

Umar Iqbal

Research Interests

Privacy; Security; Internet Measurements.

Academic Appointments

- 2023– **Washington University**, *Assistant Professor*
- 2021–23 **University of Washington**, *Postdoctoral Scholar*
Advisor: Prof. Franziska Roesner
- 2020–21 **University of California-Davis**, *Visiting Student*
Advisor: Prof. Zubair Shafiq
- 2016 **Lahore University of Management Sciences**, *Research Assistant*
Advisor: Prof. Fareed Zaffar

Industry Experience

- 2020 **Apple**, *WebKit Privacy Research Intern*
- 2019 **Mozilla**, *Privacy Research Intern*
- 2018 **Brave**, *Research Intern*
- 2017 **Microsoft**, *Program Manager Intern*
- 2013–16 **LMKT, Pakistan**, *Solution Analyst*

Education

- 2016–21 **University of Iowa**, *Ph.D. Student*
Advisor: Prof. Zubair Shafiq
Dissertation title: Towards a Privacy-Respecting Web
[Graduate Research Excellence Award](#)
[Ada Louise Ballard and Seashore Dissertation Fellowship](#)
[Graduate College Post-Comprehensive Research Fellowship](#)
- 2009–13 **National University of Computer & Emerging Sciences**
B.S. in Computer Science
[Dean's list of honor 2012-13](#)

Honors & Awards

- 2021 **Computing Innovation Fellowship**, *Computing Research Association (CRA)*
- 2021 **Graduate Research Excellence Award**, *University of Iowa*
- 2020 **Best Applied Research Paper (AdGraph)**, *3rd place, CSAW Symposium NYU*
- 2020 **Ada Louise Ballard and Seashore Dissertation Fellowship**, *University of Iowa*
- 2019 **Graduate College Post-Comprehensive Research Fellowship**, *University of Iowa*
- 2016 **Winner PeaceTech Exchange**, *LUMS University, Pakistan*
- 2012–13 **Dean's List of Honor**, *FAST/NUCES University, Pakistan*

2016–21 **Travel Grants**, *IEEE S&P (2020, 21)*, *NDSS (2020)*, *AMC IMC (2017)*, *IEEE CNS (2016)*, *USENIX Security (2016)*

Publications

- PETS 2024 **Opted Out, Yet Tracked: Are Regulations Enough to Protect Your Privacy?**
Zengrui Liu, **Umar Iqbal**, Nitesh Saxena
Proceedings on Privacy Enhancing Technologies, Bristol, 2024
- IMC 2023 **Tracking, Profiling, and Ad Targeting in the Alexa Echo Smart Speaker Ecosystem**
Umar Iqbal, Pouneh N. Bahrami, Rahmadi Trimananda, Hao Cui, Alex Gamero-Garrido, Daniel Dubois, David Choffnes, Athina Markopoulou, Franziska Roesner, Zubair Shafiq
ACM Internet Measurement Conference, Montreal, 2023
Acceptance rate: 52/201 = 25.87%
Appeared at [FTC PrivacyCon 2022](#)
- EAAMO 2023 **Gender Biases in Tone Analysis: A Case Study of a Commercial Wearable Device**
Christina Yeung, **Umar Iqbal**, Tadayoshi Kohno, Franziska Roesner
Equity and Access in Algorithms, Mechanisms, and Optimization, Boston, 2023
- CCS 2023 **CookieGraph: Measuring and Countering First-Party Tracking Cookies**
Shaor Munir, Sandra Siby, **Umar Iqbal**, Steven Englehardt, Zubair Shafiq, Carmela Troncoso
ACM Conference on Computer and Communications Security, Copenhagen 2023
- WWW 2023 **Online Advertising in Ukraine and Russia During the 2022 Russian Invasion**
Christina Yeung, **Umar Iqbal**, Yekaterina O'Neil, Tadayoshi Kohno, Franziska Roesner
The Web Conference, Austin, 2023
Acceptance rate: 256/1492 = 19.2%
Spotlight paper (candidate for the best paper award).
- USENIX 2022 **Khaleesi: Breaker of Advertising and Tracking Request Chains**
Umar Iqbal, Charlie Wolfe, Charles Nguyen, Steven Englehardt, Zubair Shafiq
USENIX Security Symposium, Boston, 2022
Acceptance rate: 256/1492 = 17.1%
- USENIX 2022 **WebGraph: Capturing Advertising and Tracking Information Flows for Robust Blocking**
Sandra Siby, **Umar Iqbal**, Steven Englehardt, Zubair Shafiq, Carmela Troncoso
USENIX Security Symposium, Boston, 2022
Acceptance rate: 256/1492 = 17.1%
- PETS 2022 **FP-Radar: Longitudinal Measurement and Early Detection of Browser Fingerprinting**
Pouneh Nikkhah Bahrami, **Umar Iqbal**, Zubair Shafiq
Privacy Enhancing Technologies Symposium, Sydney, 2022
Acceptance rate: 128/534=23.9%
- ACSAC 2021 **Eluding ML-based Adblockers With Actionable Adversarial Examples**
Shitong Zhu, Zhongjie Wang, Xun Chen, Shasha Li, Keyu Man, **Umar Iqbal**, Zhiyun Qian, Kevin S Chan, Srikanth V Krishnamurthy, Zubair Shafiq, Yu Hao, Guoren Li, Zheng Zhang, Xiaochen Zou
Annual Computer Security Applications Conference, Online, 2021
Acceptance rate: 80/326=24.5%
- S&P 2021 **Fingerprinting the Fingerprinters: Learning to Detect Browser Fingerprinting Behaviors**
Umar Iqbal, Steven Englehardt, Zubair Shafiq
IEEE Symposium on Security and Privacy, San Francisco, 2021
Acceptance rate: 77/643=11.9%
- 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 and Privacy, San Francisco, 2020
Acceptance rate: 104/841=12.3%
Best applied research paper, 3rd place, CSAW, NYU Tandon

- WWW 2019 **ShadowBlock: A Lightweight and Stealthy Adblocking Browser**
 Shitong Zhu, **Umar Iqbal**, Zhongjie Wang, Zhiyun Qian, Zubair Shafiq, Weiteng Cheng
The Web Conference, San Francisco, 2019
 Acceptance rate: 225/1247=18%
- 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
 Acceptance rate: 42/179=23.5%
- DSN 2016 **Malware Slums: Measurement and Analysis of Malware on Traffic Exchanges**
 Salman Yousaf, **Umar Iqbal**, Shehroze Farooqi, Raza Ahmad, Zubair Shafiq, Fareed Zaffar
IEEE/IFIP International Conference on Dependable Systems and Networks, France, 2016
 Acceptance rate: 58/259 =22.4%

Open Source & Industry Impact

- Brave Browser **AdGraph/PageGraph in Brave Browser**
 AdGraph instrumented Chromium (Blink and V8) to capture detailed execution of web pages, including document modifications, network requests, and script execution. AdGraph is implemented in Brave (as PageGraph) [[Official Announcement](#)] [[Brave's Integration](#)] [[Source Code](#)]
- Safari WebKit **WebKit's Intelligent Tracking Protection (ITP)**
 I instrumented Intelligent Tracking Protection in WebKit (Safari) to capture JavaScript API execution. The instrumentation is useful in detecting the abuse of JavaScript APIs for fingerprinting. [[Code Patch](#)] [[Code Patch](#)]
- Mozilla Firefox **JavaScript API Fingerprint-ability Reduction**
 Firefox is re-evaluating the fingerprint-ability of JavaScript APIs detected by my research. [[Bug reports to Mozilla Firefox](#)]
- Microsoft Edge **Adblock Landscape**
 I wrote a technical report that evaluated the feasibility of ad and tracker blocking in Microsoft Edge. In light of my evaluation, Microsoft joined Coalition for Better Ads (CBA) to develop better ads standards for desktop and mobile web.
- Ad/Tracker Blocking Filter Lists **Contribution to Filter Lists**
 I have shared my research findings to improve ad/tracker detection block lists. My findings are incorporated by popular block lists, such as Disconnect (used by Firefox and Edge) and Easylist/EasyPrivacy (used by uBlock Origin and dozens of other anti-tracking tools). [[Bug reports to filter lists](#)]

Fellowships (Total award: ~ \$275,000)

- CRA CI Fellowship **Computing Innovation Fellowship**, *Computing Research Association (CRA)*
 2021-23, Total amount: \$254,934
- Dissertation Fellowship **Ada Louise Ballard and Seashore Dissertation Fellowship**, *University of Iowa*
 2020, Total amount: \$10,000
- Post-comp Fellowship **Graduate College Post-Comprehensive Research Fellowship**, *University of Iowa*
 2019, Total amount: \$10,000

Teaching

- CSE 527S **Data-driven privacy & security**
 Fall 2023, Washington University in St. Louis
- Workshop Course **ProperData IoT Privacy Workshop**
 Summer 2023, University of California-Irvine
- CS 1210 **Fundamentals of Computing**
 Summer 2021, University of Iowa

Mentoring

Ph.D.

- 2021-23 **Tina Yeung**, University of Washington
- 2020-23 **Shaoor Munir**, University of California-Davis
- 2021-23 **Kaiming Cheng**, University of Washington
- 2020-23 **Pouneh Nikah Bahrami**, University of California-Davis

Undergraduate

- 2021-23 **Maia Xiao**, University of Washington
- 2021-23 **Manasi Shah**, University of Washington
- 2019-21 **Charlie Wolfe**, University of Iowa, *Post-grad: Software Engineer at Apple*
- 2020-21 **Charles Nguyen**, University of California-Davis, *Post-grad: Software Engineer at Apple*

Services

- 2023 **Program Committee Member**
IEEE Symposium on Security and Privacy (Oakland)
USENIX Security Symposium
- 2022 **Workshop Organizer**
ProperData IoT Privacy Workshop
University of California-Irvine
- 2022 **Program Committee Member**
ACM Internet Measurement Conference (IMC)
Privacy Enhancing Technologies Symposium (PETS)
Workshop on Measurements, Attacks, and Defenses for the Web (MADWeb)
- 2021 **Program Committee Member**
ACM Conference on Computer and Communications Security (CCS)
- 2017-23 **Invited Reviewer**
The Web Conference (WWW)
Privacy Enhancing Technologies Symposium (PETS)
International Symposium on Research in Attacks, Intrusions and Defenses (RAID)
IEEE Transactions on Dependable and Secure Computing (TDSC)
ACM Transactions on the Web (TWEB)
- U Iowa **Student Travel Grant Review Committee Member**
- 2018-19 Graduate & Professional Student Government, The University of Iowa
- IMC 2017 **Shadow Program Committee Member**
ACM Internet Measurement Conference

Invited Talks

- 2022 **The State of Web Privacy: Threats & Defenses**
Guest lecture CS484, University of Washington
- 2022 **Towards a Privacy-Respecting Web**
University of Iowa
University of New Orleans
- 2022 **Tracking, Profiling, & Ad-Targeting in Smart Speakers**
FTC PrivacyCon
ProperData IoT Privacy Workshop
- 2022 **Breaking Advertising & Tracking Request Chains**
Ad-filtering Developer Summit

- 2020 **Fingerprinting the Fingerprinters**
Brave Software
- 2019 **Machine Learning for Ad and Tracker Blocking**
Adblock Developer Summit
Ulowa Graduate Research Symposium
- 2019 **Machine Learning for Fingerprinting Detecting**
Mozilla Corporation
- 2019 **An Overview of Ad and Tracker Blocking**
Mozilla Security Research Summit

Selected Media Coverage

- Fox News 2022 **Privacy Concerns Over Amazon's Growing Footprint**, *Bret Baier*, [\[Link\]](#)
- DataSkeptic Podcast 2022 **Ad Targeting in Amazon Smart Speakers**, *Kyle Polich*, [\[Link\]](#)
- TheVerge 2022 **Researchers find Amazon uses Alexa voice data to target you with ads**, *Jennifer Pattison Tuohy*, [\[Link\]](#)
- ZDNet 2020 **A quarter of the Alexa Top 10K websites are using browser fingerprinting scripts**, *Catalin Cimpanu*, [\[Link\]](#)
- CNET 2018 **Brave's AI blocks ads better than today's browser plug-ins, company says**, *Stephen Shankland*, [\[Link\]](#)