

Boyu Tian (田博宇)

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EDUCATION

Tsinghua University

Sep. 2020 - Present

Institute for Interdisciplinary Information Sciences (交叉信息研究院)

Ph.D. student in Computer Science, advised by Prof. Mingyu Gao (高鸣宇).

Shanghai Jiao Tong University

Sep. 2016 - Jun. 2020

ACM Honors Class, Zhiyuan College (ACM 班)

B.Eng. in Computer Science, advised by Prof. Chao Li (李超).

RESEARCH INTERESTS

My research interests mainly lie in efficient memory architectures and scalable data processing, with a focus on memory-centric designs like near-data processing, memory pooling, and memory disaggregation. Additionally, I explore memory system optimizations for key workloads like deep learning and graph processing.

PUBLICATIONS

Boyu Tian, Qihang Chen, and Mingyu Gao. ABNDP: Co-optimizing Data Access and Load Balance in Near-Data Processing. In *ASPLOS*, 2023. (CCF-A).

Qihang Chen, **Boyu Tian**, and Mingyu Gao. FINGERS: Exploiting Fine-Grained Parallelism in Graph Mining Accelerators. In *ASPLOS*, 2022. (CCF-A).

Bohan Zhao, Xiang Li, **Boyu Tian**, Zhiyu Mei, and Wenfei Wu. DHS: Adaptive Memory Layout Organization of Sketch Slots for Fast and Accurate Data Stream Processing. In *KDD*, 2021. (CCF-A)

EXPERIENCES

IDEAL Lab, IIIS, Tsinghua University

Sep. 2020 - Present

Research Assistant, advised by Prof. Mingyu Gao

Beijing, China

- We focused on alleviating the memory access bottleneck for data-intensive applications.
- I paid special attention to architectures that follow the Near-Data Processing paradigm. I focused on providing system support and data communication optimization for general-purpose NDP systems with various hardware technologies, including 3D-stacked-memory-based NDP (*ASPLOS' 23*) and DRAM-bank-based NDP (*in submission*).
- (*Ongoing*) I am currently working on optimizing the memory bandwidth and capacity bottleneck of the inference of large-scale Mixture-of-Experts (MoE) models.
- (*Ongoing*) I am currently working on architecting a high-performance rack-scale CXL-based memory pool that is scalable and applicable to heterogeneous devices and various applications.

Alibaba DAMO Academy

Jun. 2023 - Jan. 2024

Research intern in Computing Technology Lab. Mentor: Dr. Dimin Niu

Beijing, China

- We focused on the design and development of memory pooling based on the CXL technology. Our work is presently being submitted to the industry track of leading conferences of computer architecture.

- I was in charge of a research project focusing on the design of a rack-level CXL-based memory pool that is scalable and applicable to multiple heterogeneous computing devices.

SAIL Lab, Shanghai Jiao Tong University

Jul. 2018 - Jun. 2020

Research Intern, advised by Prof. Chao Li

Shanghai, China

- We explored the idea of approximate graph computing. I developed a system to control approximation level of graph algorithms according to user-defined QoS requirements.
- I proposed a graph abstraction for cloud resources and inter-dependent microservices, along with a microservice deployment scheme using sub-graph matching and a runtime resource adjustment.

Turing Department, Huawei Hisilicon

Oct. 2019 - Dec. 2019

Research Intern, supervised by Dr. Heng Liao and Dr. Lin Li

Shanghai, China

- I developed algorithms for 3D view synthesis from sparse input images. I modified the rendering path generation of existing synthesis systems to adapt it for light field rendering in the 3D scenario.

CEI Lab, Duke University

Jul. 2019 - Sep. 2019

Research Intern, advised by Prof. Yiran Chen

North Carolina, U.S.

- I explored the idea of accelerating graph processing using ReRAM-based Processing-in-Memory paradigm.

HONORS AND AWARDS

ASPLOS 2023 Student Travel Award	2023
Comprehensive Excellence Scholarship of Tsinghua University	2021, 2022, 2023
Tang Lixin Scholarship	2018-2020
Outstanding Leader Scholarship of Zhiyuan College	2017
Zhiyuan Honorary Scholarship	2016-2019

TEACHING

Teaching Assistant

20470084 Computer Architecture

Spring 2021, Spring 2022

Tsinghua University

- I worked as the teaching assistant of Computer Architecture taught by Prof. Mingyu Gao, targeting undergraduate students in Yao Class and Artificial Intelligence Class in IIIS. I designed and developed the course project, which is a computer architecture simulator for RISC-V.

Teaching Assistant

C++ Programming

Fall 2017

Shanghai Jiao Tong University

- I worked as the teaching assistant of C++ Programming taught by Prof. Huiyu Weng for students in ACM Class. I designed exam questions and algorithmic programming exercises.

TECHNICAL SKILLS

Programming Languages	C, C++, Python, Verilog, Java, Rust, Go
Hardware Simulation/Analysis	ZSim, Intel Pin, CACTI, Ripes