

Zubair Shafiq

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Research Interests

Web Privacy, Internet Measurement, Internet Security, Computer Networks

Education

- 2009–2014 **Ph.D. in Computer Science**
Department of Computer Science and Engineering, Michigan State University
- 2004–2008 **B.E. in Electrical Engineering**
National University of Sciences & Technology (NUST), Pakistan

Professional Experience

- 2014– **Assistant Professor**
Department of Computer Science, University of Iowa
- 2009–2014 **Research Assistant**
Department of Computer Science and Engineering, Michigan State University
- 2013 **Research Intern**
IBM T. J. Watson Research Center
- 2012 **Research Intern**
Telefonica Research
- 2011 **Research Intern**
AT&T Labs – Research
- 2007–2009 **Research Engineer**
Next Generation Intelligent Networks Research Center, Pakistan

Honors and Awards

- 2018 **NSF Faculty Early Career Development (CAREER) Award**
- 2018 **Andreas Pfitzmann Best Student Paper Award**, Privacy Enhancing Technologies Symposium
- 2017 **Best Paper Award**, ACM Internet Measurement Conference
- 2015 **NSF CISE Research Initiation Initiative (CRII) Award**
- 2013 **Fitch-Beach Outstanding Graduate Research Award**, Michigan State University
- 2012 **Best Paper Award**, IEEE International Conference on Network Protocols
- 2011 **Best Poster Award**, Engineering Graduate Research Symposium, Michigan State University
- 2008 **Best Student Tertiary Project Award**, Pakistan Software House Association (P@SHA)
- 2008 **Best Project Award**, SOFTEC International Software Exhibition NUCES, Pakistan
- 2007 **Best Project Award**, All Pakistan Digital Innovation Competition, NUST, Pakistan
- 2007, 2008 **Dean's Plaque of Excellence**, National University of Sciences & Technology, Pakistan

Publications

Note 1: Student authors are typically listed first in descending order of contribution. I put a * next to the names of students at Iowa who I primarily advised or co-advised at Iowa and a * next to the names of students outside Iowa who I remotely co-advised.

Note 2: There are no consistent conventions for the order of faculty authors: most of the times they are alphabetical, sometimes they are in decreasing order of significance, and sometimes the last author was the leading faculty member. I am typically the leading faculty member when my students are the lead authors.

Note 3: Many top-tier conferences (e.g., ACM SIGMETRICS, IEEE S&P, PETS) have transitioned to a journal style review process. Most conferences automatically publish the accepted papers in journals (e.g., PACM, PoPETs) alleviating the need to separately publish extended conference papers in journals. Top-tier conferences are highly competitive with acceptance rates typically ranging between 10-25%.

Conferences

- S&P 2020 **AdGraph: A Graph-Based Approach to Ad and Tracker Blocking**
Umar Iqbal*, Peter Snyder, Shitong Zhu*, Benjamin Livshits, Zhiyun Qian, Zubair Shafiq
IEEE Symposium on Security & Privacy, San Francisco, 2020
- PETS 2020 **Inferring Tracker-Advertiser Relationships in the Online Advertising Ecosystem**
John Cook*, Rishab Nithyanand, Zubair Shafiq
Privacy Enhancing Technologies Symposium, Montreal, 2020
- PETS 2020 **The TV is Smart and Full of Trackers: Measuring Smart TV Advertising and Tracking**
Janus Varmarken*, Hieu Le*, Anastasia Shuba*, Zubair Shafiq, Athina Markopoulou
Privacy Enhancing Technologies Symposium, Montreal, 2020
- PETS 2019 **No Place to Hide: Inadvertent Location Privacy Leaks on Twitter**
Jonathan Rusert*, Osama Khalid*, Dat Hong, Zubair Shafiq, Padmini Srinivasan
Privacy Enhancing Technologies Symposium, Stockholm, 2019
- PETS 2019 **A Girl Has No Name: Automated Authorship Obfuscation using X-Mutant**
Asad Mahmood*, Faizan Ahmad*, Zubair Shafiq, Padmini Srinivasan, Fareed Zaffar
Privacy Enhancing Technologies Symposium, Stockholm, 2019
- WWW 2019 **Measurement and Early Detection of Third-Party Application Abuse on Twitter**
Shehroze Farooqi*, Zubair Shafiq
The Web Conference (WWW), San Francisco, 2019
- WWW 2019 **ShadowBlock: A Lightweight and Stealthy Adblocking Browser**
Shitong Zhu*, Umar Iqbal*, Zhongjie Wang, Zhiyun Qian, Zubair Shafiq, Weiteng Chen
The Web Conference (WWW), San Francisco, 2019
- WWW 2019 **Measuring Political Personalization of Google News Search**
Huyen Le*, Raven Maragh, Brian Ekdale, Timothy Havens, Andrew High, Zubair Shafiq
The Web Conference (WWW), San Francisco, 2019
- ASONAM 2019 **A Postmortem of Suspended Twitter Accounts in the 2016 U.S. Presidential Election**
Huyen Le*, Bob Boynton, Zubair Shafiq, Padmini Srinivasan
ACM/IEEE International Conference on Advances in Social Networks Analysis and Mining (ASONAM), Vancouver, 2019

- PETS 2018 **NoMoAds: Effective and Efficient Cross-App Mobile Ad-Blocking**
Anastasia Shuba*, Athina Markopoulou, Zubair Shafiq
Privacy Enhancing Technologies Symposium, Barcelona, 2018
Andreas Pfitzmann Best Student Paper Award
- NDSS 2018 **Measuring and Disrupting Anti-Adblockers Using Differential Execution Analysis**
Shitong Zhu*, Xunchao Hu, Zhiyun Qian, Zubair Shafiq, Heng Yin
Network and Distributed System Security Symposium, San Diego, 2018
- INFOCOM 2018 **Real-time Video Quality of Experience Monitoring for HTTPS and QUIC**
M. Hammad Mazhar*, Zubair Shafiq
IEEE International Conference on Computer Communications, Honolulu, 2018
- IMC 2017 **Measuring and Mitigating OAuth Access Token Abuse by Collusion Networks**
Shehroze Farooqi*, Fareed Zaffar, Nektarios Leontiadis, Zubair Shafiq
ACM Internet Measurement Conference, London, 2017
Best Paper Award
- IMC 2017 **The Ad Wars: Retrospective Measurement and Analysis of Anti-Adblock Filter Lists**
Umar Iqbal*, Zubair Shafiq, Zhiyun Qian
ACM Internet Measurement Conference, London, 2017
- SIGMETRICS 2017 **Characterizing and Modeling Patching Practices of Industrial Control Systems**
Brandon Wang*, Xiaoye Li*, Leandro P. de Aguiar, Daniel S. Menasche, Zubair Shafiq
ACM International Conference on Measurement and Modeling of Computer Systems, Urbana-Champaign, 2017
- PETS 2017 **Detecting Anti Ad-blockers in the Wild**
Muhammad Haris Mughees*, Zhiyun Qian, Zubair Shafiq
Privacy Enhancing Technologies Symposium, Minneapolis, 2017
- ICDM 2017 **Accurate Detection of Automatically Spun Content via Stylometric Analysis**
Usman Shahid*, Shehroze Farooqi*, Raza Ahmad*, Zubair Shafiq, Padmini Srinivasan, Fareed Zaffar
IEEE International Conference on Data Mining, New Orleans, 2017
- CHI 2017 **Revisiting The American Voter on Twitter**
Huyen Le*, G.R. Boynton, Yelena Mejova, Zubair Shafiq, Padmini Srinivasan
ACM Conference on Human Factors in Computing Systems, Denver, 2017
- ICDCS 2017 **Distributed Load Balancing in Key-Value Networked Caches**
Sikder Huq*, Zubair Shafiq, Sukumar Ghosh, Amir Khakpour, Harkeerat Bedi
IEEE International Conference on Distributed Computing Systems, Atlanta, 2017
- ICNP 2017 **Peering vs. Transit: Performance Comparison of Peering and Transit Interconnections**
Adnan Ahmed*, Zubair Shafiq, Harkeerat Bedi, Amir Khakpour
IEEE International Conference on Network Protocols, Toronto, 2017
- ICNP 2017 **Suffering from Buffering? Detecting QoE Impairments in Live Video Streams**
Adnan Ahmed*, Zubair Shafiq, Harkeerat Bedi, Amir Khakpour
IEEE International Conference on Network Protocols, Toronto, 2017
- ICNP 2017 **Multipath TCP Traffic Diversion Attacks and Countermeasures**
Ali Munir*, Zhiyun Qian, Zubair Shafiq, Alex Liu, Franck Le
IEEE International Conference on Network Protocols, Toronto, 2017
- ICWSM 2017 **Scalable News Slant Measurement Using Twitter**
Huyen Le*, Zubair Shafiq, Padmini Srinivasan
AAAI International Conference on Web and Social Media, Denver, 2017

- HT 2017 **Bumps and Bruises: Mining Presidential Campaign Announcements on Twitter**
Huyen Le*, G.R. Boynton, Yelena Mejova, Zubair Shafiq, Padmini Srinivasan
ACM Conference on Hypertext and Social Media, Prague, 2017
- Networking 2017 **Cascade Size Prediction in Online Social Networks**
Zubair Shafiq, Alex Liu
IFIP Networking, Prague, 2017
Best Paper Award Candidate (3 nominees)
- Networking 2017 **A Graph Theoretic Approach to Fast and Accurate Malware Detection**
Zubair Shafiq, Alex Liu
IFIP Networking, Prague, 2017
- eCrime 2017 **Characterizing Key Stakeholders in an Online Black-Hat Marketplace**
Shehroze Farooqi*, Muhammad Ikram*, Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Dali Kaafar, Zubair Shafiq, Fareed Zaffar
IEEE/APWG Symposium on Electronic Crime Research, Prague, 2017
- ICNP 2016 **Optimizing Internet Transit Routing for Content Delivery Networks**
Faraz Ahmed*, Zubair Shafiq, Amir Khakpour, Alex Liu
IEEE International Conference on Network Protocols, Singapore, 2016
- DSN 2016 **Malware Slums: Measurement and Analysis of Malware on Traffic Exchanges**
Salman Yousef*, Umar Iqbal*, Shehroze Farooqi*, Raza Ahmad*, Zubair Shafiq, Fareed Zaffar
IEEE/IFIP International Conference on Dependable Systems and Networks, France, 2016
- SIGMETRICS 2016 **QoE Analysis of a Large-Scale Live Video Streaming Event**
Adnan Ahmed*, Zubair Shafiq, Amir R. Khakpour
ACM International Conference on Measurement and Modeling of Computer Systems, France, 2016
- ICDCS 2016 **The Internet is For Porn: Measurement and Analysis of Online Adult Traffic**
Faraz Ahmed*, Zubair Shafiq, Alex X. Liu
IEEE International Conference on Distributed Computing Systems, Japan, 2016
- INFOCOM 2016 **Characterizing Caching Workload of a Large Commercial Content Delivery Network**
Zubair Shafiq, Amir R. Khakpour, Alex X. Liu
IEEE International Conference on Computer Communications, San Francisco, 2016
- SIGSPATIAL 2016 **A Traffic Flow Approach to Early Detection of Gathering Events**
Xun Zhou, Amin Khezerlou*, Alex Liu, Zubair Shafiq, Fan Zhang
ACM International Conference on Advances in Geographic Information Systems, San Francisco, 2016
- CIKM 2016 **The Rich and the Poor: A Markov Decision Process Approach to Optimizing Taxi Driver Revenue Efficiency**
Huigui Rong*, Xun Zhou, Chang Yang, Zubair Shafiq, Alex Liu
ACM International Conference on Information and Knowledge Management, Indianapolis, 2016
- IMC 2014 **Paying for Likes? Understanding Facebook Like Fraud Using Honeypots**
Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Dali Kaafar, Zubair Shafiq
ACM Internet Measurement Conference, 2014
- SIGMETRICS 2014 **Understanding the Impact of Network Dynamics on Mobile Video User Engagement**
Zubair Shafiq, Jeffrey Erman, Lusheng Ji, Alex X. Liu, Jeffrey Pang, Jia Wang
ACM International Conference on Measurement and Modeling of Computer Systems, 2014

- SIGMETRICS **Revisiting Caching in Content Delivery Networks**
 2014 Zubair Shafiq, Alex X. Liu, Amir Khakpour
ACM International Conference on Measurement and Modeling of Computer Systems, 2014
- SIGMETRICS **A First Look at Cellular Network Performance during Crowded Events**
 2013 Zubair Shafiq, Alex X. Liu, Amir Khakpour
ACM International Conference on Measurement and Modeling of Computer Systems, 2013
- ICNP 2013 **Who are You Talking to? Breaching Privacy in Encrypted IM Networks**
 Muhammad U. Ilyas, Zubair Shafiq, Alex X. Liu, Hayder Radha
IEEE International Conference on Network Protocols, 2013
- CSCW 2013 **Is News Sharing on Twitter Ideologically Biased?**
 Jonathan Morgan, Cliff Lampe, Zubair Shafiq
ACM Conference on Computer Supported Cooperative Work and Social Computing, 2013
- ICNP 2012 **A Semantics Aware Approach to Automated Reverse Engineering Unknown Protocols**
 Yipeng Wang, Xiaochun Yun, Zubair Shafiq, Alex X. Liu, Zhibin Zhang, Liyan Wang, Danfeng (Daphne) Yao, Yongzheng Zhang, Li Guo
IEEE International Conference on Network Protocols, 2012
Best Paper Award
- SIGMETRICS **A First Look at Cellular Machine-to-Machine Traffic – Large Scale Measurement and Characterization**
 2012 Zubair Shafiq, Lusheng Ji, Alex X. Liu, Jeffrey Pang, Jia Wang
ACM International Conference on Measurement and Modeling of Computer Systems, London, 2012
- ICSE 2012 **A Large Scale Exploratory Analysis of Software Vulnerability Life Cycles**
 Muhammad Shahzad, Zubair Shafiq, Alex X. Liu
International Conference on Software Engineering, Switzerland, 2012
- INFOCOM **Characterizing Geospatial Dynamics of Application Usage in a 3G Cellular Data Network**
 2012 Zubair Shafiq, Lusheng Ji, Alex X. Liu, Jeffrey Pang, Jia Wang
IEEE Conference on Computer Communications, Orlando, 2012
- SIGMETRICS **Characterizing and Modeling Internet Traffic Dynamics of Cellular Devices**
 2011 Zubair Shafiq, Lusheng Ji, Alex X. Liu, Jia Wang
ACM International Conference on Measurement and Modeling of Computer Systems, San Jose, 2011
- Networking **A Random Walk Approach to Modeling the Dynamics of the Blogosphere**
 2011 Zubair Shafiq, Alex X. Liu
IFIP Networking, Spain, 2011
- INFOCOM **A Distributed and Privacy-Preserving Algorithm for Identifying Information Hubs in Social Networks**
 2011 Muhammad U. Ilyas, Zubair Shafiq, Alex X. Liu, Hayder Radha
IEEE Conference on Computer Communications, Spain, 2011
- RAID 2009 **PE-Miner: Mining Structural Information to Detect Malicious Executables in Realtime**
 Zubair Shafiq, Syeda Momina Tabish, Fauzan Mirza, Muddassar Farooq
International Symposium On Recent Advances In Intrusion Detection, France, 2009
- GECCO 2009 **Evolvable Malware**
 Sadia Noreen, Shafaq Murtaza, Zubair Shafiq, Muddassar Farooq
ACM Genetic and Evolutionary Computation Conference, Canada, 2009

- DIMVA 2008 **Embedded Malware Detection using Markov n-grams**
Zubair Shafiq, Syed Ali Khayam, Muddassar Farooq
International Conference on Detection of Intrusions, Malware and Vulnerability Assessment, France, 2008
- GECCO 2008 **Improving Accuracy of Immune Inspired Malware Detectors using Intelligent Features**
Zubair Shafiq, Syed Ali Khayam, Muddassar Farooq
ACM Genetic and Evolutionary Computation Conference, Atlanta, 2008
- Journals**
- TDSC 2019 **Large Scale Characterization of Software Vulnerability Life Cycles**
Muhammad Shahzad, Zubair Shafiq, Alex X. Liu
IEEE Transactions on Dependable and Secure Computing, 2019
- TON 2018 **Optimizing Internet Transit Routing for Content Delivery Networks**
Faraz Ahmed*, Zubair Shafiq, Amir Khakpour, Alex Liu
IEEE/ACM Transactions on Networking, 2018
- TBD 2018 **Optimizing Taxi Driver Profit Efficiency: A Spatial Network-based Markov Decision Process Approach**
Xun Zhou, Huigui Rong, Chang Yang, Qun Zhang, Amin Khezerlou*, Hui Zheng, Zubair Shafiq, Alex Liu
IEEE Transactions on Big Data, 2018
- TOPS 2017 **Measuring, Characterizing, and Detecting Facebook Like Farms**
Muhammad Ikram*, Lucky Onwuzurike, Shehroze Farooqi*, Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Dali Kaafar, Zubair Shafiq
ACM Transactions on Privacy and Security, 2017
- TIST 2017 **A Traffic Flow Approach to Early Detection of Gathering Events: Comprehensive Results**
Amin Khezerlou*, Xun Zhou, Lufan Li*, Zubair Shafiq, Alex X. Liu, Fan Zhang
ACM Transactions on Intelligent Systems and Technology, 2017
- TON 2016 **Characterizing and Optimizing Cellular Network Performance during Crowded Events**
Zubair Shafiq, Lusheng Ji, Alex X. Liu, Jeffrey Pang, Shobha Venkataraman, Jia Wang
IEEE/ACM Transactions on Networking, 2016
- SMP 2016 **What Campaigns Become as Social Media Become the Infrastructure of Political Communication**
G.R. Boynton, Huyen Le*, Yelena Mejova, Zubair Shafiq, Padmini Srinivasan
Social Media and Politics, 2016
- TMC 2015 **Geospatial and Temporal Dynamics of Application Usage in Cellular Data Networks**
Zubair Shafiq, Lusheng Ji, Alex X. Liu, Jeffrey Pang, Jia Wang
IEEE Transactions on Mobile Computing, 2015
- TON 2013 **Large Scale Measurement and Characterization of Cellular Machine-to-Machine Traffic**
Zubair Shafiq, Lusheng Ji, Alex X. Liu, Jeffrey Pang, Jia Wang
IEEE/ACM Transactions on Networking, 2013
- JSAC 2013 **Identifying Leaders and Followers in Online Social Networks**
Zubair Shafiq, Muhammad U. Ilyas, Alex X. Liu, Hayder Radha
IEEE Journal on Selected Areas in Communications, 2013
- JSAC 2013 **A Distributed Algorithm for Identifying Information Hubs in Social Networks**
Muhammad U. Ilyas, Zubair Shafiq, Alex X. Liu, Hayder Radha
IEEE Journal on Selected Areas in Communications, 2013

- JNSM 2012 **TCAMChecker: A Software Approach to the Error Detection and Correction of TCAM-based Networking Systems**
Zubair Shafiq, Chad Meiners, Alex Liu, Ke Shen, Zheng Qin
Springer Journal of Network and Systems Management, 2012
- VB 2009 **PE-Probe: leveraging packer detection and structural information to detect malicious portable executables**
Zubair Shafiq, Syeda Momina Tabish, Muddassar Farooq
Virus Bulletin, Switzerland, 2009
- Elsevier 2009 **Fuzzy Case Based Reasoning for Facial Expression Recognition**
Asia Khanum, Muid Mufti, M. Y. Javed, Zubair Shafiq
Elsevier Fuzzy Sets and Systems, 2009
- Workshops**
- NSF/FCC QoE 2015 **Tracking Mobile Video QoE in the Encrypted Internet**
Zubair Shafiq
NSF/FCC Workshop on Tracking Quality of Experience in the Internet, Princeton, 2015
- NSF/FCC QoE 2015 **Bidirectional Crosslayer QoE Optimization**
Srikanth Sundaresan, Zubair Shafiq
NSF/FCC Workshop on Tracking Quality of Experience in the Internet, Princeton, 2015
- ACM HotNets 2013 **Cross-Path Inference Attacks on Multipath TCP**
Zubair Shafiq, Franck Le, Mudhakar Srivatsa, Alex X. Liu
ACM Workshop on Hot Topics in Networks, 2013
- CCS AISec 2009 **Using Spatio-Temporal Information in API Calls with Machine Learning Algorithms for Malware Detection and Analysis**
Faraz Ahmed, Haider Hameed, Zubair Shafiq, Muddassar Farooq
Workshop on Security and Artificial Intelligence, ACM Conference on Computer & Communications Security, Chicago, 2009
- KDD CSI 2009 **Malware Detection using Statistical Analysis of Byte-Level File Content**
Syeda Momina Tabish, Zubair Shafiq, Muddassar Farooq
Workshop on CyberSecurity and Intelligence Informatics (CSI), ACM Conference on Knowledge Discovery and Data Mining, France, 2009
- EvoComNet 2008 **A Comparative Study of Fuzzy Inference Systems, Neural Networks and Adaptive Neuro Fuzzy Inference Systems for Portscan Detection**
Zubair Shafiq, Muddassar Farooq, Syed Ali Khayam
Applications of Evolutionary Computing, EvoComNet, Italy, 2008

Funding

Total amount \$3.218 million; Personal share \$2.017 million

External Competitive Research Grants

- NSF-CAREER **Quality of Experience and Network Management in the Encrypted Internet**
National Science Foundation
PI, Duration: 2018-2023, Total: \$500,000, Share: \$500,000
Personnel: Zubair Shafiq (PI: Iowa)

- NSF-SaTC **A Multi-Layer Learning Approach to Mobile Traffic Filtering**
National Science Foundation
PI, Duration: 2018-2021, Total: \$500,000, Share: \$250,000
Personnel: Zubair Shafiq (PI: Iowa); Athina Markopoulou (PI: UC Irvine)
- NSF-SaTC **The Web Ad Technology Arms Race: Measurement, Analysis, and Countermeasures**
National Science Foundation
PI, Duration: 2017-2020, Total: \$500,000 + \$16,000 (REU Supplement 2019), Share: \$266,000
Personnel: Zubair Shafiq (PI: Iowa); Zhiyun Qian (PI: UC Riverside)
- NSF-NeTS **Towards Scalable and Energy Efficient Cellular IoT Communication**
National Science Foundation
PI, Duration: 2016-2019, Total: \$500,000, Share: \$166,000
Personnel: Zubair Shafiq (PI: Iowa); K.K. Ramakrishnan (PI: UC Riverside); Koushik Kar (PI: RPI)
- NSF-SaTC **Multipath TCP Side Channel Vulnerabilities and Defenses**
National Science Foundation
PI, Duration: 2015-2018, Total: \$500,000, Share: \$167,000
Personnel: Zubair Shafiq (PI: Iowa); Zhiyun Qian (PI: UC Riverside); Alex Liu (PI: Michigan State University)
- NSF-NeTS **Towards Measurement and Optimization of Internet Video Quality of Experience**
National Science Foundation
PI, Duration: 2015-2018, Total: \$175,000 + \$16,000 (REU Supplement 2016), Share: \$191,000
Personnel: Zubair Shafiq (PI: Iowa)
- DTL **Detection and Circumvention of Ad-Block Detectors**
Data Transparency Lab
PI, Duration: 2016-2017, Total: \$56,000, Share: \$28,000
Personnel: Zubair Shafiq (PI: Iowa); Zhiyun Qian (PI: UC Riverside)

Internal Competitive Research Grants

- UIRF **Social Media Powered Real-Time Digital News Recommendation**
University of Iowa Research Foundation
PI, Duration: 2015-2016, Total: \$75,000, Share: \$75,000
Personnel: Zubair Shafiq (PI: Iowa)
- Obermann **Heterogeneous Network Data Analytics to Improve Urban Sustainability**
Obermann Center Interdisciplinary Research Grant
PI, Duration: 2015-2016, Total: \$12,000, Share: \$6,000
Personnel: Zubair Shafiq (PI: Iowa); Xun Zhou (PI: Iowa)

Industry Grants/Gifts

- Siemens PI, Duration: 2019, Total: \$30,000, Share: \$30,000
Personnel: Zubair Shafiq (PI: Iowa)
- Siemens PI, Duration: 2018, Total: \$60,000, Share: \$60,000
Personnel: Zubair Shafiq (PI: Iowa)
- Verizon PI, Duration: 2018, Total: \$20,000, Share: \$20,000
Personnel: Zubair Shafiq (PI: Iowa)
- Minim PI, Duration: 2018, Total: \$66,164, Share: \$66,164
Personnel: Zubair Shafiq (PI: Iowa)

- Siemens PI, Duration: 2017, Total: \$30,000, Share: \$30,000
Personnel: Zubair Shafiq (PI: Iowa)
- Nokia PI, Duration: 2017, Total: \$53,200, Share: \$53,200
Personnel: Zubair Shafiq (PI: Iowa)
- Futurewei PI, Duration: 2017, Total: \$100,384, Share: \$100,384
Personnel: Zubair Shafiq (PI: Iowa)
- Facebook PI, Duration: 2016, Total: \$8,400, Share: \$8,400
Personnel: Zubair Shafiq (PI: Iowa)

Teaching

Note: The courses numbered at the 2000 level are undergraduate courses targeted at sophomore and junior students. The courses numbered at the 4000 level are graduate courses that are also open to senior undergraduate students.

- CS 4980 **Online Advertising & Tracking**
Class Size: 10, Fall 2019, University of Iowa
- CS 2620 **Networking & Security for Informatics**
Class Size: 42, Spring 2019, University of Iowa
- CS 4980 **Internet Measurement**
Class Size: 24, Fall 2018, University of Iowa
- CS 2620 **Networking & Security for Informatics**
Class Size: 59, Spring 2018, University of Iowa
- CS 2620 **Networking & Security for Informatics**
Class Size: 52, Spring 2017, University of Iowa
- CS 4980 **Network Security and Privacy**
Class Size: 20, Fall 2016, University of Iowa
- CS 2620 **Networking & Security for Informatics**
Class Size: 41, Spring 2016, University of Iowa
- CS 4980 **Advanced Computer Networks**
Class Size: 23, Fall 2015, University of Iowa
- CS 2620 **Networking & Security for Informatics**
Class Size: 38, Spring 2015, University of Iowa
- CS 4980 **Internet Measurement**
Class Size: 17, Fall 2014, University of Iowa

Students

Doctorate (Primary Supervisor)

- 2018-current John Cook
- 2016-current Umar Iqbal
- 2016-current Hammad Mazhar
- 2015-current Adnan Ahmed
- 2015-current Shehroze Farooqi
- 2015-current Huyen Le

Doctorate (Others)

- 2018-current Asad Mahmood (Primary Supervisor: Padmini Srinivasan)
- 2018-current Jonathan Rusert (Primary Supervisor: Padmini Srinivasan)
- 2016-2019 Amin Khezerlou (Primary Supervisor: Xun Zhou)
- 2015-2018 Sikder Huq (Primary Supervisor: Sukumar Ghosh)

Masters

- 2018 Daniel Zhou
- 2017 Kaustubh Mungale
- 2017 John Cook
- 2016-2017 Sai Kalyan Moguloju
- 2016 Raghavendranath Kandula
- 2016 Lufan Li
- 2016 Avinash Talreja
- 2016 Abdulaziz Alharbi

Undergraduate

- 2019 Charlie Wolfe (NSF REU)
- 2019 Ashton Woiwood (NSF REU)
- 2018 Basil Chatha
- 2017 Treyton Krupp (NSF REU)
- 2017 Daniel Zhou (NSF REU)
- 2017 Gabriel Akanni (SROP)
- 2016-2017 Xiaoye Li (NSF REU)
- 2016 Yu Dai
- 2015 Mirza Besic
- 2015 Fei Tang

High School

- 2019 Kathy Zhong (SSTP)
- 2018 Alice Martynova (SSTP)
- 2017 William Kim (SSTP)
- 2016 Brandon Wang (SSTP)

External Service

- Conference PC/Reviewer PETS (2020, 2019, 2018, 2017), CoNEXT (2019), SIGMETRICS (2020, 2013), WWW (2020, 2018), S&P Workshop on Technology and Consumer Protection (ConPro 2020), NDSS Workshop on Measurements, Attacks and Defenses for the Web (MADWeb 2019), CSCW (2019), INFOCOM (2017, 2015, 2010, 2009), WPES (2018), SIGCOMM Internet-QoE Workshop (2017), SIGCOMM Workshop on IoT Security and Privacy (2018), WWW CyberSafety Workshop (2018), WWW Workshop on Location and the Web (2018), ICNP (2014, 2013)

- Journal Reviewer IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Transactions on Network and Service Management, ACM Transactions on Multimedia Computing, IEEE Transactions on Cognitive Communications and Networking, ACM SIGCOMM Computer Communication Review, Elsevier Computer Communications, Elsevier Performance Evaluation, Springer Wireless Networks
- Co-Chair NSF NeTS Early Career Investigators Workshop 2019
- Co-Chair Student Workshop - ACM International Conference on emerging Networking EXperiments and Technologies (CoNEXT 2018)
- Co-Chair WWW 8th International Workshop on Location and the Web (LocWeb 2018)
- Poster Chair ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS 2018)
- Technical Committee Elsevier Computer Communications (2015-current)
- Guest Editor Special Issue on Mobile Traffic Analytics, Elsevier Computer Communications (2016)
- Editorial Board Proceedings on Privacy Enhancing Technologies (PoPETs) (2019)
- Panelist NSF CNS (2017, 2018, 2019); NSF CAREER (2019)

Internal Service

- Committee Departmental Graduate Committee
Department of Computer Science, University of Iowa, 2019-
- Organizer Colloquium Series
Department of Computer Science, University of Iowa, 2019-
- Committee Departmental Executive Committee
Department of Computer Science, University of Iowa, 2016-2019
- Committee Faculty Recruitment Committee
Department of Computer Science, University of Iowa, 2015, 2016, 2017, 2018
- Mentor Black Girls Do Science
College of Engineering, University of Iowa, 2015, 2016
- Mentor Iowa Edge Classroom Experience
Center for Diversity and Enrichment, University of Iowa, 2015, 2016, 2017, 2018
- Mentor Summer Research Opportunities Program (SROP)
Graduate College, University of Iowa, 2017
- Mentor Secondary Student Training Program (SSTP)
Belin-Blank Center, University of Iowa, 2016, 2017, 2018, 2019

Notable Industry Impact

- AdGraph in Brave Browser Our machine learning based ad-blocking system (AdGraph <https://arxiv.org/abs/1805.09155>) is being implemented in Brave Browser (see official announcement: <https://brave.com/brave-proposes-a-machine-learning-approach-for-ad-blocking>; GitHub: <https://github.com/brave/brave-core/tree/page-graph-integration>; <https://uiowa-irl.github.io/AdGraph>).

Facebook Graph API Abuse The OAuth access token vulnerability and abuse disclosed in our paper titled "Measuring and Mitigating OAuth Access Token Abuse by Collusion Networks" @ ACM IMC 2017 (Best Paper Award) has resulted in significant changes to Facebook's Graph API.

MPTCP Security The multipath TCP vulnerability discovered in our paper titled "Multipath TCP Traffic Diversion Attacks and Countermeasures" @ IEEE ICNP 2017 has been recognized and the fix proposed in our paper has been adopted by the IETF MPTCP Working Group in RFC 6824 (see <http://www.tessares.net/july-2017>).

US patent 9693237 Optimization of cellular network architecture based on device type-specific traffic dynamics. Co-inventors: Jia Wang, Lusheng Ji, Alex X. Liu.

US patent 9585177 Cellular Connection Sharing. Co-inventors: Jia Wang, Lusheng Ji, Alex X. Liu, Jeffrey Pang

Selected Recent Talks

- Invited Online Advertising and Tracking
Breakout Session at the NSF SaTC PI Meeting, Arlington, VA, 2019
- Invited Challenges of Network-Level Adblocking: A Case Study of Smart TVs
Ad Blocker Dev Summit, Netherlands, 2019
- Invited Overview and Demo of ShadowBlock: A Lightweight and Stealthy Adblocking Browser
Ad Blocker Dev Summit, Netherlands, 2019
- Colloquium Ad-mageddon: The Next Frontier in Web Privacy
UC Irvine, Irvine, CA, 2019
- Colloquium Ad-mageddon: The Next Frontier in Web Privacy
UC Riverside, Riverside, CA, 2019
- Invited AI-Powered Adblocking: Challenges and Opportunities
Ad-Blocking Dev Summit, San Francisco, CA, 2018
- Invited Ad Tech vs. Ad-blockers: Challenges and Opportunities
Dagstuhl Seminar on Web Application Security, Schloss Dagstuhl, Germany, 2018
- Invited Quality of Experience and Network Management in the Encrypted Internet
YouTube, San Bruno, CA, 2018
- Invited QoE Optimization in the Encrypted Internet
Verizon Digital Media Services, Santa Monica, CA, 2018
- Invited Big Data, Big Brother
Lahore University of Management Sciences (LUMS), Lahore, Pakistan, 2018
- Colloquium Measuring and Modeling Tussles in Cyberspace
University of Oregon, Eugene, OR, 2017
- Colloquium Big Data, Big Brother
Coe College, Cedar Rapids, IA, 2017
- Panel Algorithms: The Personal Is Political
Obermann Conversations, Iowa City, IA, 2017
- Invited Big Data, Big Brother
UI Summer Research Opportunities Program (SROP) Speaker Series, Iowa City, IA, 2017

- Colloquium Machine Learning on Encrypted Traffic: Past, Present, Future
Universidade Federal do Rio de Janeiro (UFRJ), Rio, Brazil, 2017
- Keynote The Arms Race Between Ad-Tech and Ad-Blockers
35th Brazilian Symposium on Computer Networks and Distributed Systems, Belem, Brazil, 2017
- Tutorial Machine Learning on Encrypted Traffic: Past, Present, Future
35th Brazilian Symposium on Computer Networks and Distributed Systems, Belem, Brazil, 2017
- Colloquium Big Data, Big Brother
Electrical & Computer Engineering Graduate Seminar, University of Iowa, Iowa City, IA, 2017
- Keynote Tracking and Optimizing Quality of Experience in the Encrypted Internet
IEEE PerCom Workshop on Data Analytics for Mobile Networking, Big Island, HI, 2017
- Invited Big Data, Big Brother
Hawkeye Lunch & Learn, Office of Outreach & Engagement, University of Iowa, Iowa City & Des Moines, IA, 2017
- Invited Detection and Circumvention of Anti Ad-Blockers: A New Arms Race on the Web
PrivacyCon, Federal Trade Commission (FTC), Washington, DC, 2017
- Invited Tracking and Surveillance in the Online Advertising Ecosystem
Iowa City Foreign Relations Council, Iowa City, IA, 2016
- Invited Detection and Circumvention of Anti Ad-Blockers
Data Transparency Lab (DTL) Conference, New York, NY, 2016
- Colloquium Tracking Reputation Fraud on Facebook
Management Sciences Seminar Series, Tippie College of Business, University of Iowa, Iowa City, IA, 2016
- Panel Security and privacy challenges within social networks
WorldCanvass, Big Data: Big Brother or Big Sister?, Iowa City, IA, 2016
- Invited Spying on Spammers: Tracking Reputation Fraud on Facebook
University of Iowa Computing Conference, Iowa City, IA, 2016
- Keynote Tracking, Surveillance, and Fraud in the Online Advertising Ecosystem
Iowa Computer Science Graduate Research Symposium, Iowa City, IA, 2015
- Colloquium Tracking Cyber Criminals in Online Social Networks
Knox College, Galesburg, IL, 2015
- Invited Tracking Cyber Criminals in Online Social Networks
University of Iowa Tech Forum, University of Iowa, Iowa City, IA, 2015