Jingrong Chen

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Education

Sept. 2020 – Present **Duke University**, *Doctor of Philosophy*, Computer Science
- Advisor: **Prof. Danyang Zhuo**

Sept. 2018 – Aug. 2020 **Hong Kong University of Science and Technology**, *Master of Philosophy (MPhil)*, Computer Science and Engineering
- Advisor: **Prof. Kai Chen**

Sept. 2014 – Jun. 2018 **Fudan University**, *Bachelor of Science*, Honor Program, School of Computer Science
- Advisor: **Prof. Yang Chen**

Research Interests

- End-system networking
- Cloud networking
- RDMA and high-speed network
- Machine learning systems

Publications

[C7] Hao Wang, Han Tian, **Jingrong Chen**, Xinchen Wan, Jiacheng Xia, Gaoxiong Zeng, Wei Bai, Junchen Jiang, Yong Wang, and Kai Chen. Towards Domain-Specific Network Transport for Distributed DNN Training. In ***NSDI***, 2024

[C6] Xiangfeng Zhu, Weixin Deng, Banruo Liu, **Jingrong Chen**, Yongji Wu, Thomas Anderson, Arvind Krishnamurthy, Ratul Mahajan, and Danyang Zhuo. Application Defined Networks. In *HotNets*, 2023

[C5] **Jingrong Chen***, Yongji Wu*, Shihan Lin, Yechen Xu, Xinhao Kong, Thomas Anderson, Matthew Lentz, Xiaowei Yang, and Danyang Zhuo. Remote Procedure Call as a Managed System Service. In ***NSDI***, 2023

[C4] Xinhao Kong, **Jingrong Chen**, Wei Bai, Yechen Xu, Mahmoud Elhaddad, Shachar Raindel, Jitendra Padhye, Alvin R. Lebeck, and Danyang Zhuo. Understanding RDMA Microarchitecture Resources for Performance Isolation. In ***NSDI***, 2023

[C3] **Jingrong Chen**, Hong Zhang, Wei Zhang, Liang Luo, Jeffrey Chase, Ion Stoica, and Danyang Zhuo. NetHint: White-Box Networking for Multi-Tenant Data Centers. In ***NSDI***, 2022

[C2] Hong Zhang, Yupeng Tang, Anurag Khandelwal, **Jingrong Chen**, and Ion Stoica. Caerus: TIMELY Task Scheduling for Serverless Analytics. In ***NSDI***, 2021

[C1] Hao Zhao, Qingyuan Gong, Yang Chen, **Jingrong Chen**, Yong Li, and Xiaoming Fu. This Place Is Swarming: Using a Mobile Social App to Study Human Traffic in Cities. In *PerCom Workshops*, 2018

Industry Experience

May 2023 – Dec. 2023 **Uber**, *Manager:* ***Dr. Hongqiang Harry Liu***, Software Networking, Off-host service mesh
- Migrated assisted load balancing (ALB) from Muttley to Envoy
- Initiated the early design and PoC of off-host service mesh

May 2022 – Aug. 2022 **Meta**, *Mentor:* ***Dr. Liang Luo***, AI System SW/HW Codesign, Distributed training auto parallelism
- Explored the design space of DHEN's performance through automated search
- Developed a codesign toolkit for open-source DHEN based on Alpa

Feb. 2019 – Aug. 2019 **Clustar**, *Mentor:* ***Dr. Shuihai Hu***, Startup company, RDMA virtualization in the cloud
- Exploited Open vSwitch hardware offloading and a programmable data-plane in NIC for RDMA I/O virtualization
- Designed an explicit route controller that enabled network virtualization (VXLAN) with the multi-path scenario into consideration
- Designed an end-host based load balancer, which leveraged active probing to select the best path
- Implemented a prototype consisting of a brain and an agent which can provision VM and allocate bandwidth on the end-host

Mar. 2018 – Aug. 2018 **ByteDance**, *Supervisor:* ***Dr. Chuanxiong Guo***, AI Lab, Machine learning system group
- Redesigned and implemented the communication part of MXNet with IBVerbs and RDMA
- Conducted experiments to demonstrate the acceleration of MXNet over RDMA on various models (including CNNs and RNNs)
- Worked on how to simplify verbs programming

Jul. 2017 – Sept. 2017 **Alibaba**, *Manager:* ***Dr. Ming Zhang***, Network Automation, Network Audit
- Promoted the coverage and accuracy of servers uplink data in Alibaba's network information base (NIB) database.
- Transferred part of NIB data and the daily auditing jobs from a local relational database to MaxCompute (a big data platform, previously called ODPS)

Course Projects

NEMU A simple but complete full-system x86 emulator designed for teachings. Many x86-specific programs can run on NEMU

Cyclone Jet Rocket A DDoS tool implemented with Go language based on raw socket, providing more than 8 kinds of attack methods, with different parameters each method

Enrollment System A scalable course enrollment system backend implemented with actor model and microservices architecture, can process ~12000 requests per second on 6 VMs

AIMv6 A cross-platform operating system for teaching purposes, written in C and ran on QEMU

Dogchamber A chatroom for Computer Networks course. Re-implemented WebSocket protocol (server-side) based on TCP socket

ESSHFS An encrypted network filesystem based on sshfs, the transparent encryption was based on *Counter* mode (CTR) AES

Awards / Honors

2022 – 2023 USENIX NSDI Student Grant

2021 – 2022 Teaching Assistant Award

2021 – 2022 Research Initiation Project Award

2020 – 2022 Duke Computer Science PhD Fellowship

2018 – 2020 HKUST Postgraduate Scholarship

Dec. 2015 The 2015 ACM-ICPC Asia Shanghai Regional Contest – **Gold Medal**

Nov. 2015 The 2015 ACM-ICPC Asia Hefei Regional Contest – **Gold Medal**

Nov. 2014 The 2014 ACM-ICPC Asia Guangzhou Regional Contest – **Gold Medal**

Aug. 2013 The 2013 CCF National Olympiad in Informatics – **Bronze Medal**

Teaching Experience

2022 Spring Teaching Assistant of Duke CPS590.04 – Data Center Systems

2021 Fall Teaching Assistant of Duke CPS310 – Operating Systems

2019 Fall Teaching Assistant of HKUST COMP3511 – Operating Systems

Programming Skills

I am experienced with Rust, C++, C, Python, JavaScript, Haskell, Bash, systems programming, asynchronous networking programming, RDMA verbs programming, parallel computation, and debugging distributed systems.