

SHAWN SHUOSHUO CHEN

PhD student · Carnegie Mellon University

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RESEARCH INTERESTS

Computer Networks, Operating Systems, High Performance Computing

EDUCATION

Carnegie Mellon University

Ph.D. in Computer Science

Advisors: Prof. Peter Steenkiste and Prof. Srinivasan Seshan

Aug. 2021 – present

Pittsburgh, PA

University of Virginia

M.S. in Computer Engineering

Advisor: Prof. Malathi Veeraraghavan

Aug. 2014 – May 2016

Charlottesville, VA

Wuhan University

B.S. in Electrical Engineering

Sep. 2010 – Jun. 2014

Wuhan, China

RESEARCH EXPERIENCE

Research Assistant

Computer Science Department, Carnegie Mellon University

- Improving large-scale ML training efficiency via reconfigurable optical networks.
- Designed time-division TCP for reconfigurable data center networks.
- Improved hardware-constrained data center traffic engineering.

Aug. 2021 – present

Pittsburgh, PA

Research Intern

Microsoft Research

- Optimized datacenter RPC communication performance.

May 2022 – Aug. 2022

Redmond, WA

Research Assistant

Computer Engineering Department, University of Virginia

- Designed and implemented a reliable multicast protocol - File Multicast Transport Protocol (FMTP), deployed and verified on GENI testbed.
- Developed a high performance traffic shaping/pacing solution based on the host network stack, including modifications on TCP congestion control, socket buffering and tc queueing disciplines.
- Conducted performance modeling and optimization on filestream traffic pattern, FMTP throughput, and system resource requirements.

Aug. 2014 – May 2016

Charlottesville, VA

Research Intern

Xilinx Inc

- Wrote switch stack software to enable a runtime reconfigurable packet processing pipeline (Openflow 1.3 compatible) for an FPGA-based open source SDN switch (ONetSwitch).
- Benchmarked switch packet forwarding rate, maximum concurrent flows, TCAM lookup latency etc.

Nov. 2013 – Aug. 2014

Shanghai, China

Undergraduate Research Assistant

Xilinx-Wuhan University IC Design Joint Lab

- Built a stateful firewall in an MPLS network.
- Offloaded expensive firewall functions to a server via port mirroring.

Sep. 2012 – Dec. 2012

Wuhan, China

INDUSTRY EXPERIENCE

Technical Lead / Software Engineer

Oct. 2016 - Apr. 2021

Google Network Infrastructure Team

Sunnyvale, CA

- Led continuous performance optimization on data center network topology and routing efficiency.
- Improved the scalability and availability of Google's data center network solution - Jupiter.
- Built Google's in-house SDN controller - Orion.

Software Development Intern

Jul. 2013 - Sep. 2013

MeshSr Co.

Nanjing, China

- Customized a light weight Linux kernel and bootloader for embedded system.
- Ported CPqD OpenFlow software switch to ARM platform.

TEACHING EXPERIENCE

CS 15-441/641 Networking and the Internet, CMU: fall 2021

CS/ECE 4457 Computer Networks, UVA: fall 2014, fall 2015

AWARDS AND MEMBERSHIP

NYU Henry M. MacCracken Fellowship (declined)

2020

Silver Perfy Award, *Google*

2019

Academic Excellence Award Nomination, *University of Virginia*

2016

OpenHW Vivado HLS Contest Runner-up, *Xilinx*

2014

Outstanding Undergraduate Milestone Project, *Wuhan University*

2014

ACM Member/ACM@CMU Member

TALKS AND PRESENTATIONS

Optical Network Infrastructure Support for Machine Learning

- At Google Networking Research Summit (Oct. 2023)

Precise Data Center Traffic Engineering with Constrained Hardware Resources

- At Google S2Infra team, Sunnyvale, CA. (Jul. 2023)

Time-division TCP for reconfigurable data center networks

- At MIT. (Aug. 2022)
- At ACM SIGCOMM'22, Amsterdam, Netherlands. (Aug. 2022)
- At Google S2Infra team, Sunnyvale, CA. (Sep. 2022)

Advances in Reliable File-Stream Multicasting over Multi-Domain Software Defined Networks (SDN)

- At IEEE ICCCN, Valencia, Spain. (Jul. 2019)

Network Infrastructure at Google

- At the School of Engineering and Applied Science, University of Virginia. (Mar. 2019)

Optimizing SDN Routing Convergence at Scale

- At Google research conference, Sunnyvale, CA. (Aug. 2018)

PUBLICATIONS

- [1] **Shawn Shuoshuo Chen**, Keqiang He, Rui Wang, Srinivasan Seshan, Peter Steenkiste. [Precise Data Center Traffic Engineering with Constrained Hardware Resources](#). In Proceedings of the 21st USENIX Symposium on Networked Systems Design and Implementation (NSDI '24). Santa Clara, CA. April 2024. *(to appear)*
- [2] **Shawn Shuoshuo Chen**, Weiyang Wang, Christopher Canel, Srinivasan Seshan, Alex C. Snoeren, Peter Steenkiste. [Time-division TCP for reconfigurable data center networks](#). In Proceedings of the ACM SIGCOMM 2022 Conference (SIGCOMM '22). Amsterdam, Netherlands. August 2022.
- [3] Andrew D. Ferguson, Steve Gribble, Chi-Yao Hong, Charles Killian, Waqar Mohsin, Henrik Muehe, Joon Ong, Leon Poutievski, Arjun Singh, Lorenzo Vicisano, Richard Alimi, **Shawn Shuoshuo Chen**, Mike Conley, Subhasree Mandal, Karthik Nagaraj, Kondapa Naidu Bollineni, Amr Sabaa, Shidong Zhang, Min Zhu, Amin Vahdat. [Orion: Google's Software-Defined Networking Control Plane](#). In Proceedings of the 18th USENIX Symposium on Networked Systems Design and Implementation (NSDI '21). Santa Clara, CA. April 2021.
- [4] Yuanlong Tan, **Shuoshuo Chen**, Steve Emmerson, Yizhe Zhang, Malathi Veeraraghavan. [Advances in Reliable File-Stream Multicasting over Multi-Domain Software Defined Networks \(SDN\)](#). In Proceedings of the 28th International Conference on Computer Communication and Networks (ICCCN). Valencia, Spain. July 2019.
- [5] **Shuoshuo Chen**, Xiang Ji, Malathi Veeraraghavan, Steve Emmerson, Joseph Sleazak, Steven G. Decker. [A cross-layer Multicast-Push Unicast-Pull \(MPUP\) architecture for reliable file-stream distribution](#). In Proceedings of the IEEE 40th Annual Computer Software and Applications Conference (COMPSAC). Atlanta, GA. June 2016.