

# ERTZA WARRAICH

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## RESEARCH INTERESTS

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

## EDUCATION

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### **Purdue University, USA**

*Jan 2020 - Present*

*Ph.D. Computer Science*

- Advisor: Prof. Muhammad Shahbaz
- Research: Systems, AI/ML, and Security

### **NUST, Pakistan**

*M.S. Computer Science*

*Sept 2017 - June 2019*

- Advisor: Prof. Syed Taha Ali
- Thesis: Intelligent botnet that uses AI for evasion

*B.E. Software Engineering*

*Sept 2012 - June 2016*

- Thesis: An autonomous network-monitoring tool

## ACADEMIA EXPERIENCE

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### **Dept. of CS, Purdue University**

*Jan 2024 - May 2024*

*Teaching Assistant*

- CS 180 Programming I (Fall 2024)
- CS 348 Information Systems (Spring 2024)

### **NextGArch Lab, Purdue University**

*Aug 2021 - Dec 2023*

*Research Assistant*

- Architectures and systems for large-scale ML training

### **PurSec Lab, Purdue University**

*Jan 2020 - Aug 2021*

*Research Assistant*

- Fingerprinting and fuzzing linux/windows kernel subsystems

## INDUSTRY EXPERIENCE

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### **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 RDMA for ML training 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

### **Ebryx Pvt. Ltd.**

*June 2016 - Aug 2017*

*Malware Researcher*

- Developed an evasive-exploits kit for cyber-attack POCs
- FP/FN analyses of FireEye and various network security devices

## PUBLICATIONS

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**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, Taegy 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

## ACADEMIC SERVICES

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**Program Committee Member** - NSDI 2025 (Pre-review Task Force)

**Research Expo Judge** - Undergrad Expo 2023 (Purdue University)

## CERTIFICATIONS

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**Cisco:** NDG Linux Essentials, Introduction to Cybersecurity

**AWS & ML Certifications:** AWS Hadoop Fundamentals, NVIDIA DLI: Fundamentals of Deep Learning

**Security Certifications** from Nessus, Fortinet, and Binalyze

## HONORS & AWARDS

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- The Honor Society of Phi Kappa Phi
- Bachelor's Gold Medalist (1 out of 150 students)
- Awarded Overall Best Student in NUST (1 out of 800 students)

## REFERENCES

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**Dr. Muhammad Shahbaz**

Assistant Professor, Dept of Computer Science, University of Michigan

msbaz@umich.edu

**Dr. Sonia Fahmy**

Professor and Assoc. Head, Dept of Computer Science, Purdue University

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**Dr. Lalith Suresh**

CEO and Co-founder, Feldera

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**Dr. Shay Vargaftik**

Senior Researcher, Broadcom

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