCE

Microsoft Research (MSR) — *May 2025 - Sept 2025*
Research Intern
- Built and optimized a suite of low-latency applications for Azure Front Door (CDN Edge)
- Created an adaptive scheduler for edge workloads to maximize cost savings

Hewlett Packard Enterprise — *June 2023 - Dec 2023*
Research Associate Intern
- Profiling inter- and intra-node connects for efficient ML communication patterns
- Leveraging network-awareness for improved LLM workload distributions

NVIDIA Corporation — *May 2022 - Sept 2022*
Advance Dev. Research Intern
- Optimizing communication collectives for large-scale ML training
- Analysis of HPC environments with Ethernet and Infiniband for collectives performance

National Research Organization — *May 2018 - Jan 2020*
Assistant Manager
- Developed an AI-based pro-active threat-intelligence framework
- Deployment, analysis & management of custom honeypots

Horizon Technologies — *Sept 2017 - Dec 2017*
Research Engineer
- Vulnerability assessment and hardening of linux-based systems
- DevOps, DevSecOps, linux systems administration and operations

Ebryx Pvt. Ltd. — *June 2016 - Sep 2017*
Malware Researcher
- Developed an evasive-exploits kit for cyber-attack POCs
- FP/FN analyses of FireEye and various network security devices