

Chaoyi Lu

Postdoctoral researcher • Institute for Network Sciences and Cyberspace, Tsinghua University
FIT 4-204, Tsinghua University, Beijing 100084, China
luchaoyi@tsinghua.edu.cn • <https://chaoyi.lu> (*personal*) • <https://port-53.info> (*team*)

Education & Employment

2022 - Present: Postdoctoral researcher

Tsinghua University

Reporting to Prof. Haixin Duan

Research Interests: Internet measurement, Network security

2017 - 2022: PhD

Tsinghua University

Advisor: Prof. Jianping Wu

Dissertation: *On Measuring Security Technologies within the Domain Name System Hierarchy*

2013 - 2017: BSc

Beijing University of Posts and Telecommunications

Research & Publications

◆ 19 published academic papers

◇ 14 at top-tier venues: CCS (x5), USENIX Security (x4), NDSS (x2), IMC (x2), WWW (x1)

◆ Research topics:

◇ *Protocol operations measurement*: encrypted DNS [6, 18], DNS servicing [13, 17]

◇ *Large-scale data analysis*: privacy [1, 11], traffic manipulation [4-5, 19], universal acceptance [3]

◇ *New security threats*: denial-of-service [15-16], DNS cache poisoning [7, 14]

◇ *Other infrastructure*: Web PKI [9, 12], Email [10], Mobile [8]

◆ Awards & community event contributions:

◇ IRTF Applied Networking Research Prize; ACM CCS Distinguished Paper Award

◇ ICANN APAC DNS Forum, IETF, BlackHat EU, IDS, OARC, ANRW

Conference papers

[19] **[IMC '24]** Y. Xing*, **Chaoyi Lu***, B. Liu, H. Duan, J. Sun, et al. **Yesterday Once More: Global Measurement of Internet Traffic Shadowing Behaviors**. To appear in Proceedings of the 24th Internet Measurement Conference, November 2024. (*Co-first authors)

[18] **[WWW '24]** R. Li, B. Liu, **Chaoyi Lu**, H. Duan, J. Shao. **A Worldwide View on the Reachability of Encrypted DNS Services**. In Proceedings of the 36th Web Conference, May 2024.

[17] **[NDSS '24]** M. Liu, Y. Zhang, X. Li, **Chaoyi Lu**, B. Liu, et al. **Understanding the Implementation and Security Implications of Protective DNS Services**. In Proceedings of the 31st Network and Distributed System Security Symposium, February 2024.

◇ Community event contribution: ICANN APAC DNS Forum (Pre-event webinar) 2024

[16] **[CCS '23a]** W. Xu, X. Li, **Chaoyi Lu**, B. Liu, J. Zhang, et al. **TsuKing: Coordinating DNS Resolvers and Queries into Potent DoS Amplifiers**. In Proceedings of the 30th ACM Conference on Computer and Communications Security, November 2023.

◇ Community event contribution: Black Hat Europe 2023, OARC 41

- [15] **[CCS '23b]** F. Zhang, B. Liu, E. Alowaisheq, J. Chen, **Chaoyi Lu**, et al. *Silence is not Golden: Disrupting the Load Balancing of Authoritative DNS Servers*. In Proceedings of the 30th ACM Conference on Computer and Communications Security, November 2023.
 ◇ Recipient of ACM CCS Distinguished Paper Award
 ◇ Community event contribution: OARC 41, ICANN APAC DNS Forum (Pre-event webinar) 2023
- [14] **[USENIX Sec '23]** X. Li, **Chaoyi Lu**, B. Liu, Q. Zhang, Z. Li, et al. *The Maginot Line: Attacking the Boundary of DNS Caching Protection*. In Proceedings of the 32nd USENIX Security Symposium, Anaheim, CA, USA, August 2023.
- [13] **[PAM '22]** F. Zhang, **Chaoyi Lu**, B. Liu, H. Duan, Y. Liu. *Measuring the Practical Effect of DNS Root Server Instances: A China-Wide Case Study*. In Proceedings of the 23rd Passive and Active Measurement Conference. March 2022.
 ◇ Community event contribution: ICANN APAC DNS Forum 2022
- [12] **[CCS '21]** Y. Zhang, B. Liu, **Chaoyi Lu**, Z. Li, H. Duan, et al. *Rusted Anchors: A National Client-Side View of Hidden Root CAs in the Web PKI Ecosystem*. In Proceedings of the 28th ACM Conference on Computer and Communications Security, November 2021.
- [11] **[NDSS '21]** **Chaoyi Lu**, B. Liu, Y. Zhang, Z. Li, F. Zhang, H. Duan, et al. *From WHOIS to WHOWAS: A Large-Scale Measurement Study of Domain Registration Privacy under the GDPR*. In Proceedings of the 28th Network and Distributed System Security Symposium, February 2021.
- [10] **[USENIX Sec '21]** K. Shen, C. Wang, X. Zheng, M. Guo, **Chaoyi Lu**, et al. *Weak Links in Authentication Chains: A Large-scale Analysis of Email Sender Spoofing Attacks*. In Proceedings of the 30th USENIX Security Symposium, August 2021.
- [9] **[CCS '20a]** M. Zhang, X. Zheng, K. Shen, Z. Kong, **Chaoyi Lu**, et al. *Talking with Familiar Strangers: An Empirical Study on HTTPS Context Confusion Attacks*. In Proceedings of the 27th ACM Conference on Computer and Communications Security, November 2020.
- [8] **[CCS '20b]** Y. Zhang, B. Liu, **Chaoyi Lu**, Z. Li, H. Duan, et al. *Lies in the Air: Characterizing Fake-base-station Spam Ecosystem in China*. In Proceedings of the 27th ACM Conference on Computer and Communications Security, November 2020.
- [7] **[USENIX Sec '20]** X. Zheng, **Chaoyi Lu**, J. Peng, Q. Yang, D. Zhou, et al. *Poison Over Troubled Forwarders: A Cache Poisoning Attack Targeting DNS Forwarding Devices*. In Proceedings of the 29th USENIX Security Symposium, August 2020.
 ◇ Community event contribution: ICANN DNS Symposium 2021
- [6] **[IMC '19]** **Chaoyi Lu**, B. Liu, Z. Li, S. Hao, H. Duan, et al. *An End-to-End, Large-Scale Measurement of DNS-over-Encryption: How Far Have We Come?*. In Proceedings of the 19th Internet Measurement Conference, October 2019.
 ◇ Recipient of IRTF Applied Networking Research Prize (ANRP) 2020
 ◇ Nominee of Distinguished Paper Award & Community Contribution Award
 ◇ Community event contribution: IETF 108, OARC 31
- [5] **[EuroS&P '19]** B. Liu, Z. Li, P. Zong, **Chaoyi Lu**, H. Duan, et al. *TraffickStop: Detecting and Measuring Illicit Traffic Monetization Through Large-scale DNS Analysis*. In Proceedings of the 4th IEEE European Symposium on Security and Privacy, June 2019.
- [4] **[USENIX Sec '18]** B. Liu, **Chaoyi Lu**, H. Duan, Y. Liu, Z. Li, et al. *Who Is Answering My Queries: Understanding and Characterizing Interception of the DNS Resolution Path*. In Proceedings of the 27th USENIX Security Symposium, August 2018.
 ◇ Community event contribution: ACM/IRTF ANRW '19, OARC 30

- [3] **[DSN '18]** B. Liu, **Chaoyi Lu**, Z. Li, Y. Liu, H. Duan, et al. *A Reexamination of Internationalized Domain Names: the Good, the Bad and the Ugly*. In Proceedings of the 48th IEEE/IFIP International Conference on Dependable Systems and Networks, June 2018.
- [2] **[EthiCS Workshop '22]** Y. Zhang, M. Liu, M. Zhang, **Chaoyi Lu**, H. Duan. *Ethics in Security Research: Visions, Reality, and Paths Forward*. 1st International Workshop on Ethics in Computer Security. June 2022.
 ◇ Recipient of Best Student Paper Award
- [1] **[FOCI Workshop '18]** M. Zhang, B. Liu, **Chaoyi Lu**, J. Zhang, S. Hao, H. Duan. *Measuring Privacy Threats in China-Wide Mobile Networks*. 8th USENIX Workshop on Free and Open Communications on the Internet, August 2018.

Industrial standard

- [1] **Chaoyi Lu**, Y. Huang, J. Zhang, H. Duan, D. Ma, et al. *Domain Name System Resolution Data Encryption Transmission Technical Requirements*. Industrial standard of telecommunication technologies of the P.R.C. (No. TD/T 4712-2024, effective Jul 2024)

Teaching & Events

Community events

- Pre-event webinar moderator, ICANN APAC DNS Forum, 2024
- Plenary & pre-event webinar moderator, ICANN APAC DNS Forum, 2023

Technical training sessions

- DNSSEC training for CERNET (under support of APNIC ISIF Project), 2023
- Cybersecurity Fundamentals, Training for Malaysia Cyber 100 Initiative, 2023
- Domain Name System Fundamentals, DataCon Student Summer Camp, 2022-2024

Courses at Tsinghua University

- Joint lecturer, Computer Network Security Experiments, 2023 Summer
- Teaching assistant, Basics and Cutting-Edge Topics of Cyberspace, 2020 Fall
- Teaching assistant, Computer Networks, 2019 Fall
- Teaching assistant, Computer Network Security Technologies, 2019 Spring

Services

Internet community committee member

- ICANN Security and Stability Advisory Committee (SSAC), 2024-Present

Conference TPC member

- EAI SecureComm '23

Conference external reviewers

- Conferences: RAID '23, NDSS '22 & '20, ICDCS '21, DSN '20, CCS '19, ESORICS '19, ICICS '19
- Journal: IEEE TNSM 2020
- Workshops: WPES '21, IoT S&P '18, RESEC '18

Awards

Academia & community

ACM CCS Distinguished Paper Award	2023
IRTF Applied Networking Research Prize (ANRP)	2020
ACM IMC Nominee of Distinguished Paper Award & Community Contribution Award	2019
IEEE/IFIP DSN Student Travel Grant	2018

Education & scholarship

Graduate Award, Education Commission of Beijing Municipality	2022 & 2017
PhD Graduate Award of Tsinghua University	2022
PhD Dissertation Award of Tsinghua University	2022
1st-Class Scholarship of Tsinghua University for Graduate Students	2021 & 2020
Cyberspace Scholarship of China Internet Development Foundation	2016