

Keqiang He

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Summary

I am a final year PH.D. student in the Computer Science Department of the University of Wisconsin-Madison. My PH.D. research area is computer networks and networked systems, especially focusing on datacenter networking, Software-Defined Networking (SDN) and network measurements.

Education

PH.D. | June 2017 (expected) | University of Wisconsin-Madison, USA

- Major: Computer Science (Advisor: Prof. Aditya Akella)
- Minor: Electrical & Computer Engineering

M.S. | May 2015 | University of Wisconsin-Madison, USA

- Major: Computer Science

M.E. | June 2012 | Tsinghua University, Beijing, China

- Major: Computer Science

B.E. | July 2009 | Xidian University, Xi'an, China

- Major: Software Engineering

Skills & Expertise

Programming Languages

- C++, C, Java, Python, Shell Scripting, SQL, Verilog, MATLAB

Computer Networking

- TCP/IP, Software-defined Networking (SDN), Open vSwitch, OpenFlow, Congestion Control, Routing, BGP, Linux Networking Subsystem, Datacenter Networking, High-Speed Packet Processing Libraries

OSes & Platforms

- Linux, MAC OS X, Windows, FPGA, Public Cloud Platforms

Tools

- Vim, Git, SVN, Latex, Eclipse, Gnuplot

Experience

Software Engineering Intern | Google Inc. | May 2016 – December 2016

- Project: Building an analysis framework for Google datacenter networks. I am the student lead of this project.
- Mentor: Radhika Niranjana Mysore.

Research Intern | IBM Research | June 2015 – January 2016

- Project: In multi-tenant clouds, outdated, inefficient, or even misconfigured TCP stacks can be implemented in Virtual Machines (VM). This can lead to increased network queueing latency and throughput unfairness. To solve these issues, we proposed a new technique, AC/DC TCP, which exerts fine-grained control over arbitrary tenant TCP stacks by enforcing per-flow congestion control in the virtual switch (Open vSwitch) in the hypervisor. I am the student lead of this project.
- Mentors: Eric Rozner, Kanak Agarwal, Wes Felter, John Carter.

Research Intern | IBM Research | May 2014 – September 2014

- Project: Designed and implemented a new load balancing scheme for data center networks. It utilizes software-defined edge (i.e., virtual switch in the hypervisor) and TCP offloading features (TCP

Segmentation Offload and Generic Receive Offload) to achieve near-perfect traffic load balancing on symmetric networks (e.g., 2-tier Clos topology). I am the student lead of this project.

- Mentors: Eric Rozner, Kanak Agarwal, Wes Felter, John Carter.

Research Intern | Bell Labs, Alcatel-Lucent | June 2013 – August 2013

- Project: Measured different kinds of OpenFlow operation's latency in SDN switches and uncovered the root causes of the switch control plane latency problem. I am the student lead of this project.
- Mentors: Marina Thottan, Li (Erran) Li.

Teaching Assistant | University of Wisconsin-Madison | August 2012 – December 2012

- I was the teaching assistant for an undergraduate level course "Introduction to Computer Networks".

Selected Publications

- AC/DC TCP: Virtual Congestion Control Enforcement for Datacenter Networks. [Keqiang He](#), Eric Rozner, Kanak Agarwal, Yu (Jason) Gu, Wes Felter, John Carter and Aditya Akella. In *ACM SIGCOMM, 2016*.
- PerfSight: Performance Diagnosis for Software Dataplanes. Wenfei Wu, [Keqiang He](#) and Aditya Akella. In *ACM IMC, 2015*.
- Presto: Edge-based Load Balancing for Fast Datacenter Networks. [Keqiang He](#), Eric Rozner, Kanak Agarwal, Wes Felter, John Carter and Aditya Akella. In *ACM SIGCOMM, 2015*.
- Measuring Control Plane Latency in SDN-enabled Switches. [Keqiang He](#), Junaid Khalid, Aaron Gember-Jacobson, Sourav Das, Chaithan Prakash, Aditya Akella, Li Erran Li and Marina Thottan. In *ACM SOSR, 2015*.
- Next Stop, the Cloud: Understanding Modern Web Service Deployment in EC2 and Azure. [Keqiang He](#), Alexis Fisher, Liang Wang, Aaron Gember, Aditya Akella and Thomas Ristenpart. In *ACM IMC, 2013*.
- Scalable Name Lookup in NDN Using Effective Name Component Encoding. Yi Wang, [Keqiang He](#), Huichen Dai, Wei Meng, Junchen Jiang, Bin Liu and Yan Chen. In *IEEE ICDCS, 2012*.
- Reducing Power of Traffic Manager in Routers via Dynamic On/Off-chip Scheduling. Jindou Fan, Chengchen Hu, [Keqiang He](#), Junchen Jiang and Bin Liu. In *IEEE INFOCOM, 2012*.

Selected Honors & Awards

- Lawrence H. Landweber NCR Fellowship in Distributed Systems, University of Wisconsin-Madison
- Tsinghua-Morgan Stanley Scholarship (top 5%)
- Outstanding Undergraduate, Xidian University (1st in software engineering major)
- First Prize in Shaanxi College Higher Mathematics Competition
- Second Prize in China Undergraduate Mathematical Contest in Modeling

Talks & Presentations

- Invited talk, "Improving DCN Performance via Intelligent Edge", IBM T. J. Watson Research Center
- Presented AC/DC TCP paper at Google, Mountain View and SIGCOMM 2016, Florianópolis, Brazil
- Presented Presto paper at IBM Research, Austin and SIGCOMM 2015, London, UK
- Presented SDN Latency paper at SOSR (co-located with Open Networking Summit), Santa Clara, CA
- Presented Cloud Measurement paper at WISDOM workshop, Madison, WI

Professional Services

- External reviewer for USENIX NSDI (2017), IEEE ICNP (2014-2015), IEEE INFOCOM (2015-2017) and ACM IMC (2015)