

Shuai Hao

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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
Advisor: Dr. Haining Wang

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

Conference and Journal Papers

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: $49/262 = 18.7\%$)

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: $=\%$)

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

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: $30/62 = 48.4\%$)

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: $38/154 = 24.7\%$)

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 Black-hat SEO**, in *the 26th European Symposium on Research in Computer Security (ESORICS 2021)*, Darmstadt, Germany, October 2021. (Acceptance Rate: $71/351 = 20.2\%$)

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

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: $357/1,736 = 20.6\%$)

Yubao Zhang, Shuai Hao, and Haining Wang. **Detecting Incentivized Review Groups with Co-Review Graph**, in *High-Confidence Computing*, Volume 1 Issue 1, Elsevier, June 2021.

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.

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.

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 Con-*

ference on Network Protocols (ICNP 2019), Chicago, IL, October 2019. (Acceptance Rate: $38/210 = 18.1\%$)

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.

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: $100/524 = 19.1\%$)

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: $62/232 = 26.7\%$)

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: $309/1,606 = 19.2\%$)

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.

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.

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: $137/831 = 16.5\%$)

Kun Xie, Xiaohong Huang, Shuai Hao, Maode Ma, Pei Zhang, and Dingyuan Hu. **E³MC: Improving Energy Efficiency via Elastic Multi-Controller SDN in Data Center Networks**, in *IEEE Access*, October 2016.

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

Passive and Active Measurement Conference (PAM) '22
IEEE/IFIP International Conference on Dependable Systems and Networks (DSN) '20 '21 '22
International Conference on Information and Communications Security (ICICS) '21 '22

Conference/Journal Reviewer

ACM CODASPY '22
ESORICS '21
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
SECURITY '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
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

**TALKS &
PRESENTATIONS**

Invited Talk, OARC36 Workshops Nov. 2021
DNS Operations, Analysis, and Research Center (DNS-OARC)

Cybersecurity Seminar Talk, Arizona State University Jan. 2019

Invited Talk, CAIDA, UC San Diego Sep. 2018
CAIDA Internet Measurement and Political Science Workshop

Security Group Luncheon, CSE Department, UC San Diego Apr. 2018

Seminar Series Talk, ECE Department, University of Delaware Sep. 2016

TEACHING

Department of Computer Science · Old Dominion University
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