

Yiwen Zhang

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RESEARCH INTERESTS

I am interested in computer networks and systems with a focus providing performance isolation and multi-tenancy support in datacenters with various types of applications. My current research focuses on providing quality of service in datacenter networks.

EDUCATION

University of Michigan	Ann Arbor, MI
Ph.D. Candidate, Computer Science and Engineering	2018 - Present
Masters, Electrical Engineering	April 2018
Bachelors, Electrical Engineering	December 2016

INDUSTRIAL EXPERIENCE

Research Intern , Microsoft	Seattle, Summer 2022
Azure for Operators. Worked on ML system research for video analytics.	
Research Intern , Google	Sunnyvale, CA, 2020 – 2021 (9 months)
Congestion Control Team, NetInfra. Worked on multi-tenancy support for applications in datacenters.	
Software Engineering Intern , Google	Sunnyvale, CA, Summer 2019
Congestion Control Team, NetInfra. Worked on datacenter bandwidth allocation for ultra-low RPC latencies.	
Performance Modeling Intern , ARM	Chandler, AZ, Summer 2017
Performance Modeling Group. Worked on modeling ARM's next-generation CPU.	

RESEARCH EXPERIENCE

Research Assistant , Computer Science and Engineering, University of Michigan	2018 - Present
<i>Advisor</i> : Prof. Mosharaf Chowdhury	

RDMA Performance Isolation

- Discovered and analyzed performance anomalies in various RDMA implementations across a wide range of RNICs.
- Designed a solution to provide predictable latencies and fair RNIC resource sharing via message-level shaping, initiator-based resource mediation, and passive system-wide latency monitoring.
- Achieved great performance improvement for both InfiniBand and RoCE with 40/100 Gbps RNICs.
- Paper accepted at NSDI'22

Multi-Tenancy Support via Distributed QoS Management

- Analyzed how QoS usage impacts application performance isolation
- Designed a distributed QoS enforcement algorithm to achieve desired application performance
- Paper accepted at SIGCOMM'22

Efficient Model Inference Pipelines with Model Multiplexing

- Studied existing solutions in model inference and identified new research opportunities
- Build an event-based simulator to analyze performance of different inference system design
- Ongoing work in preparation for a conference paper in 2020

Efficient Message Queuing System in RDMA

- Identify performance bottleneck in state-of-the-art MQ systems to motivate an RDMA-based design
- Designed and implemented a message queuing system in RDMA
- Code open-sourced at <https://github.com/SymbioticLab/rdmaMQ>

Memory Disaggregation

- Deployed various applications (VoltDB, Memcached, Powergraph and Spark) to evaluate Infiniswap
- Contributed to most of the Evaluation section in our NSDI'17 paper

TEACHING EXPERIENCE (AT UNIVERSITY OF MICHIGAN)

Graduate Student Instructor, EECS489: Computer Networks

Fall 2018

Wrote assignment auto-grader and led discussion.

Graduate Student Instructor, EECS582: Big Data Systems and Applications

Fall 2017

Designed programming assignments on big-data systems and wrote solutions

PUBLICATIONS

1. Aequitas: Admission Control for Performance-Critical RPCs in Datacenters. *SIGCOMM* '22
Yiwen Zhang, Gautam Kumar, Nandita Dukkupati, Xian Wu, Priyaranjan Jha, Mosharaf Chowdhury, Amin Vahdat
2. Justitia: Software Multi-Tenancy in Hardware Kernel-Bypass Networks. *NSDI* '22
Yiwen Zhang, Yue Tan, Brent Stephens, Mosharaf Chowdhury
3. NetLock: Fast, Centralized Lock Management Using Programmable Switches. *SIGCOMM* '20
Zhuolong Yu, **Yiwen Zhang**, Vladimir Braverman, Mosharaf Chowdhury, Xin Jin
4. Performance Isolation Anomalies in RDMA. *KBNets* '17
Yiwen Zhang, Jucheng Gu, Youngmoon Lee, Mosharaf Chowdhury, Shin Kang
5. Efficient Memory Disaggregation with INFINISWAP. *NSDI* '17
Jucheng Gu, Youngmoon Lee, **Yiwen Zhang**, Mosharaf Chowdhury, Shin Kang.

AWARDS

- **Ph.D. Student Fellowship**, Computer Science and Engineering, University of Michigan 2018 - 2019