Luozhong Zhou

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Education

Harvard University *Cambridge, MA*
Master of Engineering in Computational Science (Thesis Track) *Sep 2024 – May 2026 (Expected)*

University of Wisconsin-Madison *Madison, WI*
Bachelor of Science in Computer Science (GPA: 3.87/4.0) *Sep 2020 – May 2024*

Experience

Research Assistant, University of Wisconsin-Madison *Jan 2023 – May 2024*
Project: Software Tampering Detection, Advisor: Prof. Barton Miller

- First co-author paper: *Differential fuzz testing to detect tampering in sensor systems and its application to arms control authentication*
- Evaluated vulnerabilities in nuclear armament control software on the surrogate system platform.
- Implemented time-based & count-based attacks and co-developed anomaly detection algorithm which analyzes from time-series cyber-physical data to effectively identify tampering across various attack scenarios.
- Established software tampering detection workflow using black-box fuzzing & differential testing in Python code.

Research Assistant, University of Wisconsin-Madison *Jan 2024 – May 2024*
Project: GPU Database (Crystal), Advisor: Prof. Xiangyao Yu

- Developed Python benchmark code for state-of-the-art CPU (DuckDB) & GPU Databases (Heavy.ai, Crystal) and analyzed system performance on Amazon EC2 instances.
- Implemented the sort-based grouping operation for TPC-H queries in Crystal database CUDA C++ code, achieving a 5x performance gain compared to leading GPU databases and a 10x improvement over leading CPU databases on tested queries.

Research Assistant, University of Wisconsin-Madison *May 2023 – Jan 2024*
Project: Reliability of Userspace Filesystem (uFS), Advisor: Prof. Remzi Arpaci-Dusseau

- Enhanced the POSIX-compliance of uFS, a state-of-the-art high-performance microkernel filesystem, by implementing system call interception features using C/C++.
- Designed experiments and constructed failure model by evaluating the microkernel filesystem's reaction to fatal errors when serving typical application workloads on Linux servers.
- Fixed two critical programming bugs that reduce microkernel filesystem failure outcomes to fatal errors by 50%.

Teaching Fellow, University of Wisconsin-Madison *May 2023 – Aug 2023*
Course: CS 537 Intro to Operating Systems

- Organized weekly discussions and provided hands-on assistance on course material, projects, and debugging.

Projects

Research on FUSE Filesystem *May 2023 - Aug 2023*

- Developed Python application benchmarks with real-world workloads on ext4 and FUSE filesystem.
- Conducted an in-depth performance assessment using Linux profiling tools & Docker to analyze system behavior and bottlenecks, and identified write amplification issues that may degrade FUSE filesystem performance by 80%.

Primitive Database System *Nov 2022*

- Built a primitive relational database system in C/C++ code with basic CRUD operations and SQL parser
- Implemented buffer manager, relational operators, and concurrency control that demonstrate understanding of databases beyond course requirements.

Technical Skills

Languages: Python, C/C++, Java, SQL, CUDA, HTML/CSS/Javascript, Shell
Frameworks/Tools: Hadoop, Spark, Cassandra, PostgreSQL, MySQL, Docker, Amazon EC2, Linux perf, REST APIs

Awards

Wisconsin Science and Computing Emerging Research Stars (WISCERS) *Spring 2024*
Dean's List *Fall 2021 – Fall 2023*