

Songshi Dou

Ph.D. Student
Department of Electrical and Electronic Engineering (EEE)
The University of Hong Kong (HKU)
RM 501, Chow Yei Ching Bldg., Pokfulam Road, Hong Kong

Work Email: ssdou@eee.hku.hk
Personal Email: songshidou@hotmail.com
<https://songshidou.github.io>
(+852) 9748 2397

Summary / Statement

Songshi Dou's research focuses on computer and communication networking, including software-defined networking (SDN), LEO satellite networks, and network function virtualization (NFV). He has published 18 journal and conference papers, including IEEE/ACN TON, IEEE TCOM, Elsevier JNCA, Elsevier Computer Networks, IEEE ICDCS, and IEEE/ACM IWQoS, and owned 5 Chinese patents.

Education

The University of Hong Kong (HKU), Pokfulam, Hong Kong 2023 - 2027 (expc.)

Ph.D. student in Electrical and Electronic Engineering
Field of Study: Computer and Communication Networking
Advisor: Prof. Lawrence K. Yeung and Prof. Xianhao Chen

Beijing Institute of Technology (BIT), Beijing, China 2019 - 2022

M.S. in Control Engineering, June 2022
Field of Study: Computer Networking
Advisor: Prof. Zehua Guo
Dissertation: Maintaining the Path Programmability in Software-Defined Wide Area Networks
[Outstanding Master's Thesis of Chinese Institute of Electronics](#)

North China Electric Power University (NCEPU), Beijing, China 2015 - 2019

B.S. in Automation, June 2019

Publications

([†]Equal contribution, *Corresponding author)

Journal Papers

- [J11] **Songshi Dou**, Li Qi, and Zehua Guo, "Mitigating the Impact of Controller Failures on QoS Robustness for Software-Defined Wide Area Networks", *Elsevier Computer Networks (COMNET)*, Accepted.

- [J10] Zehua Guo, Changlin Li, Yang Li, **Songsbi Dou**, Bida Zhang, Gang Wang, and Weichao Wu, “Maintaining the Network Performance of Software-Defined WANs with Efficient Critical Routing”, *IEEE Transactions on Network and Service Management (TNSM)*, Accepted.
- [J9] Yuntian Zhang, Ning Han, Tengting Zhu, Junjie Zhang, Minghao Ye, **Songsbi Dou**, and Zehua Guo, “Prophet: Traffic Engineering-centric Traffic Matrix Prediction”, *IEEE/ACM Transactions on Networking (TON)*, Accepted.
- [J8] Zehua Guo, **Songsbi Dou**, Wenchao Jiang, and Yuanqing Xia, “Toward Improved Path Programmability Recovery for Software-Defined WANs under Multiple Controller Failures”, *IEEE/ACM Transactions on Networking (TON)*, Accepted.
- [J7] **Songsbi Dou**, Li Qi, Chao Yao, and Zehua Guo, “Exploring the Impact of Critical Programmability on Controller Placement for Software-Defined Wide Area Networks”, *IEEE/ACM Transactions on Networking (TON)*, Accepted.
- [J6] Zehua Guo, **Songsbi Dou***, Wenfei Wu, and Yuanqing Xia, “Toward Flexible and Predictable Path Programmability Recovery under Multiple Controller Failures in Software-Defined WANs”, *IEEE/ACM Transactions on Networking (TON)*, vol. 31, no. 5, pp. 1965-1980, 2023.
- [J5] Zehua Guo, **Songsbi Dou**, Li Qi, and Julong Lan, “A Survey of Maintaining the Path Programmability in Software-Defined Wide Area Networks”, *Journal of Electronics & Information Technology (JEIT)*, 45(5): 1899-1910, 2023. (in Chinese)
- [J4] Zehua Guo, **Songsbi Dou**, Sen Liu, Wendi Feng, Wenchao Jiang, Yang Xu, and Zhi-Li Zhang, “Maintaining Control Resiliency and Flow Programmability in Software-Defined WANs During Controller Failures”, *IEEE/ACM Transactions on Networking (TON)*, vol. 30, no. 3, pp. 969-984, 2022.
- [J3] Haoran Ni, Zehua Guo, Changlin Li, **Songsbi Dou**, Chao Yao, and Thar Baker, “Network Coding-based Resilient Routing for Maintaining Data Security and Availability in Software-Defined Networks”, *Elsevier Journal of Network and Computer Applications (JNCA)*, vol. 205, p. 103372, 2022.
- [J2] Zehua Guo, **Songsbi Dou**, Yi Wang, Sen Liu, Wendi Feng, and Yang Xu, “HybridFlow: Achieving Load Balancing in Software-Defined WANs with Scalable Routing”, *IEEE Transactions on Communications (TCOM)*, vol. 69, no. 8, pp. 5255-5268, 2021.
- [J1] **Songsbi Dou**, Guochun Miao, Zehua Guo, Chao Yao, Weiran Wu, and Yuanqing Xia, “Matchmaker: Maintaining Network Programmability for Software-Defined WANs under Multiple Controller Failures”, *Elsevier Computer Networks (COMNET)*, vol. 192, p. 108045, 2021.

Conference & Workshop Papers

- [C5] **Songsbi Dou**, Yongchao He, Sen Liu, Wenfei Wu, and Zehua Guo, “RateSheriff: Multipath Flow-aware and Resource Efficient Rate Limiter Placement for Data Center Networks”, *IEEE/ACM International Symposium on Quality of Service 2023 (IWQoS’23)*. (Accept Ratio: 62/264=23.5%)
- [C4] Li Qi[†], **Songsbi Dou**[†], Zehua Guo, Changlin Li, Yang Li, and Tengting Zhu, “Low Control Latency SD-WANs for Metaverse”, *International Workshop on Social and Metaverse Computing and Networking 2022 (SocialMeta’22)*.
- [C3] **Songsbi Dou**, Zehua Guo, and Yuanqing Xia, “ProgrammabilityMedic: Predictable Path Programmability Recovery under Multiple Controller Failures in SD-WANs”, *IEEE International Conference on Distributed Computing Systems 2021 (ICDCS’21)*. (Accept Ratio: 97/489=19.8%)
- [C2] Yijun Sun, Zehua Guo, **Songsbi Dou**, and Yuanqing Xia, “Video Quality and Popularity-aware Video Caching in Content Delivery Networks”, *IEEE International Conference on Web Services 2021 (ICWS’21)*.

- [C1] Zehua Guo, **Songshi Dou**, and Wenchao Jiang, “Improving the Path Programmability for Software-Defined WANs under Multiple Controller Failures”, *IEEE/ACM International Symposium on Quality of Service 2020 (IWQoS’20)*. (Accept Ratio: 44/147=29.9%)

Posters & Demos

- [D2] **Songshi Dou**, Li Qi, and Zehua Guo, “Maintaining QoS-aware and Resilient Path Programmability for Metaverse in SD-WANs”, *ACM Turing Award Celebration Conference 2023 (TURC’23)*.
- [D1] Yijun Sun, Zehua Guo, **Songshi Dou**, Junjie Zhang, Changlin Li, and Xiang Ouyang, “Poster: Enabling Fast Forwarding in Hybrid Software-Defined Networks”, *IEEE International Conference on Network Protocols 2021 (ICNP’21)*.

Manuscripts

- [M5] **Songshi Dou**, Shengyu Zhang, and Lawrence K. Yeung, “Achieving Predictable and Scalable Load Balancing Performance in LEO Mega-Constellations”, Under Review.
- [M4] **Songshi Dou** and Zehua Guo, “Path Programmability Recovery under Controller Failures for SD-WANs: Recent Advances and Future Research Challenges”, *IEEE Communications Magazine (COMMAG)*, Under Review.
- [M3] **Songshi Dou**, Li Qi, and Zehua Guo, “ARES: Predictable Traffic Engineering under Controller Failures in SD-WANs”, Under Review.
- [M2] **Songshi Dou**, Li Qi, and Zehua Guo, “EPIC: Improving Traffic Engineering Performance under Controller Failures in Software-Defined Wide Area Networks”, Under Review.
- [M1] Zehua Guo, Li Qi, **Songshi Dou**, Jiawei Weng, Xiaoyang Fu, and Yuanqing Xia, “Maintaining Control Resiliency for Traffic Engineering in SD-WANs”, *IEEE/ACM Transactions on Networking (TON)*, Under Review.

Patents

- [P5] Zehua Guo, Yutian Zhang, Ning Han, and **Songshi Dou**, “A Traffic Engineering-centric Traffic Matrix Prediction Method”, Chinese Patent, ZL202110810615.0.
- [P4] Zehua Guo, **Songshi Dou**, and Yuanqing Xia “A Scalable Routing Method for Realizing Load Balancing in Software-Defined Wide Area Networks”, Chinese Patent, ZL202010974299.6.
- [P3] Zehua Guo, and **Songshi Dou**, “Optimizing Flow Programmability under Multiple Controller Failures in Software-Defined Networks”, Chinese Patent, ZL202010544094.4.
- [P2] Zehua Guo, Penghao Sun, **Songshi Dou**, Yutian Zhang, Ning Han, and Yuanqing Xia, “Deep Reinforcement Learning-based Data Center Network Energy Management and Quality of Service Optimization Method”, Chinese Patent, ZL202010308862.6.
- [P1] Zehua Guo, Penghao Sun, **Songshi Dou**, Yuanqing Xia, and Honghai Ji, “A Load Balancing Method for Multi-Controller in Software-Defined Networking”, Chinese Patent, ZL202010094237.6.

Academic Services

Reviewer for Journals

- Future Generation Computer Systems (**FGCS**), 2023
- IEEE Transactions on Network Science and Engineering (**TNSE**), 2022
- IEEE Systems Journal (**ISJ**), 2021 - 2023
- EURASIP Journal on Wireless Communications and Networking (**JWCN**), 2021 - 2022

Reviewer for Conferences

- IEEE International Conference on Communications (**ICC**), 2023
- IEEE Global Communications Conference (**GLOBECOM**), 2022
- International Teletraffic Congress (**ITC**), 2022
- International Conference on Knowledge Science, Engineering and Management (**KSEM**), 2022 - 2023

Teaching Experience

- CCST9003, Everyday Computing and the Internet (Fall 2023, Tutor)

Honors & Awards

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| • Postgraduate Scholarships (PGS) , The University of Hong Kong | <i>2023-2027</i> |
| • Certificate in Teaching and Learning in Higher Education , The University of Hong Kong | <i>2023</i> |
| • Outstanding Master's Thesis , Chinese Institute of Electronics | <i>2022</i> |
| • Outstanding Master's Thesis , Beijing Institute of Technology | <i>2022</i> |
| • Outstanding Graduates , Beijing Institute of Technology | <i>2022</i> |
| • National Scholarship Award (Top 1%) , Chinese Ministry of Education | <i>2021</i> |
| • Outstanding Model Master Student (Top 1%) , Beijing Institute of Technology | <i>2021</i> |
| • ICNP 2021 Student Registration Award , IEEE Computer Society | <i>2021</i> |
| • OSDI 2021 Student Grant , USENIX | <i>2021</i> |
| • ICDCS 2021 Student Registration Award , IEEE Computer Society | <i>2021</i> |
| • CNCC 2020 Student Registration Award , China Computer Federation | <i>2020</i> |

Talks & Presentations

- “RateSheriff: Multipath Flow-aware and Resource Efficient Rate Limiter Placement for Data Center Networks”, *IEEE/ACM International Symposium on Quality of Service 2023 (IWQoS’23)*, Orlando, FL, USA, June 2023.
- “ProgrammabilityMedic: Predictable Path Programmability Recovery under Multiple Controller Failures in SD-WANs”, *IEEE International Conference on Distributed Computing Systems 2021 (ICDCS’21)*, Online, July 2021.
- “Improving the Path Programmability for Software-Defined WANs under Multiple Controller Failures”, *IEEE/ACM International Symposium on Quality of Service 2020 (IWQoS’20)*, Online, June 2020.