

Yang Yang

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Keywords: Computer Architecture/GPU/Memory System/Confidential Computing/Performance

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RESEARCH INTERESTS

I am interested in **GPU** × **Trusted Computing** × **Cryptography** × **Memory**.

Recently, I have focused on understanding and addressing performance issues in secure GPU architectures such as confidential computing. I am also interested in accelerating cryptographic protocols such as private information retrieval using GPUs. To explore these ideas, I use different types of simulations (e.g., GPGPU-Sim) and real hardware (e.g., H100).

EDUCATION

 University of Virginia, Charlottesville, USA

Aug. 2023 – Present

 Ph.D. in Computer Science

GPA: 3.91/4.0

Topics: GPU × {Cryptography, Trusted-Computing, Memory, CXL}

Advisor: Prof. Adwait Jog

 Jilin University, Changchun, China

Sept. 2019 – Jul. 2023

 B.S. in Computer Science

GPA: 3.69/4.0

Thesis: The Design and Implementation of Binary Code Analysis Framework for NVIDIA GPU.

Advisor: Prof. Jingweijia TAN

PUBLICATIONS

[C3] [\(In-Submission, ISCA'26\)](#)

Abstract: Building on our ISPASS'25 results, we try to understand and optimize UVM under CC. Our evaluation on GPGPU-Sim achieved up to 3.1× and 5.1× speedup over the CC baselines. On average, it delivers 2.2× and 2.7× speedup in the two settings.

[C2] [\(ISCA'25\)](#) [\[PDF\]](#) [\[Slides.pdf\]](#) [\[Slides.pptx\]](#)

NetCrafter: Tailoring Network Traffic for Non-Uniform Bandwidth Multi-GPU Systems

Amel Fatima, Yang Yang, Yifan Sun, Rachata Ausavarungnirun, Adwait Jog

In the Proceedings of ACM International Symposium on Computer Architecture (ISCA), Tokyo, Japan, June 2025

Abstract: We present **NetCrafter**, a set of novel techniques to manage network traffic, especially across low-bandwidth links in multi-GPU systems. NetCrafter reduces the volume of flit traffic by (i) stitching compatible, partially filled flits, (ii) trimming unnecessary flits to avoid redundant transfers, and (iii) sequencing flits so that latency-sensitive ones arrive at their destinations faster.

[C1] [\(ISPASS'25\)](#) [\[PDF\]](#) [\[Talk@ISPASS\]](#) [\[Talk@CC-Summit\]](#) [\[Artifact Available\]](#)

Dissecting Performance Overheads of Confidential Computing on GPU-based Systems

Yang Yang, Mohammad Sonji, Adwait Jog

In the Proceedings of IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS), Ghent, Belgium, May 2025

Abstract: For the first time, we present a detailed event-level analysis of GPU applications, showing that kernels without unified virtual memory (UVM) are less affected in execution time but face higher launch and queuing delays. In contrast, UVM kernels experience severe slowdowns under CC. We further evaluate CNN training and LLM inference, where overheads grow at scale, and explore optimizations such as kernel fusion, overlapping and quantization to mitigate these costs.

RESEARCH EXPERIENCE

[Insight Computer Architecture Lab](#)

Aug. 2023 – Present

University of Virginia, Charlottesville, Virginia, USA

Advisor: Prof. Adwait Jog

Focus:

- GPU memory and storage system (UVM across DDR/HBM/SSD via PCIe/CXL/RDMA).
- TDX-based confidential computing on GPUs.
- Cryptography (FHE/PIR) with GPU acceleration.
- Efficient encryption for GPU-based heterogeneous memory system.

[State Key Laboratory of Processor](#)

Jul. 2022 – Sept. 2023

Institute of Computing Technology, Chinese Academy of Science, Beijing, P.R.China

Advisor: Prof. Guangli Li

Topics: Compiler & Programming Systems

Focus: Facilitating Profile-Guided Compiler Optimization with Graph Learning

- Proposed a branch predictor using XGBoost based on compile time static analysis.
- Utilize graph representations to build predictive profile-guided optimization framework and integrated it into LLVM.
- Released a new dataset for graph-related static analysis tasks.

Advisor: Prof. Jingwei Jia TAN

Topics: GPU × {PTX/SASS, Reliability, Energy Efficiency}

Focus:

- Process variation of FinFET and chiplet based MCM-GPUs.
- SASS level analysing and modeling framework for NVIDIA Ampere GPUs.
- Learning techniques for GPU power modeling.
- Instruction level under-voltage reliability of GPUs

TEACHING EXPERIENCE

25 Fall @ UVA, TA for [CS 4444: Introduction to Parallel Computing](#) (undergraduate course)

- Designed programming assignments in CUDA.

24 Fall @ UVA, TA for [CS 6354: Computer Architecture](#) (graduate course)

- Designed a pipelined RISC-V simulator in Python.

AWARD

[Travel Grant] ISPASS'25 ISCA'25

[Fellowship@UVA] 2023

[Scholarship@JLU] 2019 2020 2021 2022

SERVICE

[SIG] Co-organizer of Systems-Interest-Group meetings at UVA from Summer 2024 to Fall 2025.

[Artifact Evaluation Committee] IISWC'25

SKILLS

Languages C/C++ · Assembly · Python · Go

Frameworks CUDA · Pytorch · LLVM · TDX · QEMU/KVM · NVIDIA Linux Open GPU Kernel Module

Software LINUX · LATEX · GNU compiler (gcc, etc.) · GPGPU-Sim/Accel-Sim · Varius-TC · Z3 Solver