# Chendi Li

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PhD student | AI+System

I am currently a third-year PhD student at the University of Utah, advised by Prof. **P. (Saday) Sadayappan**. I'm working on software system design for accelerating GPU kernels. I received my master's degree from the State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences, under the supervision of Prof. **Yunquan Zhang**.

#### **RESEARCH INTERESTS**

- High-Performance Computing
- High-Performance Machine learning
- Optimizing Tensor Computations

#### EDUCATION

Sep 2022 — Now
Sep 2019 — July 2022
Sep 2014 — June 2018
Sep 2022 — Now
Sep 2019 — July 2022
Jan 2018 — June 2019

#### PUBLICATIONS

[ICS 2024] Chendi Li\*, Yufan Xu\*, Sina Mahdipour Saravani, Saday Sadayappan, Accelerated Auto-Tuning of GPU Kernels for Tensor Computations.

[TPDS 2024] Cunyang Wei, Haipeng Jia, Yunquan Zhang, Jianyu Yao, Chendi Li, Wenxuan Cao. IrGEMM: An Input-Aware Tuning Framework for Irregular GEMM on ARM and X86 CPUs.

[ICS 2023] T Chen, H Jia, Y Zhang, K Li, Z Li, X Zhao, J Yao, Chendi Li, et al. OpenFFT: An Adaptive Tuning Framework for 3D FFT on ARM Multicore CPUs.

[ISPA 2021] Chendi Li, Haipeng Jia, Hang Cao, et al. AutoTSMM: An Auto-tuning Framework for Building High-Performance Tall-and-Skinny Matrix-Matrix Multiplication on CPUs.

[ICPADS 2021] Jianyu Yao, Boqian Shi, Chunyang Xiang, Haipeng Jia, Chendi Li, et al. IAAT: An Input-Aware Adaptive Tuning framework for Small GEMM.

[HPCC 2021] Tun Chen, Haipeng Jia, Zhihao Li, Chendi Li, et al. A Transpose-free Three-dimensional FFT Algorithm on ARM CPUs.

[HPC China 2020] Chendi Li, Guangting Zhang, Haipeng Jia. Fast Computation of Elementary Functions on ARM Platforms.

#### PROJECTS

#### Apache TVM, Ansor-AF-DS Contributor

#### Feb 2023 — Feb 2024

Designed and developed the dynamic gradient algorithm in TVM. Experimental evaluation on a number of matrix-matrix
multiplication and 2D convolution kernels demonstrates an order-of-magnitude improvement in auto-tuning time to achieve the
same level of code performance. The paper was published in ICS 2024. The pull request is currently being reviewed by the Apache
TVM community.

#### **OpenBLAS**, Contributor

Developed and optimized pre-packed matrix-matrix multiplication and triangular solve with multiple right-hand sides (TRSM) for ARMv8 and x86 platforms. OpenBLAS is one of the most widely used open-source BLAS libraries.

## AutoTSMM, Contributor

Designed and developed AutoTSMM, which is used to build high-performance tall-and-skinny matrix multiplication on mainstream CPUs. AutoTSMM is competitive with Intel OneMKL and outperforms all conventional GEMM implementations on ARMv8 platform. This work was published in IEEE ISPA 2021 and it was published in TPDS'24 as a part of IrGEMM framework.

# IAAT, Contributor

 Investigated JIT tools for small GEMM. IAAT is a template-driven, just-in-time small GEMM framework targeting CPUs. This work was accepted by IEEE ICPADS 2021.

# AutoFFT/OpenFFT, Contributor

Optimized small-scale FFT and contributed to multi-threading and 2D-FFT. AutoFFT/OpenFFT is a template-based FFT code auto-generation framework that contributes to many Chinese vendors' libraries. This work was published in SC'19, TPDS'20, HPCC'21, and ICS'23.

# **OpenVML**, Contributor

 Optimized the mathematical functions by manipulating IEEE 754 floating-point representations, OpenVML, a high-performance vector math library, demonstrated significant performance improvements over both the C standard library and ARMPL. This work was accepted and presented at HPC China 2020.

# Awards & Honors

2021 **First-class scholarships** 

2015 Collegiate programming contest first prize; Outstanding volunteer

#### **TECHNICAL SKILLS**

Tools	Linux, Git, Vim, NVIDIA Nsight Compute, GDB, CMake
Programming/Scripting	Python, C, C++, CUDA, X86 and ARM Assembly, X86 and NEON intrinsic

# Nov 2020 — June 2022

Nov 2020 — June 2022

## Jan 2020 - Oct 2020

# Nov 2020 — Feb 2022

# Jan 2018 — Feb 2021