

Jiaqi Lou

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EDUCATION

University of Illinois Urbana-Champaign

August 2021-Present

Ph.D. Candidate in Electrical and Computer Engineering

Advisor: Prof. Nam Sung Kim

- Research Interests: intra-host high-performance I/O and network stacks (RDMA and DPDK), SmartNICs, hardware-software co-design, and computer architecture.

Zhejiang University

August 2017-June 2021

Bachelor of Engineering in Electrical Engineering and Automation (Dual-Degree Program)

- Graduated with Scholarship of Zhejiang Province

University of Illinois Urbana-Champaign

August 2017-June 2021

Bachelor of Science in Electrical Engineering, Minor in Computer Science (Dual-Degree Program)

- Graduated with Highest Honors

EXPERIENCE

IBM Research

Yorktown Heights, NY, USA

Research Intern, Mentor: I-Hsin Chung, Hubertus Franke, Alaa Youssef

May 2026-August 2026

- Worked on intra-host network topology research and routing optimizations, focusing on the PCIe multi-path.
- IBM Extern through IBM-UIUC IIDAI research center program.

Intel Labs

Hillsboro, OR, USA

Research Intern, Mentor: Ren Wang, Atul Kwatra

May 2024-August 2024

- Researched characterizations and use cases of on-chip accelerators on Intel 4th-Generation Xeon Scalable Processors and future generations.

Microsoft Research

Redmond, WA, USA

Research Intern, Mentor: Wei Bai, Ranveer Chandra

June 2022-August 2022

- Researched multi-tenancy challenges for kernel-bypass networking including RDMA and DPDK in public clouds. Explored disaggregated storage with NVMe-over-fabrics in the networking group.

TECHNICAL SKILLS

- Systems & Networking:** PCIe, RDMA, DPDK, NVMe-over-Fabrics, Linux Kernel
- Hardware:** FPGA, computer architecture simulation, and performance characterization
- Programming Languages:** Verilog/SystemVerilog, C/C++, Python, Bash

PROJECTS

Intra-host Communication Optimization and RDMA Performance Isolation

- Designed and built an FPGA-based Programmable Intelligent PCIe Switch (PIPS), providing unprecedented observability, manageability, and programmability of intra-host networks.
- Applied PIPS to enforce RDMA performance isolation in multi-tenant public clouds (NSDI'2024) and to enable new intra-host traffic orchestration, security enforcement, and accelerator integration.

SmartNIC and Intra-host Datapath Optimization

- Developed AccDirect, which creates direct datapath between off-chip NICs and on-chip accelerator (Intel DLB) to reduce host CPU overhead while maximizing load-balanced application performance (ISCA'25).
- Comprehensively studied the characterizations of commodity SmartNICs and designed hardware-assisted SmartNIC and host collaborated computing framework for better energy efficiency (ISCA'24).

Host Microarchitecture Resource Management

- Built an LLC management runtime that mitigates I/O-induced cache contention from improper Data Direct I/O (DDIO) use, combining priority-aware cache-way partitioning with selective DDIO toggling to protect latency-critical workloads (ISCA'25).

PUBLICATIONS

1. **Dynamic Load Balancer in Intel Xeon Scalable Processor: Performance Analyses, Enhancements, and Guidelines**
J. Lou, S. Vanavasam, Y. Yuan, R. Wang, N. S. Kim
52nd IEEE/ACM International Symposium on Computer Architecture (ISCA 2025)
2. **A4: Microarchitecture-Aware LLC Management for Datacenter Servers with Emerging I/O Devices**
H. Park, **J. Lou**, S. Lee, Y. Yuan, K. S. Park, Y. Son, I. Jeong, N. S. Kim
52nd IEEE/ACM International Symposium on Computer Architecture (ISCA 2025)
3. **HINT: A Hardware Platform for Intra-host NIC Traffic and SmartNIC Emulation**
J. Lou*, Y. Li*, S. Vanavasam, N. S. Kim
IEEE Computer Architecture Letters (CAL 2025)
4. **Harmonic: Hardware-assisted RDMA Performance Isolation for Public Clouds**
J. Lou*, X. Kong*, J. Huang, W. Bai, N. S. Kim, D. Zhuo
21st USENIX Symposium on Networked Systems Design and Implementation (NSDI 2024)
5. **HAL: Hardware-Assisted Load Balancing for Energy-Efficient SNIC-Host Cooperative Computing**
J. Huang, **J. Lou**, S. Vanavasam, X. Kong, H. Ji, I. Jeong, D. Zhuo, E. K. Lee, N. S. Kim
51st IEEE/ACM International Symposium on Computer Architecture (ISCA 2024)
6. **Demystifying CXL Memory with Genuine CXL-Ready Systems and Devices**
Y. Sun, Y. Yuan, Z. Yu, R. Kuper, C. Song, J. Huang, H. Ji, S. Agarwal, **J. Lou**, I. Jeong, R. Wang, J. H. Ahn, T. Xu, N. S. Kim
56th IEEE/ACM International Symposium on Microarchitecture (MICRO 2023)
7. **LADIO: Leakage-Aware Direct I/O for I/O-Intensive Workloads**
I. Jeong, **J. Lou**, Y. Son, Y. Park, Y. Yuan, N. S. Kim
IEEE Computer Architecture Letters (CAL 2023)
8. **Making Sense of Using a SmartNIC to Reduce Datacenter Tax from SLO and TCO Perspectives [Best Paper Runner-Up Award]**
J. Huang, **J. Lou**, Y. Sun, T. Wang, E. K. Lee, and N. S. Kim
IEEE International Symposium on Workload Characterization (IISWC 2023)
9. **Towards a Manageable Intra-Host Network**
X. Kong, **J. Lou**, W. Bai, N. S. Kim, D. Zhuo
19th Workshop on Hot Topics in Operating Systems (HotOS 2023)
10. **MESA: Microarchitecture Extensions for Spatial Architecture Generation**
D. K. Wang, **J. Lou**, N. Jin, E. Mascarenhas, R. Mahapatra, S. Kinzer, S. Ghodrati, A. Yazdanbakhsh, H. Esmaeilzadeh, N. S. Kim
50th IEEE/ACM International Symposium on Computer Architecture (ISCA 2023)
11. **Analyzing Energy Efficiency of a Server with a SmartNIC under SLO Constraints**
J. Huang, **J. Lou**, Y. Sun, T. Wang, E. K. Lee, N. S. Kim
IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS 2023)

HONORS & AWARDS

• Wen-mei W. Hwu Award	2024
• NSDI 2024 Student Grant	2024
• IISWC 2023 Best Paper Runner-Up Award	2023
• Promise of Excellence Fellowship, University of Illinois Urbana-Champaign	2021
• Zhejiang University Outstanding Graduation Award	2021
• Dean's List at ZJU-UIUC Institute	2021

PROFESSIONAL SERVICES

- **Program Committee:** MICRO 2026 (Student PC), HPCA 2026 (Student PC).
- **Artifact Evaluation Committee:** NSDI 2026, SIGCOMM 2026, ASPLOS 2025, JSys.
- **Journal Reviewer:** Future Generation Computer Systems (FGCS 2026).

TEACHING EXPERIENCE

- **ECE411 Computer Organization and Design**, Graduate Teaching Assistant, UIUC, 2023 Spring.
- **CS101 Introduction to Computing for Engineering and Science**, Undergraduate Teaching Assistant, Zhejiang University, 2019 Fall / 2020 Fall / 2021 Spring.