Xinhao Kong

Email: **xinhao.kong@duke.edu**
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
  – 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. 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)
2. **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**).*
3. 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**).*
4. **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**
  – NVIDIA Networking Software Architecture Group *March, 2023*
- **Towards a Manageable Intra-Host Network**
  – HotOS 2023 *June, 2023*
- **Understanding RDMA Microarchitecture Resources for Performance Isolation**
  – USENIX NSDI 2023 *April, 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

- 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