Shuai Hao

Assistant Professor, Department of Computer Science, Old Dominion University
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RESEARCH

Networking and Security

Applying **measurement**, **empirical study**, and **data-driven approach** to (1) study the practical security phenomena on the Internet and Networked Systems and (2) facilitate the protocol and system design that makes the Internet more robust and secure

- Internet-Wide Vulnerability and Security
- Internet Infrastructure and Measurement
- Data-Driven Security Analytics
- Web Security and Cybercrime

EDUCATION

Ph.D. in Computer Science · 2011 - 2017
College of William and Mary . . . . ♀ Williamsburg, VA
Department of Computer Science · Advisor: Dr. Haining Wang

M.S. in Computer Science · 2007 - 2010
Beijing University of Posts and Telecommunications . . . . ♀ Beijing, China

B.S. in Computer Science and Engineering · 2003 - 2007
North China Electric Power University . . . . ♀ Baoding, Hebei, China

EXPERIENCE & EMPLOYMENT

Assistant Professor,
Old Dominion University . . . . ♀ Norfolk, VA
Department of Computer Science   July 2019 - present

Postdoctoral Researcher,
Center for Applied Internet Data Analysis (CAIDA),
University of California San Diego . . . . ♀ La Jolla, CA
Advisors: Dr. Alberto Dainotti & Dr. Amogh Dhamdhere   Feb. 2018 - June 2019

Ph.D. Candidate, Research Assistant, Teaching Assistant,
College of William and Mary . . . . ♀ Williamsburg, VA
Department of Computer Science · Advisor: Dr. Haining Wang   2011 - 2017

- *Visiting Ph.D. Student,* **University of Delaware** . . . . ♀ Newark, DE
  Department of Electrical & Computer Engineering   2014 - 2017

VISITING & INTERNSHIPS

Research Intern, **NEC Laboratories America** . . . . ♀ Princeton, NJ
Computer Security Department · Mentor: Dr. Junghwan Rhee   Sep. 2017 - Jan. 2018

Research Intern, **HP Labs China** . . . . ♀ Beijing, China
Networking and Communications Lab   May - Aug. 2012

Visiting Research Scholar, **Tsinghua University** . . . . ♀ Beijing, China
Department of Computer Science · Mentor: Dr. Ke Xu   2010 - 2011

PUBLICATIONS   Google Scholar - https://scholar.google.com/citations?user=nblhwAwAAAAJ

Conference and Journal Papers

[*INFOCOM '24*]   Rui Bian, Lin Jin, **Shuai Hao**, Haining Wang, and Chase Cotton. **Silent Observers Make a Difference: A Large-scale Analysis of Transparent Proxies on the Internet**, in *IEEE International Conference on Computer Communications (INFOCOM 2024)*, Vancouver, Canada, May 2024. (Acceptance Rate: 256/1,307 = 19.6%)

[*IMC '23*]   Guannan Liu, Lin Jin, **Shuai Hao**, Yubao Zhang, Daiping Liu, Angelos Stavrou, and Haining Wang. **Dial "N" for NXDomain: The Scale, Origin, and Security Implications of DNS Queries to Non-Existent Domains**, in *ACM Internet Measurement Conference (ACM IMC 2023)*, Montréal, Canada, October 2023. (Acceptance Rate: 52/201 = 25.9%)

[*SIGCOMM '23*]   Minyuan Zhou*, Xiao Zhang*, **Shuai Hao**, Xiaowei Yang, Jiaqi Zheng, Guihai Chen, and Wanchun Dou. **Regional IP Anycast: Deployments, Performance, and Potentials**, in *ACM Conference of the ACM Special Interest Group on Data Communication (ACM SIGCOMM 2023)*, New York City, NY, September 2023. (Acceptance Rate: 71/323 = 22.0%; *co-first authors)

[*CCS '22*]   Guannan Liu, Daiping Liu, **Shuai Hao**, Xing Gao, Kun Sun, and Haining Wang. **Ready Raider One: Exploring the Misuse of Cloud Gaming Services**, in *the 29th ACM Conference on Computer and Communications Security (ACM CCS 2022)*, Los Angeles, CA, November 2022. (Acceptance Rate: 218/971 = 22.5%)

[*DSN '22*]   Rebekah Houser, **Shuai Hao**, Chase Cotton, and Haining Wang. **A Comprehensive, Longitudinal Study of Government DNS Deployment at Global Scale**, in *the 52nd IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2022)*, Baltimore, MD, June 2022. (Acceptance Rate: 49/262 = 18.7%)

[*SIGMETRICS '22*]   Lin Jin, **Shuai Hao**, Haining Wang, and Chase Cotton. **Understanding the Practices of Global Censorship through Accurate, End-to-End Measurements**, in *Proceedings of the ACM on Measurement and Analysis of Computing Systems (ACM SIGMETRICS 2022)*, Mumbai, India, June 2022. (Acceptance Rate: 59/303 = 19.5%)

[*COMNET*]   Rui Bian, **Shuai Hao**, Haining Wang, and Chase Cotton. **Shining a Light on Dark Places: A Comprehensive Analysis of Open Proxy Ecosystem**, in *Computer Networks (COMNET)*, Volume 208, Elsevier, May 2022.

[*PAM '22*]   Alexander Gamero-Garrido, Esteban Carissimo, **Shuai Hao**, Bradley Huffaker, Alex C. Snoeren, and Alberto Dainotti. **Quantifying Nations' Exposure to Traffic Observation and Selective Tampering**, in *the Passive and Active Measurement Conference (PAM 2022)*, March 2022. (Acceptance Rate: 30/62 = 48.4%; 🏆 *Best Dataset Award*)

[*ICNP '21*]   Lin Jin, **Shuai Hao**, Yan Huang, Haining Wang, and Chase Cotton. **DNSonChain: Delegating Privacy-Preserved DNS Resolution to Blockchain**, in *the 29th IEEE International Conference on Network Protocols (ICNP 2021)*, Dallas, TX, November 2021. (Acceptance Rate: 38/154 = 24.7%)

[*ESORICS '21*]   Hao Yang, Kun Du, Yubao Zhang, **Shuai Hao**, Haining Wang, Jia Zhang, and Haixin Duan. **Mingling of Clear and Muddy Water: Understanding and Detecting Semantic Confusion in Blackhat SEO**, in *the 26th European Symposium on Research in Computer Security (ESORICS 2021)*, Darmstadt, Germany, October 2021. (Acceptance Rate: 71/351 = 20.2%)

[*SRDS '21*]   Rebekah Houser, **Shuai Hao**, Zhou Li, Daiping Liu, Chase Cotton, and Haining Wang. **A Comprehensive Measurement-based Investigation of DNS Hijacking**, In *the 40th International Sym-*

posium on Reliable Distributed Systems (SRDS 2021), Chicago, IL, September 2021. (Acceptance Rate: 27/106 = 25.5%)

[*WWW '21*] Lin Jin, **Shuai Hao**, Haining Wang, and Chase Cotton. **Understanding the Impact of Encrypted DNS on Internet Censorship**, in *the 30th The Web Conference (WWW 2021)*, Ljubljana, Slovenia, April 2021. (Acceptance Rate: 357/1,736 = 20.6%)

[*SecureComm '20*] Yubao Zhang, **Shuai Hao**, and Haining Wang. **Review Trade: Everything is Free in Incentivized Review Groups**, in *the 16th EAI International Conference on Security and Privacy in Communication Networks (SecureComm 2020)*, Washington D.C., October 2020.

[*IEEE-TIFS*] Yubao Zhang, Jidong Xiao, **Shuai Hao**, Haining Wang, Sencun Zhu, and Sushil Jajodia. **Understanding the Manipulation on Recommender Systems through Web Injection**, in *IEEE Transactions on Information Forensics and Security (TIFS)*, Volume 15, 2020.

[*ICNP '19*] Lin Jin, **Shuai Hao**, Haining Wang, and Chase Cotton. **Unveil the Hidden Presence: Characterizing the Backend Interface of Content Delivery Networks**, in *the 27th IEEE International Conference on Network Protocols (ICNP 2019)*, Chicago, IL, October 2019. (Acceptance Rate: 38/210 = 18.1%)

[*SIGCOMM CCR*] Rui Bian, **Shuai Hao**, Haining Wang, Amogh Dhamdhere, Alberto Dainotti, and Chase Cotton. **Towards Passive Analysis of Anycast in Global Routing: Unintended Impact of Remote Peering**, in *ACM SIGCOMM Computer Communication Review (CCR)*, Volume 49 Issue 3, July 2019.

[*USENIX Security '18*] **Shuai Hao**, Yubao Zhang, Haining Wang, and Angelos Stavrou. **End-Users Get Maneuvered: Empirical Analysis of Redirection Hijacking in Content Delivery Networks**, in *the 27th USENIX Security Symposium (USENIX Security 2018)*, Baltimore, MD, August 2018. (Acceptance Rate: 100/524 = 19.1%)

[*DSN '18*] Lin Jin, **Shuai Hao**, Haining Wang, and Chase Cotton. **Your Remnant Tells Secret: Residual Resolution in DDoS Protection Services**, in *the 48th IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2018)*, Luxembourg City, Luxembourg, June 2018. (Acceptance Rate: 62/232 = 26.7%)

[*INFOCOM '18*] **Shuai Hao**[*], Haitao Xu[*], Alparslan Sari, and Haining Wang ([*]co-first authors). **On the Privacy Implications of Email Tracking**, in *IEEE International Conference on Computer Communications (INFOCOM 2018)*, Honolulu, HI, April 2018. (Acceptance Rate: 309/1,606 = 19.2%)

[*IEEE Access*] Kun Xie, Xiaohong Huang, **Shuai Hao**, and Maode Ma. **Distributed Power Saving for Large-Scale Software-Defined Data Center Networks**, in *IEEE Access*, January 2018.

[*SIGCOMM CCR*] **Shuai Hao** and Haining Wang. **Exploring Domain Name Based Features on the Effectiveness of DNS Caching**, in *ACM SIGCOMM Computer Communication Review (CCR)*, Volume 47 Issue 1, January 2017.

[*CCS '16*] Daiping Liu, **Shuai Hao**, and Haining Wang. **All Your DNS Records Point to Us: Understanding the Security Threats of Dangling DNS Records**, in *the 23rd ACM Conference on Computer and Communications Security (ACM CCS 2016)*, Vienna, Austria, October 2016. (Acceptance Rate: 137/831 = 16.5%)

[*IEEE Access*] Kun Xie, Xiaohong Huang, **Shuai Hao**, Maode Ma, Pei Zhang, and Dingyuan Hu. **E^{3}MC: Improving Energy Efficiency via Elastic Multi-Controller SDN in Data Center Networks**, in *IEEE Access*, October 2016.

[*ICNP '15*] **Shuai Hao**, Haining Wang, Angelos Stavrou, and Evgenia Smirni. **On the DNS Deployment of Modern Web Services**, in *the 23rd IEEE International Conference on Network Protocols (ICNP 2015)*, San Francisco, CA, November 2015. (Acceptance Rate: 38/190 = 20.0%; *Best Paper Nominee*)

Workshops, Posters, and Patents

Junghwan Rhee, Hongyu Li, **Shuai Hao**, Chung Hwan Kim, Zhenyu Wu, Zhichun Li, Kangkook Jee, and Lauri Korts-Parn. **Host Behavior and Network Analytics Based Automotive Secure Gateway**, *US Patent 10931635B2*, 2021.

Shuai Hao, Xiaohong Huang, and Yan Ma. **A Simple Packet Authentication Mechanism Based on Stateless Core Approach**, in *Workshop on Management of Emerging Networks and Services, IEEE Globecom*, Miami, FL, 2010.

Shuai Hao, Xiaohong Huang, and Yan Ma. **Application QoS for Video: Benchmarking, Control Strategies, and Systems**, in *the 5th IEEE International Conference on Wireless Communications, Networking and Mobile Computing*, Beijing, China, 2009.

PROFESSIONAL ACTIVITIES

Program Committee
ACSAC '24
ACM IMC '24
MADWeb '24
PAM '22 '23 '24
IEEE/IFIP DSN '20 '21 '22 '24
IEEE CNS '22 '23
RAID '23
ICICS '21 '22

Professional Services
IEEE Conference on Communications and Network Security (CNS) '22 - Poster Chair, Panelist

Conference/Journal Reviewer
ESORICS '21 '22 '23
IEEE/ACM IWQoS '23
WWW '23
ACM CODASPY '22
IEEE INFOCOM '14 '15 '16 '17 '18 '19 '20 '21 '22
IEEE/IFIP DSN '14 '15 '16 '17 '19
ACM IMC '18 (*Shadow PC*)
ACM CCS '17 '18
IEEE CNS '15 '18
IEEE HASE '17
ACM IWSPA '17
SECRYPT '16
SecureComm '15 '16
IEEE Security & Privacy (Oakland) '15
ICICS '13 '19

IEEE/ACM Transactions on Networking (ToN)
IEEE Transactions on Information Forensics and Security (TIFS)
IEEE Transactions on Dependable and Secure Computing (TDSC)
IEEE Transactions on Mobile Computing (TMC)
ACM Transactions on Privacy and Security (Formerly TISSEC)

Journal of Computer Security
Journal of Computer Communications (ComCom)
Journal of Communications and Networks
Journal of Security and Communication Networks
Journal of Supercomputing
International Journal of Distributed Sensor Networks
IEEE Security & Privacy Magazine
EAI Transactions on Security and Safety
Communications of the Association for Information Systems
IEEE Communications Letters

TEACHING   **Department of Computer Science · Old Dominion University**

Spring 2024: CS 772/872 - Advanced Computer and Network Security
CS 464/564 - Networked Systems Security

Fall 2023: CS 761/861 - Malware Analysis and Reverse Engineering

Spring 2023: CS 464/564 - Networked Systems Security

Fall 2022: CS 772/872 - Advanced Computer and Network Security
CS 761/861 - Malware Analysis and Reverse Engineering

Spring 2022: CS 464/564 - Networked Systems Security
CS 465/565 - Information Assurance

Fall 2021: CS 761/861 - Malware Analysis and Reverse Engineering
CS 469/569 - Data Analytics for Cybersecurity

Spring 2021: CS 795/895 - Topics in Advanced Computer and Network Security

Spring 2020: CS 465/565 - Information Assurance

Fall 2019: CS 795/895 - Topics in Internet Infrastructure and Security