

Wenfei Wu

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Education

Ph.D. Computer Science, University of Wisconsin-Madison, 2015, advisor: Prof. Aditya Akella¹

M.S. Computer Science, University of Wisconsin-Madison, 2012

B.E. Computer Science and Technology, Beihang University, 2010

B.S. (double degree), Applied Mathematics, Beihang University, 2010.

Employments

Assistant Professor, Institute for Interdisciplinary Information Sciences, **Tsinghua University**, Dean: Andrew Chi-Chih Yao, 2017.4 - now.

Administrative Committee Member, Haihua Institute for Frontier Information Technology ([link](#)), 2018.12 - now

Post-doctoral Researcher, Networking Systems Research Group, **Hewlett Packard Labs**, Manager: Sujata Banerjee, Mentor: Ying Zhang, 2016.1 - 2017.4.

Research Areas

I am broadly interested in networked systems. I have experience in the following areas.

Current Projects (in submission)

In-network computation, using programmable network hardware to enhance network appliances and distributed systems.

DevOps for Network Functions, a model-driven approach to bridge the gap between NF operation and NF development. [1]

Past Projects

Network Architecture, including architecture design for the Internet, data center networks, and mobile networks. [4, 7, 9, 18, 19, 22, 23, 25]

Network Protocols, including protocol improvement for TCP, and QoS appliances. [5, 8, 12, 20]

Network Management, including network diagnostics, network software development, and policy management. [3, 6, 10, 11, 13, 15, 16, 17, 21, 24]

Network Security, including malware analysis, and trusted execution environment for network services. [2, 14]

¹Prof. Aditya Akella ([link](#)) was awarded Applied Networking Research Prize in 2015 and ACM SIGCOMM Rising Star Award in 2014, and he is a PI of CloudLab ([link](#)).

Teaching Experience

I taught “Yao Class” (elite undergraduate students in Tsinghua) and IIIS graduate students.

Fundamentals for Cryptography, for Yao Class, in fall 2017, fall 2018, fall 2019, and fall 2020.

Security Technologies in the Cyberspace, for IIIS graduate students, in spring 2018, spring 2019, and spring 2020.

Awards

Best Paper Runner-up. International Performance Computing and Communications Conference (IPCCC), London, UK, 2019.

Microsoft Collaborative Research Award. Microsoft Research Asia, 2018

Best Student Paper. Symposium of Cloud Computing (SoCC), Santa Clara, USA, 2013.

Grants

I received and managed 9.24 million RMB grant, including 1.61 million from NSFC, 2.7 million from the industry, and internal 4.93 million RMB in the institute.

Fusion Networks for Smart Medium, 1.34M RMB, Ministry of Science and Technology, 2020-2024.

Rapid Development of Network Functions for Heterogeneous Networks, 270K RMB, National Natural Science Foundation of China, 2019-2022.

Other grants from the industry, 2.7M RMB, about NFV, SmartNIC, Network Management, and Optical Networks; provided on request.

Institute internal grants, 4.93M RMB, about network verification, and machine learning infrastructure; provided on request.

Professional Services

Technical Program Committee Member

ANCS'19, TPC Member

ANCS'18, TPC Member

Hot-IoT'16, TPC Member

Transaction on Computers, Reviewer

Transaction on Networking, Reviewer

Transaction on Network and Service Management, Reviewer

Internet Computing, Reviewer

Organizing Committee Member

SIGMETRICS'21, local management chair

SOSR'20, publication chair

SIGCOMM'19, registration chair

SOSR'19, publicity chair

APNet'18, local management chair

SOSR'17, travel grant chair

Publications

I published 27 papers and 3 patents, and have 3 patents under review. My Google Scholar Citation is 1413, i10-index is 14, and h-index is 13.

Conference Papers

- [1] Bangwen Deng, **Wenfei Wu***, and Linhai Song. “**Redundant Logic Elimination in Network Functions**”. In: *Proceedings of the 2020 Symposium on SDN Research*. SOSR '20. 2020.
- [2] Qingxiu Liu, **Wenfei Wu***, Qingsong Liu, and Qun Huang. “**T2DNS: A Third-Party DNS Service with Privacy Preservation and Trustworthiness**”. In: *Proceedings of the 29th International Conference on Computer Communications and Networks*. ICCCN '20. 2020.
- [3] Yongheng Chen, Linhai Song, Xinyu Xing, Fengyuan Xu, and **Wenfei Wu**. “**Automated Finite State Machine Extraction**”. In: *Proceedings of the 2019 Workshop on Forming an Ecosystem Around Software Transformation*. FEAST '19. 2019.
- [4] Yimin Jiang, Yong Cui, **Wenfei Wu**, Zhe Xu, Jiahao Gu, K. K. Ramakrishnan, Yongchao He, and Xuehai Qian. “**SpeedyBox: Low-Latency NFV Service Chains with Cross-NF Runtime Consolidation**”. In: *Proceedings of the 39th IEEE International Conference on Distributed Computing Systems*. ICDCS '19. 2019.
- [5] Junfeng Li, Dan Li, **Wenfei Wu**, K. K. Ramakrishnan, Jinkun Geng, Fei Gui, Fanzhao Wang, and Kai Zheng. “**Sphinx: A Transport Protocol for High-Speed and Lossy Mobile Networks**”. In: *Proceedings of the 38th IEEE International Performance Computing and Communications Conference*. IPCCC '19. 2019.
- [6] Soo-Jin Moon, Jeffrey Helt, Yifei Yuan, Yves Bieri, Sujata Banerjee, Vyas Sekar, **Wenfei Wu**, Mihalis Yannakakis, and Ying Zhang. “**Alembic: Automated Model Inference for Stateful Network Functions**”. In: *Proceedings of the 16th USENIX Symposium on Networked Systems Design and Implementation*. NSDI '19. 2019.
- [7] Qi-An Fu and **Wenfei Wu***. “**TUS: A Transactional Update Service for SDN Applications**”. In: *Proceedings of the 9th ACM SIGOPS Asia-Pacific Workshop on Systems*. APSys '18. 2018.
- [8] Qingmei Ren, Yong Cui, **Wenfei Wu**, Changfeng Chen, Yuchi Chen, Jiangchuan Liu, and Hongyi Huang. “**Improving Quality of Experience for Mobile Broadcasters in Personalized Live Video Streaming**”. In: *2018 IEEE/ACM 26th International Symposium on Quality of Service*. IWQoS '18. 2018.
- [9] Ye Yu, Ying Zhang, **Wenfei Wu**, and Chen Qian. “**NetCP: Consistent, Non-interruptive and Efficient Checkpointing and Rollback of SDN**”. In: *2018 IEEE/ACM 26th International Symposium on Quality of Service*. IWQoS '18. 2018.

- [10] Anubhavnidhi Abhashkumar, Joon-Myung Kang, Sujata Banerjee, Aditya Akella, Ying Zhang, and **Wenfei Wu**. “**Supporting Diverse Dynamic Intent-based Policies using Janus**”. In: *Proceedings of the 13th ACM International on Conference on emerging Networking Experiments and Technologies*. CoNEXT '17. Google Scholar Citation 16. 2017.
- [11] Anubhavnidhi Abhashkumar, Jeongkeun Lee, Jean Tourrilhes, Sujata Banerjee, **Wenfei Wu**, Joon-Myung Kang, and Aditya Akella. “**P5: Policy-driven optimization of P4 pipeline**”. In: *Proceedings of the 2017 Symposium on SDN Research*. SOSR '17. 2017.
- [12] Keqiang He, Weite Qin, Qiwei Zhang, **Wenfei Wu**, Junjie Yang, Tian Pan, Chengchen Hu, Jiao Zhang, Brent Stephens, Aditya Akella, and Ying Zhang. “**Low Latency Software Rate Limiters for Cloud Networks**”. In: *Proceedings of the 2017 Asia-Pacific Workshop on Networking*. APNet '17. 2017.
- [13] Ying Zhang, **Wenfei Wu**, Sujata Banerjee, Joon-Myung Kang, and Mario A Sanchez. “**SLA-Verifier: Stateful and Quantitative Verification for Service Chaining**”. In: *Proceedings of the 2017 IEEE Conference on Computer Communications*. INFOCOM '17. 2017.
- [14] Linhai Song, Heqing Huang, Wu Zhou, **Wenfei Wu**, and Yiyang Zhang. “**Learning from Big Malwares**”. In: *Proceedings of the 7th ACM SIGOPS Asia-Pacific Workshop on Systems*. APSys '16. 2016.
- [15] **Wenfei Wu**, Ying Zhang, and Sujata Banerjee. “**Automatic Synthesis of NF Models by Program Analysis**”. In: *Proceedings of the 15th ACM Workshop on Hot Topics in Networks*. HotNets '16. Google Scholar Citation 26. 2016.
- [16] Aaron Gember-Jacobson, **Wenfei Wu**, Xiujuan Li, Aditya Akella, and Ratul Mahajan. “**Management plane analytics**”. In: *Proceedings of the 2015 ACM Conference on Internet Measurement Conference*. IMC '15. Google Scholar Citation 14. 2015.
- [17] **Wenfei Wu**, Keqiang He, and Aditya Akella. “**Perfsight: Performance diagnosis for software dataplanes**”. In: *Proceedings of the 2015 ACM Conference on Internet Measurement Conference*. IMC '15. Google Scholar Citation 27. 2015.
- [18] Mehrdad Moradi, **Wenfei Wu**, Li Erran Li, and Zhuoqing Morley Mao. “**SoftMoW: recursive and reconfigurable cellular WAN architecture**”. In: *Proceedings of the 10th ACM International on Conference on emerging Networking Experiments and Technologies*. CoNEXT '14. Google Scholar Citation 57. 2014.
- [19] **Wenfei Wu**, Li Erran Li, Aurojit Panda, and Scott Shenker. “**PRAN: Programmable radio access networks**”. In: *Proceedings of the 13th ACM Workshop on Hot Topics in Networks*. HotNets '14. Google Scholar Citation 27. 2014.
- [20] **Wenfei Wu**, Yizheng Chen, Ramakrishnan Durairajan, Dongchan Kim, Ashok Anand, and Aditya Akella. “**Adaptive data transmission in the cloud**”. In: *2013 IEEE/ACM 21st International Symposium on Quality of Service*. IWQoS '13. 2013.
- [21] **Wenfei Wu**, Guohui Wang, Aditya Akella, and Anees Shaikh. “**Virtual network diagnosis as a service**”. In: *Proceedings of the 4th annual Symposium on Cloud Computing*. SoCC '13. Google Scholar Citation 31. 2013.
- [22] Dongsu Han, Ashok Anand, Fahad Dogar, Boyan Li, Hyeontaek Lim, Michel Machado, Arvind Mukundan, **Wenfei Wu**, Aditya Akella, David G. Andersen, John W. Byers, Srinivasan Seshan, and Peter Steenkiste. “**XIA: Efficient Support for Evolvable Internetworking**”. In: *Proceedings of the 9th USENIX Symposium on Networked Systems Design and Implementation*. NSDI '12. Google Scholar Citation 190. 2012.
- [23] Ashok Anand, Fahad Dogar, Dongsu Han, Boyan Li, Hyeontaek Lim, Michel Machado, **Wenfei Wu**, Aditya Akella, David G Andersen, John W Byers, et al. “**XIA: An architecture for an evolvable and trustworthy Internet**”. In: *Proceedings of the 10th ACM Workshop on Hot Topics in Networks*. HotNets '11. 2011.

- [24] Kai Chen, Chuanxiong Guo, Haitao Wu, Jing Yuan, Zhenqian Feng, Yan Chen, Songwu Lu, and **Wenfei Wu**. “**Generic and Automatic Address Configuration for Data Center Networks**”. In: *Proceedings of the ACM SIGCOMM 2010 Conference*. SIGCOMM '10. Google Scholar Citation 70. 2010.
- [25] Chuanxiong Guo, Guohan Lu, Helen J. Wang, Shuang Yang, Chao Kong, Peng Sun, **Wenfei Wu**, and Yongguang Zhang. “**SecondNet: A Data Center Network Virtualization Architecture with Bandwidth Guarantees**”. In: *Proceedings of the 6th International Conference on emerging Networking Experiments and Technologies (CoNEXT)*. CoNEXT '10. Google Scholar Citation 699. 2010.

Journal Papers

- [1] **Wenfei Wu** and Ying Zhang. “**Network Function Modeling and Its Applications**”. In: *IEEE Internet Computing* (2017).
- [2] Kai Chen, Chuanxiong Guo, Haitao Wu, Jing Yuan, Zhenqian Feng, Yan Chen, Songwu Lu, and **Wenfei Wu**. “**DAC: generic and automatic address configuration for data center networks**”. In: *IEEE/ACM Transactions on Networking* (2012). Google Scholar Citation 32.

Patents

- [1] **Wenfei Wu**, Yongchao He, Xuemin Wen, and Haifeng Li. “**Design and Implementation of Rate Limiters on Programmable Switches**”. In: (2019). Chinese Patent Application.
- [2] Joon Myung Kang, Anubhavnidhi Abhashkumar, Sujata Banerjee, Ying Zhang, and **Wenfei Wu**. “**Generating composite network policy**”. In: (2018). US Patent Application US20180316576A1.
- [3] **Wenfei Wu**, Hongyi Huang, Yongchao He, and Bangwen Deng. “**A Compiler for Network Functions**”. In: (2018). Chinese Patent Application.
- [4] **Wenfei Wu**, Hongyi Huang, Yongchao He, and Bangwen Deng. “**A Development Framework of Network Functions**”. In: (2018). Chinese Patent Application.
- [5] **Wenfei Wu**, Ying Zhang, and Sujata Banerjee. “**Middlebox modeling**”. In: (2018). US Patent Application US20180131621A1.
- [6] Ying Zhang, **Wenfei Wu**, and Sujata Banerjee. “**Selectively monitoring a network of network function chains based on probability of service level agreement violation**”. In: (2018). US Patent 10491528.