

Hao Wang

AFFILIATION	Edward S. Rogers Sr. Department of Electrical and Computer Engineering University of Toronto 10 King's College Road Toronto, Ontario M5S 3G4, Canada	<i>Email:</i> haowang@ece.utoronto.ca <i>Web:</i> http://www.haow.ca/ <i>Mobile:</i> +1 (647) 891-0836
PERSONAL INFORMATION	<i>Citizenship</i> Chinese	
EDUCATION	University of Toronto , Toronto, Ontario, Canada <i>Department of Electrical and Computer Engineering</i> ◇ Ph.D. candidate , Electrical and Computer Engineering, Sept. 2015 – Present ▷ <i>Advisor:</i> Prof. Baochun Li, Department of Electrical and Computer Engineering Shanghai Jiao Tong University , Shanghai, People's Republic of China <i>School of Electronic Information and Electrical Engineering</i> ◇ M.Engr. , Software Engineering, Mar. 2015 ▷ <i>Dissertation:</i> "Generic and Accurate Traffic Prediction for Data-Parallel Clusters" ▷ <i>Advisor:</i> Prof. Haibing Guan, Department of Computer Science Prof. Zhengwei Qi, School of Software Engineering ◇ B.Engr. , Information Security, Jul. 2012 ▷ <i>Dissertation:</i> "Performance Evaluation and Tuning of Cloud Computing"	
RESEARCH INTERESTS	Large-scale data analytics, machine learning system, distributed computing, cloud computing, datacenter networking.	
RESEARCH AND INDUSTRY EXPERIENCE	Research Assistant , supervised by Prof. Baochun Li <i>University of Toronto</i> , Toronto	Sept. 2015 – Present
	Research Intern , supervised by Dr. Yongqiang Xiong <i>Microsoft Research Asia</i> , Beijing, P. R. China	Aug. 2013 – Aug. 2014
	Visiting Research Assistant , supervised by Prof. Kai Chen <i>Hong Kong University of Science and Technology</i> , Hong Kong, P. R. China	Nov. 2013 – Dec. 2014
	Co-fonder and Full-Stack Developer <i>Ramy Tech Inc.</i> , Shanghai, P. R. China	Jul. 2013 – Nov. 2013
	Development Intern on Cloud performance tuning <i>Intel Asia-Pacific Research and Development Ltd.</i> , Shanghai, P. R. China	Dec. 2011 – Dec. 2012
	Research Assistant , Supervised by Dr. Xiaochao Zi <i>Shanghai Jiao Tong University</i> , Shanghai, P. R. China	Nov. 2009 – Nov. 2010

◇ **Journal Articles** (in reverse chronological order)

[J1] **Hao Wang**, Di Niu, Baochun Li. “Turbo: Dynamic and Decentralized Global Analytics via Machine Learning,” in *IEEE Transactions on Parallel and Distributed Systems (TPDS)*, under submission.

[J2] **Hao Wang**, Baochun Li. “Mitigating Bottlenecks in Wide Area Data Analytics via Machine Learning,” in *IEEE Transactions on Network Science and Engineering (TNSE)*, 2018.

[J3] Wei Bai, Li Chen, Kai Chen, Dongsu Han, Chen Tian, **Hao Wang**. “Information-Agnostic Flow Scheduling for Commodity Data Centers,” in *IEEE/ACM Transactions on Networking (ToN)*, 2017.

[J4] Hong Zhang, Kai Chen, Wei Bai, Dongsu Han, Chen Tian, **Hao Wang**, Haibing Guan, Ming Zhang. “Guaranteeing Deadlines for Inter-Datcenter Transfers,” in *IEEE/ACM Transactions on Networking (ToN)*, 2016

[J5] 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,” in *IEEE/ACM Transactions on Networking (ToN)*, 2015

[J6] Yang Peng, Kai Chen, Guohui Wang, Wei Bai, Yangming Zhao, **Hao Wang**, Yanhui Geng, Zhiqiang Ma, Lin Gu. “Towards Comprehensive Traffic Forecasting in Cloud Computing: Design and Application,” in *IEEE/ACM Transactions on Networking (ToN)*, 2015.

◇ **Conference Papers** (in reverse chronological order)

[C1] **Hao Wang**, Zakhary Kaplan, Di Niu, Baochun Li. “Optimizing Federated Learning on Non-IID Data with Reinforcement Learning,” in the Proceedings of IEEE INFOCOM 2020, Beijing, China, April 27 - 30, 2020. (acceptance ratio: 20%).

[C2] **Hao Wang**, Di Niu, Baochun Li. “Distributed Machine Learning with a Serverless Architecture,” in the Proceedings of IEEE INFOCOM 2019, Paris, France, April 29 - May 2, 2019. (acceptance ratio: 20%).

[C3] **Hao Wang**, Di Niu, Baochun Li. “Dynamic and Decentralized Global Analytics via Machine Learning,” in the Proceedings of the *ACM Symposium on Cloud Computing 2018 (SoCC 2018)*, Carlsbad, California, October 11-13, 2018 (acceptance ratio: 24%).

[C4] **Hao Wang**, Baochun Li. “Lube: Mitigating Bottlenecks in Wide Area Data Analytics,” in the Proceedings of the *9th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud 2017)*, Santa Clara, California, July 10-11, 2017 (acceptance ratio: 32%).

[C5] Shuhao Liu, **Hao Wang**, Baochun Li. “Optimizing Shuffle in Wide-Area Data Analytics,” in the Proceedings of the 37th International Conference on Distributed Computing Systems (ICDCS 2017), Atlanta, Georgia, June 5–8, 2017 (acceptance ratio: 17%).

[C6] **Hao Wang**, Li Chen, Kai Chen, Ziyang Li, Yiming Zhang, Haibing Guan, Zhengwei Qi, Dongsheng Li, Yanhui Geng. “FlowProphet: Generic and Accurate Traffic Prediction for Data-parallel Cluster Computing,” in the Proceedings of the 35th International Conference on Distributed Computing Systems (ICDCS 2015), Columbus, Ohio, June 29-July 2, 2015 (acceptance ratio: 13%).

[C7] Hong Zhang, Kai Chen, Wei Bai, Dongsu Han, Chen Tian, **Hao Wang**, Haibing Guan, Ming Zhang. “Guaranteeing Deadlines for Inter-Datcenter Transfers,” in the Proceedings of the *ACM European Conference on Computer Systems (EuroSys 2015)*, Bordeaux, France, April 21-24, 2015 (acceptance ratio: 21%).

[C8] Wei Bai, Li Chen, Kai Chen, Dongsu Han, Chen Tian, **Hao Wang**. “Practical Information-Agnostic Flow Scheduling for Data Center Networks,” in the Proceedings of the *12th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2015)*, Oakland, CA, May 4-6, 2015 (acceptance ratio: 20%).

[C9] 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,” in the Proceedings of the *12th USENIX Symposium on Networked Systems Design and Implementation (NSDI 2015)*, Oakland, CA, May 4-6, 2015 (acceptance ratio: 20%).

[C10] **Hao Wang**, Yangming Zhao, Haibing Guan. “On Pricing Schemes in Data Center Network with Game Theoretic Approach,” in the Proceedings of the *23rd IEEE International Conference on Computer Communications and Networks (ICCCN 2014)*, Shanghai, China, August 4-7, 2014 (acceptance ratio: 28%).

◇ **Conference Posters** (in reverse chronological order)

[P1] **Hao Wang**, Di Niu, Baochun Li. “Dynamic and Decentralized Global Analytics via Machine Learning,” the *ACM Symposium on Cloud Computing 2018 (SoCC 2018)*, Carlsbad, California, October 11-13, 2018

[P2] **Hao Wang**, Baochun Li. “Lube: Mitigating Bottlenecks in Wide Area Data Analytics,” the *9th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud 2017)*, Santa Clara, California, July 10-11, 2017

[P3] **Hao Wang**, Baochun Li. “Bottleneck Detection for Wide Area Data Analytics on the SAVI Testbed,” the *3th SAVI Annual General Meeting*, Toronto, Ontario, July 6, 2016

SCHOLARLY TALKS	Distributed Machine Learning with a Serverless Architecture <i>IEEE INFOCOM</i> , Paris, France	Apr. 2019
	Optimizing Large Scale Data Analytics via Machine Learning <i>Shanghai Jiao Tong University</i> , Shanghai, China	Jan. 2019
	Dynamic and Decentralized Global Analytics via Machine Learning <i>ACM SoCC</i> , Carlsbad, CA	Oct. 2018
	Mitigating Bottlenecks in Wide Area Data Analytics <i>ACM HotCloud</i> , Santa Clara, CA	Jul. 2017
	Generic and Accurate Traffic Prediction for Data-parallel Cluster Computing <i>IEEE ICDCS</i> , Columbus, OH	Oct. 2015
	On Pricing Schemes in Data Center Network with Game Theoretic Approach <i>IEEE ICCCN</i> , Shanghai, China	Oct. 2014

PROFESSIONAL SERVICES	<ul style="list-style-type: none"> ◇ Web Chair: IEEE ICNP 2017 ◇ Reviewer for Journal Manuscript Submissions: IEEE Transactions on Networking, IEEE Transactions on Network Science and Engineering, IEEE Transactions on Big Data, Multimedia Systems Springer Journals, IEEE Access ◇ Reviewer for Conference Manuscript Submissions: ACM SIGCOMM poster, USENIX Hot-Cloud, ACM Multimedia, ACM MMSys, ACM NOSSDAV, IFIP Networking, IEEE INFOCOM, IEEE IWQoS, IEEE GLOBECOM, IEEE IC2E, WiOpt, ACM/IEEE IoTDI 	
HONOURS AND AWARDS	<ul style="list-style-type: none"> ◇ DiDi Graduate Awards (\$10,000 CAD), Didi Chuxing Technology Co. 2019 ◇ Best In-session Presentation Award, INFOCOM'19, IEEE 2019 ◇ Doctoral Completion Award (\$18,000 CAD), ECE Department, University of Toronto 2019 ◇ SGS Conference Grant (\$1,000 CAD), School of Graduate Studies, University of Toronto 2018 ◇ Student Scholarships (\$900 USD), SoCC'18, ACM 2018 ◇ University of Toronto Fellowship, Department of ECE, University of Toronto 2015 ◇ Edward S. Rogers Sr. Graduate Scholarships, University of Toronto 2015 ◇ Yunfeng Prize (Top 1%), the 2nd Aliyun Worldwide Developer Conference, Alibaba Inc. 2013 ◇ The Second-Class Postgraduate Scholarship, Shanghai Jiao Tong University 2012 ◇ The 3rd Prize, the 4th National College Information Security Contest 2011 ◇ The Second-Class Academic Excellence Scholarship, Shanghai Jiao Tong University 2009 	
GRANT WRITING EXPERIENCE	<p>Worked as a main technical contributor in the following grant applications. <i>The NSERC is the largest funder of scientific research in Canada, which is similar to the NSF in US.</i></p> <ul style="list-style-type: none"> ▷ NSERC Strategic Grant 2016 "Online Monitoring and Performance Optimization on Data Analytic Applications across Geo-Distributed Datacenters", PI: Baochun Li; Co-Applicants: Ding Yuan, Micheal Stumm ▷ NSERC Collaborative Research and Development (CRD) Grant 2016 "Performance Optimization for Multi-Datacenter Cloud Platforms", PI: Baochun Li ▷ NSERC Collaborative Research and Development (CRD) Grant 2017 "Optimizing Geo-Distributed Data Analytics Across Multiple Datacenters", PI: Baochun Li ▷ NSERC Collaborative Research and Development (CRD) Grant 2019 "Towards a Quantitative Understanding of Short Texts with Deep Learning", PI: Baochun Li ▷ Research Gift from Orbis Investment Management Inc. 2019 "Sentiment Analysis and Topic Modeling on Short Texts", PI: Baochun Li ▷ Compute Canada Resources for Research Groups (RRG) Competition 2019 "Performance Optimization for Large Scale Data Analytics", PI: Baochun Li 	
TEACHING EXPERIENCE	APS1203: Teaching Engineering in Higher Education <i>University of Toronto, Toronto</i>	Fall 2019

A course for senior Ph.D. candidates on course design, lecturing techniques, assessment strategy, learning styles and technology tools.

Teaching Assistant Sept. 2015 – Present

University of Toronto, Toronto

- ▷ ECE 444: Software Engineering Fall 2017 – 2019
- ▷ CSC 454: Computer Systems Programming Fall 2018
- ▷ CSC 369: Operating Systems Summer 2017, Fall 2019
- ▷ ECE 344: Operating Systems Fall 2016
- ▷ CSC 343: Introduction to Databases Summer 2016
- ▷ ECE 353: Systems Software Winter 2016 – 2019
- ▷ CSC 458: Computer Networks Fall 2015 – 2016

MENTORING

Maliha Islam, female undergraduate student at *University of Toronto* Sept. 2019 – Present
Thesis title: “Optimizing Parallelism in Federated Learning”

Jeffrey Nguyen, undergraduate student at *University of Toronto* Sept. 2019 – Present
Thesis title: “Masking the Topic: a Topic Model for Short Texts”

Zakhary Kaplan, undergraduate student at *University of Toronto* Jun. 2019 – Aug. 2019
Research topic: “Optimizing Federated Learning on Non-IID Data with Reinforcement Learning”

Haobo Ding, undergraduate student at *University of Toronto* Sept. 2018 – Apr. 2019
Thesis title: “Speedup Straggler Workers in Distributed Machine Learning”

Yudian Shi, female undergraduate student at *University of Toronto* Sept. 2018 – Apr. 2019
Thesis title: “Speeding Up Distributed Machine Learning with a Serverless Architecture”

Zhongyang Xiao, undergraduate student at *University of Toronto* Sept. 2016 – Apr. 2017
Thesis title: “Identifying Runtime Performance Bottlenecks of Spark Task Scheduler”
Software Enginner at Amazon

Luyuan Chen, undergraduate student at *University of Toronto* Sept. 2016 – Apr. 2017
Thesis title: “Optimizing SparkSQL using Machine Learning”
Master candidate at University of Toronto

Shing-Chun Tse and Kai-Chung Law, undergraduate students at *Hong Kong University of Science and Technology* Dec. 2013 – Dec. 2014
Research topic: “Studying and Building a Software-Defined Network”

REFERENCES

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