

# Xinhao Kong

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Website: <https://sigempty.github.io>

## EDUCATION

- **Duke University** 2021 - Now  
Ph.D. in Computer Science GPA: 4.0/4.0
  - Advisor: Danyang Zhuo
- **Peking University** 2016 - 2020  
B.S. in Computer Science GPA: 3.65/4.0
  - Advisor: Guangyu Sun
- **Hong Kong University of Science and Technology** 2019  
Exchange student in Computer Science and Engineering GPA: 4.25/4.0 (exceeding scale due to A+ grades)
  - Advisor: Kai Chen

## RESEARCH INTEREST

- **RDMA-Bench: Benchmark Framework for Systematic RDMA Performance Tests**
  - Uncover performance anomalies in RDMA subsystems.
  - Understand and mitigate performance interference in RDMA networks.
  - Vulnerabilities uncovered in NVIDIA ConnectX-5 and ConnectX-6 NICs.
    - \* [Security Bulletin: NVIDIA ConnectX - April 2023](#)
- **Nextgen-RDMA: Towards Next Generations of Hyper-Scale RDMA Networks**
  - Hardware-software co-design solutions for multi-tenant RDMA in public clouds.
  - Revisit transport and application design for cross datacenter **long-haul** RDMA networks.
  - Automatic RDMA performance tuning and diagnosis for GPU-centered AI networks.

## PUBLICATIONS ([GOOGLE SCHOLARS](#))

### Conference Papers

1. Jinghan Huang, Jiaqi Lou, Srikar Vanavasam, **Xinhao Kong\***, Houxiang Ji, Ipoom Jeong, Eun Kyung Lee, Danyang Zhuo, Nam Sung Kim. **HAL: Hardware-assisted Load Balancing for Energy-efficient SNIC-host Cooperative Computing**. In *51st International Symposium on Computer Architecture (ISCA 2024)*.
2. Jiaqi Lou\*, **Xinhao Kong\***, Jinghan Huang, Wei Bai, Nam Sung Kim, Danyang Zhuo. **Hardware-assisted RDMA Performance Isolation for Public Clouds**. In *21th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2024)*. (\* indicates co-primary author)
3. **Xinhao Kong**, Jingrong Chen, Wei Bai, Yechen Xu, Mahmoud Elhaddad, Shachar Raindel, Jitendra Padhye, Alvin R. Lebeck, Danyang Zhuo. **Understanding RDMA Microarchitecture Resources for Performance Isolation**. In *20th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2023)*.
4. Jingrong Chen, Yongji Wu, Shihan Lin, Yechen Xu, **Xinhao Kong**, Thomas Anderson, Matthew Lentz, Xiaowei Yang, Danyang Zhuo. **Remote Procedure Call as a Managed System Service**. In *20th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2023)*.
5. **Xinhao Kong**, Yibo Zhu, Huaping Zhou, Zhuo Jiang, Jianxi Ye, Chuanxiong Guo, and Danyang Zhuo. **Collie: Finding performance anomalies in RDMA subsystems**. In *19th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2022)*.

### Workshop Papers

1. **Xinhao Kong**, Jiaqi Lou, Wei Bai, Nam Sung Kim, Danyang Zhuo. **Towards A Manageable Intra-Host Network**. In *Proceedings of the 19th Workshop on Hot Topics in Operating Systems (HotOS 2023)*.

## INDUSTRY EXPERIENCE

- **Research SDE Intern** **Microsoft**  
*Team: Azure Core Host Networking* *May. 2023 - Aug. 2023*
  - Apply RDMA-Bench to Microsoft Azure Network Adapter (MANA) to expose performance issues and vulnerabilities.
  - Investigate and fix the uncovered issues to improve MANA’s reliability and efficiency.
  - Shadow oncall and assist to handle OpenAI RDMA network performance issues.
- **Research SDE Intern** **Microsoft**  
*Team: Azure Core Host Networking* *May. 2022 - Aug. 2022*
  - Systematically uncover performance issues and interference vulnerabilities of Azure accelerated networks.
  - Collaborate with vendors to investigate and fix the uncovered issues.
- **Software Engineer** **ByteDance**  
*Team: Data/Sys/Networking* *Sep. 2020 - May. 2021*
  - Design, implement, and deploy RDMA-based Pingmesh for ByteDance RDMA telemetry systems.
  - Test and find-tune customized DGX servers to enable extremely high speed RDMA for machine learning applications.
  - Operate RDMA networks to support large-scale machine learning workloads for Applied Machine Learning team.

## TEACHING SERVICES

- **Teaching Assistant** **Duke University**  
*Graduate Course: Distributed Systems* *Feb. 2023 - May. 2023*
- **Teaching Assistant** **Duke University**  
*Undergraduate Course: Introduction to Operating System* *Sep. 2022 - Jan. 2023*
  - Received an exceptional course evaluation score of 4.62/5.0 (university average is 4.13).
- **Teaching Assistant** **Peking University**  
*Undergraduate Course: Introduction to Computer Systems* *Sep. 2018 - Jan. 2019*

## INVITED TALKS

- **Towards Reliable and Predictable RDMA Networks** *March, 2023*
  - NVIDIA Networking Software Architecture Group
- **Towards a Manageable Intra-Host Network** *June, 2023*
  - HotOS 2023
- **Understanding RDMA Microarchitecture Resources for Performance Isolation** *April, 2023*
  - USENIX NSDI 2023
  - Microsoft Research and Microsoft Azure *Aug, 2022*
- **Collie: Finding Performance Anomalies in RDMA Subsystems**
  - Harvard Cloud & Network System Group *May, 2022*
  - USENIX NSDI 2022 *April, 2022*
  - Student Lightning Talk @Google Networking Research Summit 2022 *March, 2022*
  - Microsoft Research and Microsoft Azure *Sep, 2021*

## AWARDS

- NSDI '24 Student Grant 2024
- Duke Outstanding Research in Progress Award 2023
- Duke Outstanding Teaching Assistant Award 2023
- NSDI '23 Student Grant 2023
- NSDI '22 Student Grant 2022
- Duke Ph.D. Fellowship 2021-2022
- Outstanding Graduate of Peking University 2020
- Beijing Innovation Fund 2019
- Huirong Li Scholarship (top 5%) 2018