

Tianyi Cui

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Education

University of Washington

Seattle, US

PH.D. IN COMPUTER SCIENCE

Sep. 2018 - Present

- Research focus on Datacenter Networking and Systems
- Advisor: Arvind Krishnamurthy
- GPA: 3.95

University of Science and Technology of China, Special Class for the Gifted Young¹

Hefei, China

B.S.E. IN COMPUTER SCIENCE

Sep. 2014 - July 2018

- Overall GPA: 3.93/4.3 Rank: 2/147
- Honor Class Student

Publications

- [1] B. Li, **T. Cui**, Z. Wang, W. Bai, L. Zhang, "SocksDirect: Datacenter Sockets can be Fast and Compatible." Proceedings of the 2019 ACM SIGCOMM Conference(**SIGCOMM '19**) (**Co-First author**)
- [2] M. Liu, **T. Cui**, H. Schuh, A. Krishnamurthy, S. Peter, K. Gupta "iPipe: A Framework for Building Distributed Applications on Multicore SoC SmartNICs." Proceedings of the 2019 ACM SIGCOMM Conference(**SIGCOMM '19**)
- [3] **T. Cui**, W. Zhang, K. Zhang, A. Krishnamurthy "Offloading load balancers onto SmartNICs." Proceedings of the 12th ACM SIGOPS Asia-Pacific Workshop on Systems(**APSys '21**)

Research Experience

Intelligent Buffer Tuning for SONiC

Microsoft Research, Redmond

RESEARCH INTERN, ADVISOR: WEI BAI

July. 2020 - Dec. 2020

- Identified a performance bottleneck in the Datacenter
- Designed an optimization algorithm for switch buffer management
- Achieved zero packet lose and eliminated Pause Frames for testbed

SocksDirect: Datacenter sockets can be Fast and Compatible

Microsoft Research Asia

RESEARCH INTERN, ADVISOR: PROF. LINTAO ZHANG

Oct. 2017 - July. 2018

- Designed and implemented a Linux socket API compatible communication Framework
- Leverage RDMA for inter-host communication and shared memory for intra-host communication
- Designed sophisticated techniques to bridge the gap of socket semantics and RDMA
- Achieved 17x latency improvement and 7x message throughput improvement

Go-to-FPGA Compilation Framework: Let Software Programmer Play Hardware

UCLA

RESEARCH INTERN, ADVISOR: PROF. JASON CONG

June 2017 - Sep. 2017

- Aim to reduce the programming difficulty for software developers to develop FPGA
- Developed a Golang to FPGA compiler to leverage Go routine and channel features in Golang
- Discovered several backend optimizations (fine-grained parallelism and task-level pipeline) for my compiler to improve the performance of generated code

Wireless Backscatter with Commodity WiFi Device

USTC

RESEARCH ASSISTANT, ADVISOR: PROF. XIANGYANG LI, PROF. PANLONG YANG

Oct. 2016 - June. 2017

- Designed a wireless backscatter system which could transmit signal with off-the-shelf WiFi routers
- Implemented the system with FPGA and Labview

¹I entered the university one year earlier than my peers.

HTTPS Gateway using FPGA

Microsoft Research Asia

RESEARCH INTERN, ADVISOR: PROF. **KUN TAN**

July, 2016 - Aug. 2016

- Offloaded RSA decryption in HTTPS handshakes to FPGA
- Designed an efficient and scalable RSA algorithm on FPGA with high level C-like language
- Our accelerator saved up to 13 CPU cores previously used for RSA decryption to maintain 16K HTTPS connections per second
- Won the **global 2nd place** of the “Quality for cloud customers” challenge out of 200+ projects worldwide in Microsoft Hackathon

Courses

Au 2018	CSE 550 , Systems for all	4.0
Wi 2019	CSE 551 , Operating Systems	4.0
Sp 2019	CSE 552 , Distributed Systems	4.0
Sp 2020	CSE 547 , Machine Learning for Big Data	3.9

Awards

Oct. 2017	Guo Moruo Scholarship , Highest honor in USTC, awarded top 1.7% of our university	USTC
Oct. 2016	National Scholarship , Top 0.2% of the nation	USTC
Aug. 2016	Global 2nd prize of “Quality for cloud customers” challenge , Microsoft Hackathon	Microsoft
Jan. 2016	Outstanding Project , Topic of An analysis of the privacy and security of MI Phone	USTC
Dec. 2015	Outstanding Scholarship Award ,	USTC
Oct. 2015	Gold Medal , International Genetically Engineered Machine Competition (iGEM)	Boston, US
Aug. 2014	Bronze Medal , National Olympiad in Informatics (NOI) (nationwide)	Shenzhen, China

Activities

Technical Group of the College of the Gifted Young

USTC

PRESIDENT

May 2015-May 2016

- Maintained the web servers and network gateways of our college
- Built the website of our college
- Organized the Capture the Flag competition in USTC

Linux User Group

USTC

PRESIDENT

May 2016 - June 2017

- One of the largest Linux User Groups in China
- Maintained a VPN server for hundreds of users
- Organized Linux Install Party, Software Freedom Day, several talks etc. Each time hundreds of students attend them

Skills

Programming Language	C/C++, Python, CUDA, \LaTeX
Hardware	Verilog, OpenCL, Vivado, Quartus
Tools	Linux, Git, LLVM
Networking	DPDK, RDMA, NP based SmartNIC