

Haibo Wang

Department of Computer Science
University of Kentucky
301 Davis Marksbury Building
329 Rose Street, Lexington, KY 40506

Phone: (352) 870-2394
Email: wanghaibo@uky.edu
Home: <http://www.haibo.pro>

Research Interests

Network traffic measurement and monitoring, data streaming algorithms and data sketches, statistical data science, edge-cloud computing and Internet of Things, software-defined networks.

Education

- Aug. 2019–May 2023 Ph.D. in Computer Science, University of Florida
Dissertation Title: Real-time Processing of High-speed Data Streams with Probabilistic and Randomized Data Structures and Algorithms
Supervisor: Shigang Chen
Committee members: Anand Rangarajan, Sartaj K Sahni, Samuel S Wu
- Sep. 2016–Jun. 2019 M.Sc., Computer Science, University of Science & Technology of China (USTC)
Thesis Title: Joint Resource Optimization of Control and Data Planes in Software Defined Networks
Supervisors: Liusheng Huang, Chunming Qiao, Hongli Xu
- Aug. 2012–Jun. 2016 B.Eng., Nuclear Science & Engineering and Minor in Business Management, University of Science & Technology of China

Appointments

- Aug. 2023– Assistant Professor, Dept. of Computer Science, University of Kentucky
- Jan. 2022–May 2023 Teaching Assistant, Dept of CISE, University of Florida
- Aug. 2019–Dec. 2021 Research Assistant, Network Lab, Dept of CISE, University of Florida
- Sep. 2016–Jun. 2019 Research Assistant, School of Computer Science, USTC

Publications

*# indicates equal contribution, * indicates corresponding author, author is student/scholar supervised by me.*

Journal Articles

- [1] Fully Distributed Task Offloading in Vehicular Edge Computing
Qianpiao Ma, Hongli Xu, **Haibo Wang**, Yang Xu, Qingmin Jia, Chunming Qiao
IEEE Transactions on Vehicular Technology (**TVT**), 2023
- [2] Reveal: Robustness-aware VNF Placement and Request Scheduling in Edge Clouds
Jin Fang, Gongming Zhao, Hongli Xu, Huaqing Tu, **Haibo Wang**
Computer Networks (**ComNet**), vol. 233, Sep. 2023
- [3] From CountMin to Super kJoin Sketches for Flow Spread Estimation in Data Streaming
Chaoyi Ma, Olufemi O Odegbile, Dimitrios Melissourgios, **Haibo Wang**, Shiping Chen
IEEE Transactions on Network Science and Engineering (**TNSE**), 2023, accepted
- [4] Distributed Strategy for Collaborative Traffic Measurement in a Multi-controller SDN
Da Yao, Qianpiao Ma, **Haibo Wang**, Min Chen, Hongli Xu
IEEE Transactions on Network Science and Engineering (**TNSE**), 2023, accepted
- [5] Lightweight Per-flow Traffic Measurement using Improved LRU List
Da Yao, **Haibo Wang**, Hongli Xu, Minli Zhang
IEEE Transactions on Network Science and Engineering (**TNSE**), 2023, accepted
- [6] Randomized Error Removal for Online Spread Estimation in High-speed Networks
Haibo Wang, Chaoyi Ma, Olufemi O Odegbile, Shigang Chen, Jih-Kwon Peir
IEEE/ACM Transactions on Networking (**TON**), Aug. 2022
- [7] Virtual Filter for Non-duplicate Sampling with Network Applications
Chaoyi Ma[#], **Haibo Wang**[#], Olufemi O Odegbile, Shigang Chen
IEEE/ACM Transactions on Networking (**TON**), June 2022, fast-tracked from the ICNP 2021 best paper
- [8] Fast and Accurate Cardinality Estimation by Self-morphing Bitmaps
Haibo Wang, Chaoyi Ma, Shigang Chen, Yuanda Wang
IEEE/ACM Transactions on Networking (**TON**), direct accept, Feb. 2022
- [9] Achieving High Reliability and Throughput in Software Defined Networks
Xuwei Yang, Hongli Xu, Jianchun Liu, Chen Qian, Xingpeng Fan, He Huang, **Haibo Wang**
Computer Networks (**ComNet**), vol. 197, October 2021
- [10] Spread Estimation with Non-duplicate Sampling in High-speed Networks
He Huang, Yu-E Sun, Chaoyi Ma, Shigang Chen, Yang Du, **Haibo Wang**, Qingjun Xiao,
IEEE/ACM Transactions on Networking (**TON**), vol. 29, issue 5, pp. 2073-2086, October 2021
- [11] Robust Task Offloading in Dynamic Edge Computing
Haibo Wang, Hongli Xu, He Huang, Min Chen, Shigang Chen
IEEE Transactions on Mobile Computing (**TMC**), Mar. 2021
- [12] Joint Routing and Sketch Configuration in Software-Defined Networking
Yutong Zhai, Hongli Xu, **Haibo Wang**, Zeyu Meng, He Huang
IEEE/ACM Transactions on Networking (**TON**), vol. 28, issue 5, October 2020
- [13] PrePass: Load Balancing with Data Plane Resource Constraints using Commodity SDN Switches
Haibo Wang, Hongli Xu, Chen Qian, Juncheng Ge, Jianchun Liu, He Huang
Computer Networks (**ComNet**), vol. 178, September 2020

- [14] Fast and Accurate Traffic Measurement with Hierarchical Filtering
Haibo Wang, Hongli Xu, Liusheng Huang, Yutong Zhai
IEEE Transactions on Parallel and Distributed Systems (**TPDS**), vol. 31, issue 10, Oct. 2020
- [15] Integrating Coflow and Circuit Scheduling for Optical Networks
Haibo Wang, Xiwen Yu, Hongli Xu, Jingyuan Fan, Chunming Qiao, Liusheng Huang
IEEE Transactions on Parallel and Distributed Systems (**TPDS**), vol. 30, issue, 6, June 2019
- [16] CountMax: A Lightweight and Cooperative Sketch Measurement for Software-Defined Networks
Xiwen Yu, Hongli Xu, Da Yao, **Haibo Wang**, Liusheng Huang
IEEE/ACM Transactions on Networking (**TON**), vol 26, issue 6, December 2018
- [17] Load-Balancing Routing in Software Defined Networks with Multiple Controllers
Haibo Wang, Hongli Xu, Liusheng Huang, Jianxin Wang, Xuwei Yang
Computer Networks (**ComNet**), vol. 141, pp. 82-91, August 2018
- [18] Incremental Deployment and Throughput Maximization Routing for a Hybrid SDN
Hongli Xu, Xiang-Yang Li, Liusheng Huang, Hou Deng, He Huang, **Haibo Wang**
IEEE/ACM Transactions on Networking (**TON**), vol. 25, issue 3, June 2017

Conference Papers

- [1] A HyperLogLog-based Solution to Measuring Sliding Window Flow Spread in High-Speed Networks
Michael Hentz, Aayush Karki, **Haibo Wang**
Proc. of IEEE International Conference on Meta Computing, 2024
- [2] Enhancing Accuracy for Super Spreader Identification in High-Speed Data Streaming
Haibo Wang
Proc. of the VLDB Endowment (**VLDB**), 2024
- [3] InGo: In-Network Aggregation Routing with Batch Size Adjustment for Distributed Training
Jianfeng Bao, Gongming Zhao, Hongli Xu, **Haibo Wang**, Peng Yang
IEEE/ACM International Symposium on Quality of Service (**IWQoS**), 2024
- [4] Leaf: Improving QoS for Reconfigurable Datacenters with Multiple Optical Circuit Switches
Jingzhou Wang, Gongming Zhao, Hongli Xu, **Haibo Wang**
IEEE/ACM International Symposium on Quality of Service (**IWQoS**), 2024
- [5] BurstDetector: Real-Time and Accurate Across-Period Burst Detection in High-Speed Networks
Zhongyi Cheng, Guoju Gao, He Huang, Yu-e Sun, Yang Du, **Haibo Wang**
Proc. of IEEE International Conference on Computer Communications (**INFOCOM**), 2024
- [6] Single Update Sketch with Variable Counter Structure
Dimitrios Melissourgos[#], **Haibo Wang**[#], Shigang Chen, Chaoyi Ma, Shiping Chen
Proc. of the VLDB Endowment (**VLDB**), August 2024
- [7] Real-time Spread Burst Detection in Data Streaming
Haibo Wang[#], Dimitrios Melissourgos[#], Chaoyi Ma, Shigang Chen
ACM SIGMETRICS (Winter), June 2023, acceptance rate (13/130 = 10%)

- [8] Supporting Real-time Networkwide T -Queries in High-speed Networks
Yuanda Wang[#], **Haibo Wang**[#], Chaoyi Ma, Shigang Chen
Proc. of IEEE International Conference on Distributed Computing Systems (**ICDCS**), July 2022.
Acceptance rate: 19.9%
- [9] Online Cardinality Estimation by Self-morphing Bitmaps
Haibo Wang, Chaoyi Ma, Shigang Chen, Yuanda Wang
Proc. of IEEE International Conference on Data Engineering (**ICDE**), May 2022
- [10] Virtual Filter for Non-duplicate Sampling
Chaoyi Ma[#], **Haibo Wang**[#], Olufemi O Odegbile, Shigang Chen
Proc. of IEEE International Conference on Network Protocols (**ICNP**), November 2021, **Best Paper Award** (1/154)
- [11] Spatial Sketch Configuration for Traffic Measurement in Software Defined Networks
Da Yao, Hongli Xu, **Haibo Wang**, Liusheng Huang, Huaqing Tu, Xingpeng Fan
Proc. of International Conference on Wireless Algorithms, Systems, and Applications (**WASA**), June 2021, workshop
- [12] Dynamic Edge-Twin Computing for Vehicle Tracking
Yuanda Wang, Shigang Chen, Ye Xia, Dimitrios Melissourgos, **Haibo Wang**
Proc. IEEE International Conference on Cloud Computing (**IEEE CLOUD**), September 2021, short paper
- [13] Supporting Real-Time T -Queries on Network Traffic with An Offloading Model
Yuanda Wang[#], **Haibo Wang**[#], Shigang Chen, Ye Xia
Proc. of IEEE International Conference on Cloud Computing (**IEEE CLOUD**), September 2021, invited paper
- [14] Noise Measurement and Removal for Data Streaming Algorithms with Network Applications
Chaoyi Ma, **Haibo Wang**, Olufemi O Odegbile, Shigang Chen
Proc. of IFIP Networking Conference, June 2021
- [15] Randomized Error Removal for Online Spread Estimation in Data Streaming
Haibo Wang, Chaoyi Ma, Olufemi O Odegbile, Shigang Chen, Jih-Kwon Peir
Proc. of the VLDB Endowment (**VLDB**), August 2021
- [16] Rumor Remove Order Strategy on Social Networks
Yuanda Wang, **Haibo Wang**, Shigang Chen, Ye Xia
Proc. of International Conference on Information System and Data Mining (**ICISDM**), May 2021
- [17] A Survey on Mainstream Dimensions of Edge Computing
Yuanda Wang, **Haibo Wang**, Shigang Chen, Ye Xia
Proc. of International Conference on Information System and Data Mining (**ICISDM**), May 2021
- [18] Task Offloading in Edge-Clouds with Budget Constraint
Lei He, Hongli Xu, **Haibo Wang**, Liusheng Huang, Jingyi Ma
Proc. of International Conference on Algorithms and Architectures for Parallel Processing (**ICA3PP**), November 2018

Book chapters

- [1] Digital Twin with a Perspective from Manufacturing Industry

Haibo Wang, Shigang Chen, Md Sami UI Islam Sami, Fahim Rahman, Mark Tehranipoor
A chapter of Book “Emerging Topics in Hardware Security”, Springer International Publishing,
Editors: Mark Tehranipoor, ISBN: 978-3-030-64448-2, DOI: 10.1007/978-3-030-64448-2, 2021

Talks & Presentations

- [1] Sketches for Network Traffic Measurement: From Fundamentals to Recent Advancements
 - KCS Talk, University of Kentucky, October 2023
- [2] Real-time Streaming Algorithms for Network Anomaly Detection
 - Soochow University, May 2023
- [3] Real-time Processing of High-speed Data Streams with Probabilistic and Randomized Data Structures and Algorithms
 - University of Florida, PhD dissertation defense, March 2023
 - IUPUI, April 2023
 - Texas Tech University, April 2023
 - San Diego State University, March 2023
 - University of Kentucky, March 2023 (online event)
 - Southern Illinois University, Feb. 2023 (online event)
 - University of Texas at San Antonio, College of Business, Jan. 2023
 - Nanjing University, October 2022 (online event)
- [4] Fast and Accurate Traffic Measurement with Hierarchical Filtering
 - Guest lecturer of Course: Data Streaming Algorithms, Peking University, Nov. 2022 (online event, invited by Prof. Tong Yang)
- [5] Online Cardinality Estimation by Self-morphing Bitmaps
 - on IEEE ICDE conference, May 2022 (virtual event)
- [6] Randomized Error Removal for Online Spread Estimation in Data Streaming
 - on VLDB conference, Aug. 2021 (virtual event)

Selected Honours and Awards

- | | |
|------|---|
| 2024 | IEEE INFOCOM 2024 Distinguished TPC Member |
| 2022 | UF CISE Gartner Group Graduate Fellowship (rank 1 out of all PhD applicants) |
| 2021 | IEEE ICNP Best Paper Award |
| 2021 | UF CISE Gartner Group Graduate Fellowship (rank 1 out of all PhD applicants) |
| 2021 | VLDB SPEND grant for virtual attendance |
| 2019 | CCF Excellent CS master thesis (15 out of all graduates in Anhui Province, China) |

Teaching

Teaching Assistant

Spring 2023	CNT 5106C, Computer Networks	University of Florida
Fall 2022	CIS6930, Special Topics: Internet Data Streaming	University of Florida
Spring 2022	CNT4007, Computer Network Fundamentals	University of Florida
Summer 2018	Database System	USTC
Spring 2018	Graduate Introduction to Algorithm	USTC
Fall 2017	Graduate Combinatorics	USTC

Instructor

Fall 23	CS 585/685 Special Topics: Internet Data Streaming	University of Kentucky
Spring 24	CS 378 Introduction to Cryptology	University of Kentucky

Professional Activities

- TPC member, IEEE INFOCOM 2024, 2025
- TPC member, IEEE CLOUD 2022, 2023, 2024
- TPC member, SecureComm 2024
- Reviewers: IEEE/ACM Transactions on Networking (**TON**), IEEE Transactions on Mobile Computing (**TMC**), Computer Networks (**ComNet**), IEEE Journal on Selected Areas in Communications (**JSAC**), IEEE Transactions on Network Science and Engineering (**TNSE**)