

# Tianyi Cui

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## Education

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### University of Washington

PH.D. IN COMPUTER SCIENCE

Focus on Systems and Networking

Seattle, US

Sep. 2018 - Present

### University of Science and Technology of China, Special Class for the Gifted Young<sup>1</sup>

B.S.E. IN COMPUTER SCIENCE

- Overall GPA: 3.96/4.3 Rank: 2/147
- Honor Class Student

Hefei, China

Sep. 2014 - July 2018

### University of California, Los Angeles (UCLA)

VISITING SUMMER STUDENT

- Individual research supervised by Prof. Jason Cong

Los Angeles, USA

July 2017 - Sep. 2017

## Research Interests

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### Systems, Networking, Computer Architecture

## Publications

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- [1] B. Li, **T. Cui**, Z. Wang, W. Bai, L. Zhang, "SocksDirect: Datacenter Sockets can be Fast and Compatible." SIGCOMM'2019 (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." SIGCOMM'2019

## Research Experience

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### IPC-Direct: Fast and Compatible Inter-Process Communication in User Space

RESEARCH INTERN, ADVISOR: PROF. **LINTAO ZHANG**

- Accelerated Linux inter-process communication while keeping compatibility with POSIX API
- Used logically centralized monitor process to coordinate communication
- Achieved 9x performance as compared to socket on Linux
- Currently attempting to scale it to multiple monitor processes and multiple servers using RDMA
- **Plan to submit to OSDI'2018.** Currently, the design is finished and is under implementation

Microsoft Research Asia

Sep. 2017 - Jan. 2019

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

RESEARCH INTERN, ADVISOR: PROF. **JASON CONG**

- 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

UCLA

June 2017 - Sep. 2017

### Wireless Backscatter with Commodity WiFi Device

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

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

USTC

Oct. 2016 - June. 2017

### HTTPS Gateway using FPGA

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

- 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

Microsoft Research Asia

July. 2016 - Aug. 2016

## Course Projects (Selected)

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### Low-power Consumption Operating System for DA14580 SoC

USTC

LEADER OF OS COURSE PROJECT, ADVISOR: PROF. **KAI XING**

Mar. 2016 - July 2016

- The first one to port the OS(uC/OS II) to DA14580 lower-power Bluetooth SoC.
- Implemented the hibernation feature to cut down the power consumption and implemented Bluetooth Low Energy (BLE) 4.0 communication between DA and smartphone
- Scored 100 in the Operating System course
- Github: [https://github.com/1997cui/low\\_power\\_bluetooth](https://github.com/1997cui/low_power_bluetooth)

### A Hardware Implementation of Google Authenticator

USTC

DIGITAL CIRCUIT COURSE PROJECT

Dec. 2015

- Implemented Google Authenticator (Time-based One-time Password Algorithm) on FPGA
- Implemented the SHA-1 algorithm on FPGA and leverage shared registers between FPGA and CPU to synchronize time
- Github: <https://github.com/1997cui/google-authenticator>

## Awards

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- 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

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### 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

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<b>English</b>	TOEFL: R29, L30, S22, W27, Total: 108, GRE score: Verbal: 154, Math: 170, Writing: 3.5
<b>Programming Language</b>	C/C++, Python, CUDA, $\LaTeX$
<b>Hardware</b>	Verilog, OpenCL, Vivado, Quartus
<b>Tools</b>	Linux, Git, LLVM
<b>Web Design</b>	HTML, SQL, PHP

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<sup>1</sup>I entered the university one year earlier than my peers.