

# YANG CHENG

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## EDUCATION

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**Tsinghua University**, Beijing, China 2016.09 – Present

*Ph.D.* in Computer Science and Technology

Advisor(s): Prof. Jianping Wu and Assoc. Prof. Dan Li

Research Interests: I'm broadly interested in computer networking & system architecture, devoted to building High-performance networked systems, with special focus on distributed machine learning system

**University of Electronic Science and Technology of China**, Chengdu, China 2012.09 – 2016.07

*B.Eng.* in Software Engineering, graduating with honors

GPA/Ranking: 3.8/4.0, 1<sup>st</sup>/103

## WORKING EXPERIENCE

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**Microsoft Research Asia**, Research Intern 2018.04 – 2018.10

- Leading the AIPre project to accelerate end-to-end DL workflows in the cloud.

**Chengdu Haocaiduo Agricultural Technology Co., Ltd.**, Developing Engineer 2014.06 – 2014.07

- Developing intelligent agricultural management system to simplify the management of crops;

**Tsinghua University**, Teaching Assistant

- [00240112-90], [undergraduates], Next Generation Internet Spring of 2018&2019
- [74120023-0], [graduates], Security Foundation and Frontier of Cyberspace Autumn of 2017

## SELECTED PROJECTS

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**Mars**: exploring data-driven routing with multi-agent reinforcement learning 2019.06 – 2019.12

- Exploring the designing of data-driven routing system with multi-agent reinforcement learning;

**AIPre**: Boosting end-to-end DL workflows in the cloud 2018.04 – 2018.10

- Evaluate the performance of deep learning systems (TF, PyTorch, Caffe), from an end-to-end perspective;
- Offload data preprocessing workloads to FPGAs to remove the CPU bottleneck in end2end DL workflows;
- Overlap gradient computation and error propagation by re-scheduling BP workflows when training NNs.

**BML**: A scalable and high-performance DML system 2017.09 – 2018.01

- Re-design synchronization paradigms for TensorFlow to reduce communication cost of distributed training;
- Incorporate RDMA and BCube topology to achieve high-performance data communication primitives;
- Outperform the PS and the Ring paradigms by up to  $2.4\times$  and  $1.2\times$  training throughput, respectively.

**Virtual desktop management and control system** 2015.01 – 2015.08

- Design a high-performance, cross-platform virtual desktop management system, with the SPICE protocol;
- Implement tin-clients on Android and PC platforms, to interact with the VMs running on remote server;
- Design and implement SMx(2/3/4)-based encryption mechanism to protect user information from leakage

## SELECTED PUBLICATIONS

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- [1] Songtao Wang, Dan Li, **Yang Cheng**, Jinkun Geng, Yanshu Wang, Shuai Wang, Shutao Xia, and Jianping Wu, "BML: A Scalable, High-performance and Fault-tolerant Network Architecture for Distributed Machine Learning", *IEEE/ACM Transactions on Networking (ACM/IEEE ToN)*, 2020
- [2] Kaihui Gao, Dan Li, Li Chen, Jinkun Geng, Fei Gui, **Yang Cheng**, and Yue Gu, "Incorporating Intra-flow Dependencies and Inter-flow Correlations for Traffic Matrix Prediction", *IEEE/ACM International Symposium on Quality of Service (ACM/IEEE IWQoS 2020)*

- [3] **Yang Cheng**, Dan Li, Zhiyuan Guo, Binyao Jiang, Jiaxin Lin, Xi Fan, Jinkun Geng, Xinyi Yu, Wei Bai, Lei Qu, Ran Shu, Peng Cheng, Yongqiang Xiong, and Jianping Wu, “DLBooster: Boosting End-to-End Deep Learning Workflows with Offloading Data Preprocessing Pipelines”, *In Proceedings of the 48th International Conference on Parallel Processing (ICPP 2019)*
- [4] Shuai Wang, Dan Li, Jinkun Geng, Yue Gu, and **Yang Cheng**, “Impact of Network Topology on the Performance of DML: Theoretical Analysis and Practical Factors”, *In IEEE INFOCOM 2019-IEEE Conference on Computer Communications (INFOCOM 2019)*
- [5] Songtao Wang, Dan Li, **Yang Cheng**, Jinkun Geng, Yanshu Wang, Shuai Wang, Shutao Xia, and Jianping Wu, “BML: A High-performance, Low-cost Gradient Synchronization Algorithm for DML Training”, *In Thirty-second Advances in Neural Information Processing Systems (NeurIPS 2018)*
- [6] **Yang Cheng**, Jinkun Geng, Yanshu Wang, Junfeng Li, Dan Li, and Jianping Wu, “Bridging machine learning and computer network research: a survey”, *CCF Transactions on Networking (CCF ToN)*, 2018
- [7] Zhetao Li, Fei Gui, Jinkun Geng, Dan Li, Zhibo Wang, Junfeng Li, **Yang Cheng**, and Usama Zafar, “Dante: Enabling FOV-Aware Adaptive FEC Coding for 360-Degree Video Streaming”, *In Proceedings of the 2nd Asia-Pacific Workshop on Networking (APNet 2018)*
- [8] Jinkun Geng, Dan Li, **Yang Cheng**, Shuai Wang, and Junfeng Li, “HiPS: Hierarchical Parameter Synchronization in Large-Scale Distributed Machine Learning”, *In Proceedings of the 2018 Workshop on Network Meets AI & ML (NetAI 2018)*
- [9] Junfeng Li, Dan Li, Yukai Huang, **Yang Cheng**, and Ruilin Ling, “Quick NAT: High performance NAT system on commodity platforms”, *In 2017 IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN 2017)*

## SELECTED HONORS

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Outstanding graduates in Sichuan province	Jun. 2016
Tang Lixin Scholarship, UESTC	Sep. 2015
National Scholarship	Sep. 2015
National Endeavor Scholarship	Sep. 2013
First prize, awarded on the 8 <sup>th</sup> National College Student Information Security Contest	Aug. 2015
First prize, awarded on the 6 <sup>th</sup> National College Students Mathematics Competition, Sichuan	Nov. 2014