YUQI XUE

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RESEARCH INTERESTS

Computer Architecture and Systems. Accelerator Design. Hardware Security.

EDUCATION

University of Illinois at Urbana-Champaign *Aug 2021 – Present*
Ph.D. in Electrical and Computer Engineering
Advised by Prof. Jian Huang

University of Illinois at Urbana-Champaign *Aug 2017 – May 2021*
Bachelor of Science in Computer Engineering with High Honors
Bachelor of Science in Mathematics with Highest Distinction

PUBLICATION

IceClave: A Trusted Execution Environment for In-Storage Computing. Luyi Kang*, **Yuqi Xue***, Weiwei Jia*, Xiaohao Wang, Jongryool Kim, Changhwan Youn, Myeong Joon Kang, Hyung Jin Lim, Bruce Jacob, and Jian Huang. In *Proceedings of the 54th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO'21)*. 2021.
*Co-primary authors.

RESEARCH PROJECTS

Hardware-assisted Multi-tenant Neural Processing Unit (NPU) *2022*
Under submission to ISCA'23 *UIUC*

· Conducts a thorough study of the resource utilization of modern NPUs with real hardware devices.
· Proposes a multi-tenant NPU design for improving resource utilization and fairness.
· Designs a tensor operator scheduler that improves the fairness and throughput for collocated ML workloads.
· Develops a clustering scheme to identify pairs of collocatable DNN workloads.

Software-Defined Rack-Scale Storage System with Network-Storage Co-Design *2022*
Under submission to OSDI'23 *UIUC*

· Proposes a rack-scale storage system that co-designs software-defined network and software-defined storage.
· Develops a new I/O scheduling mechanism across network and storage for predictable performance.
· Develops a coordinated GC mechanism for a rack of SSDs to minimize the impact on the storage performance.
· Develops a rack-scale wear leveling mechanism for ensuring the uniform lifetime of a rack of SSDs.

Trusted Execution Environment for In-Storage Computing *2021*
Paper accepted to MICRO'21 *UIUC*

· Develops *IceClave*, a trusted execution environment for in-storage computing in modern solid-state drives.
· Enables security isolation between in-storage apps and the flash translation layer with ARM TrustZone.
· Proposes efficient memory encryption and verification method to protect user data against physical attacks.

WORK EXPERIENCE

Systems Platform Research Group, UIUC *May 2021 - Present*
Graduate Research Assistant *Urbana, IL*

ECE 511: Computer Architecture, UIUC *Fall 2022*
Graduate Teaching Assistant *Urbana, IL*

ECE 310: Digital Signal Processing, UIUC *Jan 2020 - Jul 2020*
Undergraduate Grader *Urbana, IL*

TALKS

IceClave: A Trusted Execution Environment for In-Storage Computing

- *54th Annual IEEE/ACM International Symposium on Microarchitecture (MICRO'21).* Virtual. Oct 19, 2021.
- *13th Annual Non-Volatile Memories Workshop (NVMW'22).* San Diego, CA, United States. May 10, 2022.
- *17th Coordinated Science Lab Student Conference (CSLSC'22).* Urbana, IL, United States. Feb 24, 2022.

SERVICES

Artifact Evaluation Committee

- IEEE/ACM International Symposium on Microarchitecture (MICRO), 2022
- USENIX Symposium on Operating Systems Design and Implementation (OSDI), 2022
- USENIX Annual Technical Conference (ATC), 2022
- IEEE International Symposium on High-Performance Computer Architecture (HPCA), 2023

Reviewer

- IEEE Computer Architecture Letters, 2022