Xianghang (Scott) Mi

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Research Interests

Security, Networking, Privacy, Internet Measurement, Applied Cryptography

Research Overview

The goal of my research is to make the Internet *secure* and *privacy-preserving*. This research goal is achieved through two arrays of efforts: One focuses on discovering novel security risks, while the other aims to design better defensive solutions. Especially, by means of data-driven measurement and ethical attack experiments, security risks are discovered and profiled, especially for emerging Internet infrastructures, e.g., residential proxies, edge CDNs, and federated social networks, as well as new communication paradigms such as the interaction between individuals and AI agents. Then, leveraging AI techniques and cryptographic primitives, defensive solutions are designed and prototyped to harden the Internet with regards to anonymity, prevention of spam and harm, and censorship resistance.

Education

2015 – 2020: Indiana University, Bloomington IN
Ph.D. Degree, Department of Computer Science
Advisors: Professor XiaoFeng Wang, and Professor Feng Qian

2009 – 2013: Beijing Institute of Technology, Beijing, China
B.S. Degree, Department of Software Engineering

Work Experience

2021/09 – Now: USTC (University of Science and Technology of China)
Pre-Tenure Full Professor (equal to U.S. Associate Professor)

School of Computer Science

2021/01 – 2021/08: University at Buffalo
Tenure-Track Assistant Professor
Department of Computer Science and Engineering

2019/06 – 2021/01: Meta, Inc
Research Scientist in Security Infrastructure
Project: Distributed fuzzing platform for automatic vulnerability discovery.
Project: Anti-crawling and bot detection.

2014/05 – 2015/06: Baidu, Inc
Senior Software Engineer in Location-Based Services
Project: Developing the mobile website of Baidu's group buying service.

Honors and Awards

[2022] The Education Grant from the Foundation of Yang YuanQing

[2019] Best Paper Award (3 out of 80) in CSAW Applied Research Competition: This award is given to our paper (SP'19-b) studying the security of virtual personal assistants (i.e., AI agents).

[2019] NDSS Distinguished Paper Award (4 out of 89): This award is given to the paper (NDSS'19) studying the take-down practices of malicious domains.

[2016] Student Travel Grant from ACM CoNEXT

[2013] Excellent Undergraduate Thesis Award at Beijing Institute of Technology

[2010] National Motivational Scholarship at Beijing Institute of Technology

Selected Publications

Summary: My research has led to tens of publications in well-recognized security venues, e.g., IEEE Security & Privacy, USENIX Security, CCS, NDSS, IMC, CoNEXT, DSN, ACSAC, AsiaCCS, etc. Most publications can be grouped by the following research topics:

- The security risks of residential proxies and reverse proxies: [SP'19-a] [NDSS'21] [CCS'22-a] [arXiv'24-a] [arXiv'24-b] .

- The security of AI agents (e.g., voice assistants): [IMC'17] [SP'19-b] [AsiaCCS'24]
- The security of decentralized network infrastructures: [IWQoS'23] [DSN'24] [ACSAC'24]
- Privacy-preserving prevention of harmful content (e.g., spam and malware): [CCS'22-b] [arXiv'24-e] [arXiv'24-f] .
- Detecting and understanding online abuse and cybercrime: [SP'17] [NDSS'18] [NDSS'19] [Security'19] [arXiv'24-c] [arXiv'24-d]

* denotes co-first authors, † stands for corresponding authors.

[1] [arXiv'24-a] Port Forwarding Services Are Forwarding Security Risks
Haoyuan Wang, Yue Xue, Xuan Feng, Chao Zhou, ***Xianghang Mi***†.
Under submission and in arXiv preprint 2024.

[2] [arXiv'24-b] Shining Light into the Tunnel: Understanding and Classifying Network Traffic of Residential Proxies
Ronghong Huang, Dongfang Zhao, ***Xianghang Mi***†*, Jingmiao Zhang, XiaoFeng Wang.*
Under submission and in arXiv preprint 2024.

[3] [arXiv'24-c] Reflected Search Poisoning for Illicit Promotion
Sangyi Wu, Jialong Xue, Shaoxuan Zhou, ***Xianghang Mi***†.
Under submission and in arXiv preprint 2024.

[4] [arXiv'24-d] Illicit Promotion on Twitter
*Hongyu Wang**, *Ying Li**, *Ronghong Huang,* ***Xianghang Mi***†.
Under submission and in arXiv preprint 2024.

[5] [arXiv'24-e] Fostering Cyber Threat Detection Through Federated Learning
Yu Bi, Yekai Li, Xuan Feng, ***Xianghang Mi***†.
Under submission and in arXiv preprint 2024.

[6] [arXiv'24-f] SpamDam: Towards Privacy-Preserving and Adversary-Resistant SMS Spam Detection
Yekai Li, Rufan Zhang, Wenxin Rong, ***Xianghang Mi***†.
Under submission and in arXiv preprint 2024.

[7] [ACSAC'24] Dissecting Open Edge Computing Platforms: Ecosystem, Usage, and Security Risks
*Yu Bi**, *Mingshuo Yang**, *Yong Fang,* ***Xianghang Mi***†*, Shanqing Guo*†*, Shujun Tang, Haixin Duan.*
To appear in ACSAC 2024.

Acceptance rate: 20% = 83/421.

[8] [AsiaCCS'24] Command Hijacking on Voice-Controlled IoT in Amazon Alexa Platform
Wenbo Ding, Song Liao, Long Cheng, ***Xianghang Mi****, Ziming Zhao, Hongxin Hu.*
The 19th ACM Asia Conference on Computer and Communications Security (AsiaCCS 2024).
Acceptance rate: 18% = 418/2,322.

[9] [DSN'24] Stealthy Peers: Understanding Security Risks of WebRTC-based Peer-Assisted Video Streaming
Siyuan Tang, Eihal Alowaisheq, ***Xianghang Mi***†*, Yi Chen, XiaoFeng Wang, Yanzhi Dou.*
IEEE/IFIP DSN 2024.
Acceptance rate: 20% = 42/203.

[10] [IWQoS'23] An Empirical Study of Storj DCS: Ecosystem, Performance, and Security
Hao Li, ***Xianghang Mi***†, Yanzhi Dou, Shanqing Guo†
IEEE/ACM IWQoS 2023.
Acceptance rate: 23.5% = 62/264.

[11] [CCS'22-a] An Extensive Study of Residential Proxies in China
*Mingshuo Yang**, *Yunnan Yu**, ***Xianghang Mi***†*, Shujun Tang, Shanqing Guo*†*, Yilin Li, Xiaofeng Zheng, Haixin Duan.*
ACM CCS 2022.
Acceptance rate: 22.5% = 218/971.

[12] [CCS'22-b] Clues in Tweets: Twitter-Guided Discovery and Analysis of SMS Spam
Siyuan Tang, ***Xianghang Mi***†*, Ying Li, Xiaofeng Wang, Kai Chen.*
ACM CCS 2022.
Acceptance rate: 22.5% = 218/971.

[13] [NDSS'21] Your Mobile Phone is My Proxy: Understanding and Detecting Mobile Proxy Networks
Xianghang Mi†*, Siyuan Tang, Zhengyi Li, Xiaojing Liao, Feng Qian, Xiaofeng Wang.*
Network and Distributed System Security Symposium 2021.
Acceptance rate: 15.2% = 87/573.

[14] [SP'19-a] Resident Evil: Understanding Residential IP Proxy as a Dark Service
Xianghang Mi*, Xuan Feng, Xiaojing Liao, Baojun Liu, Xiaofeng Wang, Feng Qian, Zhou Li, Sumayah Alrwais, Limin Sun, Ying Liu.*
IEEE Symposium on Security and Privacy 2019.

Acceptance rate: 12% = 84/679.

[15] [SP'19-b] Dangerous Skills: Understanding and Mitigating Security Risks of Voice-Controlled Third-Party Functions on Virtual Personal Assistant Systems
3rd Place (3 out of 80) of CSAW'19 Applied Research Competition
*Nan Zhang, **Xianghang Mi**, Xuan Feng, XiaoFeng Wang, Yuan Tian, Feng Qian.*
IEEE Symposium on Security and Privacy 2019.
Acceptance rate: 12% = 84/679.

[16] [Security'19] Understanding iOS-based Crowdturfing through Hidden UI Analysis
Yeonjoon Lee, Xueqiang Wang*, Kwangwuk Lee, Xiaojing Liao, XiaoFeng Wang, Tongxin Li, **Xianghang Mi**.*
USENIX Security Symposium (Security), 2019.
Acceptance rate: 16% = 113/697.

[17] [NDSS'19] Cracking the Wall of Confinement: Understanding and Analyzing Malicious Domain Take-downs
Distinguished Paper Award
*Eihal Alowaisheq, Peng Wang, Sumayah A Alrwais, Xiaojing Liao, XiaoFeng Wang, Tasneem Alowaisheq, **Xianghang Mi**, Siyuan Tang, Baojun Liu.*
Network and Distributed System Security Symposium 2019, San Diego, CA.
Acceptance rate: 17% = 89/521.

[18] [NDSS'18] Game of Missuggestions: Semantic Analysis of Search-Autocomplete Manipulations
*Peng Wang, **Xianghang Mi**, Xiaojing Liao, XiaoFeng Wang, Kan Yuan, Feng Qian, and Raheem Beyah.*
Network and Distributed System Security Symposium 2018, San Diego, CA.
Acceptance rate: 21.5% = 71/331.

[19] [Security'17] Picking Up My Tab: Understanding and Mitigating Synchronized Token Lifting and Spending in Mobile Payment
Xiaolong Bai, Zhe Zhou*, XiaoFeng Wang, Zhou Li, **Xianghang Mi**, Nan Zhang, Tongxin Li, S. Hu, Kehuan, Zhang.*
USENIX Security Symposium 2017, VANCOUVER, BC, CANADA.
Acceptance rate: 16.3% = 85/522.

[20] [SP'17] Under the Shadow of Sunshine: Understanding and Detecting BulletProof Hosting on Legitimate Service Provider Networks
*Sumayah Alrwais, Xiaojing Liao, **Xianghang Mi**, Peng Wang, XiaoFeng Wang, Feng Qian, Raheem Beyah, Damon McCoy.*
IEEE Symposium on Security and Privacy 2017, San Jose, CA.

Acceptance rate: 13% = 60/457.

[21] [arXiv'17] Understanding IoT Security Through the Data Crystal Ball: Where We Are Now and Where We Are Going to Be
*Nan Zhang, Soteris Demetriou, **Xianghang Mi**, Wenrui Diao, Kan Yuan, Peiyuan Zong, Feng Qian, XiaoFeng Wang, Kai Chen, Yuan Tian, Carl A Gunter, Kehuan Zhang, Patrick Tague, Yue-Hsun Lin.*
In arXiv preprint 2017.

[22] [IMC'17] An Empirical Characterization of IFTTT: Ecosystem, Usage, and Performance
***Xianghang Mi**, Feng Qian, Ying Zhang, and Xiaofeng Wang.*
ACM Internet Measurement Conference 2017, London, UK.
Acceptance rate: 23.4% = 42/179.

[23] [CoNEXT'16] SMig: Stream Migration Extension For HTTP/2
***Xianghang Mi**, Feng Qian, and XiaoFeng Wang.*
International Conference on emerging Networking EXperiments and Technologies 2016, Irvine, CA.
Acceptance rate: 17.6% = 35/199.

Teaching

2022-2024 Introduction to Cybersecurity, USTC
2022 The Frontier of Cybersecurity Research, Fall 2022, USTC
2021 CSE 489/589 Modern Networking Concepts, Spring 2021,UB
2016-2017 Guest Lectures: CSCI P438 (Computer Networks, IU, Fall 2016), CSCI P538 (Advanced Computer Networks, IU, Fall 2016/Fall 2017).

Professional Service

Conference and Workshop Program Committee: AsiaCCS 2025, IEEE ICPADS 2023, GenoPri 2020/2021, SKM 2021.

Reviewer for Journals: IEEE Transaction on Mobile Computing 2018, ACM Transactions on Privacy and Security 2021/2022, IEEE Transactions on Dependable and Secure Computing 2021/2022, IEEE Security & Privacy 2021/2022.

Reviewer for Conferences and Workshops: IEEE Security & Privacy 2020, ACM CHI 2020, ACM CCS 2019, IEEE INFOCOM 2019, NDSS 2022/2019/2018, IEEE ICDCS 2017, ACM AsiaCCS 2016, BIGCOM 2016.

Funding Awards

2023 *Understanding and Mitigating the Security Risks of Residential Proxies*, ¥300K, NSFC
2022 *Fostering Cyber Threat Detection through Federated Learning*, ¥200K, MSR Asia
2022 *The Innovation Fund for Young Investigators*, ¥90K, USTC

Graduated Students

- Yu Bi, MPhil 2024 $\Longrightarrow$ Security Engineer at Meituan
- Mingshuo Yang, MPhil 2024 $\Longrightarrow$ Software Engineer at Huawei
- Mingkai Li, BS 2023 $\Longrightarrow$ PhD at Columbia University
- Ying Li, MPhil 2023 $\Longrightarrow$ PhD at UCLA
- Hanliang Jiang, BS 2023 $\Longrightarrow$ Master at UIUC
- Wenxin Rong, BS 2022 $\Longrightarrow$ PhD at University of Delaware