

# Shuihai Hu

## Contact Information

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Personal Email: hushccgg@gmail.com

Huawei Shenzhen Base, Shenzhen, China

## Education

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**Hong Kong University of Science and Technology (HKUST)**

*Ph.D. in Computer Science and Engineering*

Advisor: Prof. Kai Chen

**Hong Kong, China**

*Aug. 2013 - June 2019*

**University of Science and Technology of China (USTC)**

*B.S. in Computer Science and Technology*

**Hefei, China**

*Sept. 2009 - June 2013*

## Research Interest

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I am broadly interested in computer networking, with special focuses on real-time media communication, data center networking, RDMA networks, and AI-based networking solutions. I also worked on distributed AI systems and federated learning systems.

## Work Experiences

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- **Huawei**, Shenzhen, China  
Principal Research Engineer 7/2021 - present
- **Clustar**, Shenzhen, China  
Chief Scientist 7/2019 - 6/2021

## Pre-graduation Industrial Experiences

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- **Huawei**, Shenzhen, China  
Intern, Cloud Networking Lab 11/2017 - 1/2018
- **Microsoft Research Asia**, Beijing, China  
Research Intern, Cloud and Mobile Group 10/2016 - 1/2017
- **Microsoft Research Asia**, Beijing, China  
Research Intern, Wireless and Networking Group 9/2015 - 1/2016

## Publications

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### Conference:

- **Shuihai Hu**, Wei Bai, Gaoxiong Zeng, Zilong Wang, Baochen Qiao, Kai Chen, Kun Tan, Yi Wang, "Aeolus: A Building Block for Proactive Transport in Datacenters", **SIGCOMM**, 2020.
- Wei Bai, **Shuihai Hu**, Kai Chen, Kun Tan, Yongqiang Xiong, "One More Config is Enough: Saving (DC)TCP for High-speed Extremely Shallow-buffered Datacenters", **INFOCOM**, 2020.
- Zhuotao Liu, Kai Chen, Haitao Wu, **Shuihai Hu**, Yih-Chun Hu, Yi Wang, Gong Zhang, "Enabling Work-conserving Bandwidth Guarantees for Multi-tenant Datacenters via Dynamic Tenant-Queue Binding", **INFOCOM**, 2018.
- **Shuihai Hu**, Yibo Zhu, Peng Cheng, Chuanxiong Guo, Kun Tan, Jitendra Padhye, Kai Chen, "Tagger: Practical PFC Deadlock Prevention in Data Center Networks", **CoNEXT**, 2017.
- **Shuihai Hu**, Wei Bai, Kai Chen, Chen Tian, Ying Zhang, Haitao Wu, "Providing Bandwidth Guarantees, Work Conservation and Low Latency Simultaneously in the Cloud", **INFOCOM**, 2016.
- **Shuihai Hu**, Kai Chen, Haitao Wu, Wei Bai, Chang Lan, Hao Wang, Hongze Zhao, Chuanxiong Guo, "Explicit Path Control in Commodity Data Centers: Design and Applications", **NSDI**, 2015.

### Journal:

- Wei Bai, **Shuihai Hu**, Kai Chen, Kun Tan, Yongqiang Xiong, "One More Config is Enough: Saving (DC)TCP for High-speed Extremely Shallow-buffered Datacenters", **IEEE/ACM Transactions on Networking**, 2020.
- **Shuihai Hu**, Yibo Zhu, Peng Cheng, Chuanxiong Guo, Kun Tan, Jitendra Padhye, Kai Chen, "Tagger: Practical PFC Deadlock Prevention in Data Center Networks", **IEEE/ACM Transactions on Networking**, 2019.
- **Shuihai Hu**, Wei Bai, Kai Chen, Chen Tian, Ying Zhang, Haitao Wu, "Providing Bandwidth Guarantees, Work Conservation and Low Latency Simultaneously in the Cloud", **IEEE Transactions on Cloud Computing**, 2019.
- **Shuihai Hu**, Kai Chen, Haitao Wu, Wei Bai, Chang Lan, Hao Wang, Hongze Zhao, Chuanxiong Guo, "Explicit Path Control in Commodity Data Centers: Design and Applications", **IEEE/ACM Transactions on Networking**, 2016.

### Workshop:

- Xincheng Wan, Hong Zhang, **Shuihai Hu**, Junxue Zhang, Kai Chen, "RAT - Resilient Allreduce Tree for Distributed Machine Learning", **APNet**, 2020.
- Zhaoxiong Yang, **Shuihai Hu**, Kai Chen, "FPGA-Based Hardware Accelerator of Homomorphic Encryption for Efficient Federated Learning", **FL-IJCAI**, 2020.
- **Shuihai Hu**, Wei Bai, Baochen Qiao, Kai Chen, Kun Tan, "Augmenting Proactive Congestion Control with Aeolus", **APNet**, 2018.
- Wei Bai, Kai Chen, **Shuihai Hu**, Kun Tan, Yongqiang Xiong, "Congestion Control for High-speed Extremely Shallow-buffered Datacenter Networks", **APNet**, 2017.
- **Shuihai Hu**, Yibo Zhu, Peng Cheng, Chuanxiong Guo, Kun Tan, Jitendra Padhye, Kai Chen, "Deadlocks in Datacenter Networks: Why Do They Form, and How To Avoid Them", **HotNets**, 2016.
- Li Chen, **Shuihai Hu**, Kai Chen, Haitao Wu, Danny H. K. Tsang, "MCP: Towards Minimal Delay Deadline-Driven Datacenter Transport" **HotNets**, 2013.

### Poster:

- **Shuihai Hu**, Kai Chen, Gaoxiong Zeng, "Improved Path Compression for Explicit Path Control in Production Data Centers", **NSDI**, 2016.

## Teaching Experience

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Teaching Assistant, HKUST COMP 4621: Computer Communication Networks I	2016 Spring
Teaching Assistant, HKUST COMP 2021: Unix and Script Programming	2015 Spring
Teaching Assistant, HKUST COMP 3511: Operating Systems	2014 Fall
Teaching Assistant, HKUST COMP 2611: Computer Organization	2014 Spring

## Awards and Honors

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<b>HKTIIT Postgraduate Excellence Scholarships</b>	2017
HKUST Research Travel Grant	2015-2017
USENIX NSDI Student Grant	2015
HKUST Postgraduate Scholarship	2013 - 2017
USTC First-Class Outstanding Student Scholarship (Top 5%)	2012
CASTC Second-Class Outstanding Student Scholarship (Top 15%)	2011

## Selected Talks

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- Aeolus: A Building Block for Proactive Transport in Datacenters.  
SIGCOMM 2020, Virtual Conference August 2020
- Tagger: Practical PFC Deadlock Prevention in Data Center Networks.  
CoNEXT 2017, Seoul/Incheon, South Korea December 2017
- Congestion Control for High-speed Extremely Shallow-buffered Datacenter Networks.  
APNet 2017, Hong Kong, China August 2017
- Deadlocks in Datacenter Networks: Why Do They Form, and How To Avoid Them.  
HotNets 2016, Atlanta, Georgia, USA November 2016
- Providing Bandwidth Guarantees, Work Conservation and Low Latency Simultaneously in the Cloud.  
INFOCOM 2016, San Francisco, CA, USA April 2016

## Professional Activities

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- IEEE Transactions on Parallel and Distributed Systems (TPDS). Reviewer, 2019.
- IEEE/ACM Transactions on Networking (ToN), Reviewer, 2018
- IEEE Transactions on Communications (TCOM), Reviewer, 2017
- The Computer Journal (COMPJ), Reviewer, 2016