I'm a 2nd year Ph.D. student at the University of Michigan (advised by Prof. Satish Narayanasamy), working on confidential computing and trusted hardware, with a strong background in GPU architecture, memory systems and Out-of-Order CPU architecture. I'm looking for an internship position during the summer of 2024 in the field of computer architecture and systems. I'm open to research focused positions and engineer/architect positions.

Please see next page for my CV and detailed background.

– Joy

SUMMARY

Juechu (Joy) Dong is a 2nd year Ph.D. student with the Computer Engineering Lab at the University of Michigan, advised by Prof. Satish Narayanasamy. Her research seeks to advance confidential computing solutions for enabling privacy-preserving data analytics solutions ranging from population scale genomic analysis to generative AI. Her current work focuses on scaling trusted memory capacity from hundreds of MB to tens of TB and developing privacy-preserving genome-wide association study platform on Azure's confidential computing platform.

EDUCATION

University of Michigan - Ann Arbor   (exp.) **2027**
Computer Science and Engineering, PhD

> **Topics:** Computer System & Architecture, Trusted Hardware / Confidential Computing
> **Advisor:** Prof. Satish Narayanasamy
> **GPA:** 4.00/4.00
> James B. Angell Scholar   2022-2023

University of Michigan-Shanghai Jiao Tong University Joint Institute   **Aug 2022**
Computer Engineering, Bachelor of Science

> John Wu & Jane Sun Outstanding Scholarship   2018-2022
> Outstanding Academic Performance Scholarship   2018-2020

University of Michigan - Ann Arbor   **Apr 2022**
Computer Engineering, Bachelor of Science in Engineering, Summa Cum Lauda

> **Selected Coursework:** Comp. Architecture A, Compiler A+, Operating System A
> **GPA:** 3.99/4.00
> Dean's List   2020-2022
> University Honors   2020-2022

PUBLICATION

VersionVault: Towards Large Capacity Trusted Memory with HW Protection   **ISCA 2024**
J. Dong, J. Rosenblum, S. Narayanasamy   *under preparation*

- Scale trusted memory size from hundreds of MB to tens of TB by expanding the span of trusted from a single trusted processor to an entire platform including intelligent memories.
- Design a new scheme of freshness protection that reduces the space requirement by 50x.
- Reduce deployment cost by spacing sharing one intelligent memory device among multiple CPUs.

mm2-long: Accelerating Accurate Ultra Long Genome Sequence Mapping on AMD GPU
J. Dong, X. Liu, H. Sadasivan, G. Sitaraman, S. Narayanasamy   *on-going*

- Accelerate computational intensive chaining step in the state-of-art long sequence mapping tool minimap2 using AMD GPU by 5x.
- Optimize towards ultra long reads of 100k+ to accommodate genome sequencing technology trend.
- Develop adaptive GPU scheduling algorithm to balance highly heterogeneous workload.

SECRET-GWAS: A Platform for Online Million-Patient Multi-institutional GWAS based on TEE   Nature Methods
J. Rosenblum, J. Dong, S. Narayanasamy   *under submission*

- Develop a thousand-core platform on Azure Confidential Computing to conduct multi-institutional GWAS on millions of patients in less than a minute.
- Adapt Spark-based Hail genomic analysis framework to run on TEE under obliviousness requirement.
- Parallelize GWAS computation on 1k cores to achieve near linear speedup.

INDUSTRY EXPERIENCE

NVIDIA   May 2022 - Aug. 2022
GPU Deep Learning Architect Intern
- Model and analyze new memory features on next-gen GPUs such as distributed shared memory, asynchronous transaction barrier, etc.
- Analyze and optimize multi-GPU data movement for deep learning workloads using Tensor Memory Accelerator (TMA).

TEACHING

Instructional Aide at University of Michigan   2021FA, 2022WN
EECS470 Computer Architecture
- Primary Instructor: Prof. Ron Dreslinski / Prof. Mark Brehob

Graduate Student Instructor   2023FA
EECS471 Applied Parallel Programming with GPUs
- Primary Instructor: Dr. Valeriy Tenishev

SERVICE

Computer Engineering Lab Reading Group   2022 - present
Coordinator
- Organize weekly paper reading presentations and discussions.
- Host talks from visiting researchers and professors.

UM-SJTU Joint Institute Alumni Association   2022 - present
Founder & Vice President
- **Alumni Engagement**: Organize alumni and student gatherings.
- **Relationship Building**: Involve in expanding SJTU - UM collaborations, connecting to JI sponsors, and building industry relationships.
- **Career Advising**: Organize students career development workshops.
- **Welcoming**: Host new student orientation events, organize airport pickups, and offer settle down help.
- **Student Support**: Support students during the stressful transition to start in a new university in a new country, and during urgent crisis.

SKILLS

Programming Languages: C/C++, CUDA, HIP, SIMD, (system) verilog, bash, Makefile

Technologies/Frameworks:

GPU Tuning: nsight-compute/nsight-sys, omniperf/omnitrace/rocprof

Formal Verification: Murphi,

SIMD: avx512, avx2 on Xeon Phi

Simulation: SniperSim, DRAMSim, pinplay

Confidential Computing: Open Enclave SDK

Architectures: AMD CDNA2 Instinct GPU, NVIDIA Hopper GPU, Intel Xeon Phi, Out-of-order CPU