

Interests I am passionate about data-driven analysis of online privacy & security issues and abuses in networked systems. I am keen in using statistical methods to derive salient features and use applied machine-learning algorithms to auto-detect these issues and abuses for vetting and correcting purposes.

Online Presence [Homepage](#), [@Google Scholar](#), & [@LinkedIn](#)

Education

- 09/2014 – 05/2018 **PhD in Electrical and Telecommunication Engineering**, [UNSW](#), Australia.
○ *Thesis*: [Analysis and design of secure and privacy preserving systems](#). Mentor: **Mohamed Ali (Dali) Kaafar**
- 03/2008 – 02/2010 **M.Sc in Computer Engineering**, [Ajou University](#), Korea.
(GPA: 4.06/4.5) ○ *Thesis*: Design and analysis of a resource- and energy-efficient surveillance scheme for wireless sensor networks. Mentor: **Ki Hyung Kim**
- 12/2002 – 03/2007 **B.Sc in Computer Systems Engineering**, [UET Peshawar](#), Pakistan.
(GPA: 3.71/4.0) ○ *Project*: Simulation and implementation of CDMA transceiver with advanced access control mechanisms using MATLAB and field programmable graphics arrays. Mentor: **Mustafa Bari**

Professional experience

- 07/2018 – to date **Postdoc Research Fellow**, *Censored Planet*, [University of Michigan](#), Ann Arbor, USA.
○ Designed and deployed systems to analyze server-side blocking and discriminations at scale
○ Analyzed and characterized facets of blocking (or censorship) in Russia
○ Analyzed and characterized the security and privacy issues of URL-shorters' redirections
- 09/2018 – to date **Postdoc Research Fellow**, *Optus MQ Cyber Security Hub*, Sydney, Australia.
○ Designing systems to characterize the security and privacy issues related to mobile apps' resource-loading
○ Designing systems to analyze suspicious redirects of web traffic and prevent the inflicted harms
○ Implemented systems to reveal vulnerabilities of network service libraries/APIs in iOS apps
- 10/2018 – to date **Visiting Scientist**, *Data61*, [CSIRO](#), Sydney, Australia.
○ Research and development on optimizing the balance of data privacy and utility in the context of differential privacy
- 01/2018 – 09/2018 **Research Associate**, *Optus Macquarie University Cyber Security Hub*, Sydney, Australia.
○ Designed and analyzed testbed for investigating security and privacy issues in mobile applications
○ Analyzed graph-features of Android malware and designed ML-based scheme to detect malicious application in the wild
○ Tutored PenTesting course: "COMP350 Special Topics in Computing and Information Systems"
- 09/2014 – 06/2018 **Graduate Researcher**, Networks Group, CyberPhysical Systems Research Program, Data61-CSIRO, Australia.
○ Modeled and implemented an obfuscation resilient tool for detecting Android malware via behavior modeling of weighted directed Android API call graph
○ Designed analysis framework for longitudinally analysis of invisible structures and information aggregation revealed through DNS
○ Designed and implemented data-analysis framework to comprehensively analyzed characterize sellers, buyers, and services of prominent underground marketplaces that involved in eCrime activities.
○ Analyzed the inefficiencies of state-of-the art spam detection systems and proposed as well as validated an NLP and machine-learning based system to efficiently detect (and prevent) even the most trickiest and stealthy spammer
○ Designed and implemented obfuscation-resilient malware detection framework to detect polymorphic malicious activities in softwares such as Android apps.
○ Designed and implemented a data-analysis and intelligence framework to retrieve and (Temporal-longitudinally) analyze malware in the wild.
○ Designed and implemented an analysis framework to analyze privacy preserving systems for the Web and proposed as well as validated a machine-learning based systems with improved usability and efficiency.
○ Designed and implemented data-collection and analysis framework to analyze security and privacy risks of security-promising systems (e.g., Android VPN apps and Ad-Blocking apps).
- 05/2014 – 08/2014 **Software Engineer**, *Network Research Lab (NRL) NICTA*, Sydney, Australia.
○ Implemented an analysis framework to extract syntactic and semantic features from JavaScript programs collected from Alexa's top 5K websites.

- 05/2013 – 12/2013 **Software Engineer**, *STU, Umm Al Qura University*, Makkah, Saudi Arabia.
- o Designed and implemented crowd sensing system to monitor crowd behavior in Hajj—one of the largest religious gatherings.
- 02/2010 – 01/2013 **Research Engineer**, *Peer-to-Peer Networks*, Technische Universität Darmstadt, Germany.
- o Implemented monitoring systems to analyzing security and resiliency of p2p-based services.
 - o Contributed to research activities in QuaP2P (www.quap2p.de) project to benchmark security (attacks and countermeasures) against p2p-based systems.
- 11/2009 – 01/2010 **Software Engineer**, *GStorm*, Seoul, Korea.
- o Ported multi-media codec for Samsung Galaxy mobile phone at GStorm from propriety multi-media applications to Android OS.
- 07/2008 – 08/2008 **Software Engineer**, *Lanbrid Company*, Seoul, Korea.
- o Implemented security solutions, mainly IPSec, in network service processors i.e., propriety gateways and routers.
- 03/2008 – 01/2010 **Research Assistant**, *Information and Communication Security Lab*, Seoul, South Korea.
- o Programmed sensor node and deployed surveillance applications in sensor networks and collected multimedia monitored data.
 - o Proposed efficient relay node placement scheme for two-tiered wireless sensor networks.
- 03/2007 – 03/2008 **Lab Instructor**, *DCSE, University of Engineering and Technology*, Peshawar, Pakistan.
- o Conducted lab courses including embedded system programming, Java-based object oriented software development, and image processing.

Selected publications (Complete list @GScholar)

Peer-reviewed publications

- 1) Jingxiu Su, Zhenyu Li, Stephane Grumbach, **Muhammad Ikram**, Kave Salamatian and Gaogang Xie, "[Web Tracking Cartography with DNS Records](#)", International Performance Computing and Communications Conference (IPCCC), 2018.
- 2) Rahat Masood, Dinusha Vatsalan, **Muhammad Ikram** and Dali Kaafar, "[Incognito: A Method for Obfuscating Web Data](#)", in proceeding of World Wide Web (WWW), 2018.
- 3) **Muhammad Ikram** and Mohamed Ali Kaafar, "[A First Look at Mobile Ad-Blocking Apps](#)", in proceeding of IEEE Network Computing and Applications (NCA), 2017.
- 4) **Muhammad Ikram**, Lucky Onwuzurike, Shehroze Farooqi, Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Mohamed Ali Kaafar, M. Zubair Shafiq, "[Measuring, Characterizing, and Detecting Facebook Like Farms](#)", in issue of ACM Transaction on Privacy and Security (TOPS), 2017.
- 5) **Muhammad Ikram**, Hassan Jameel Asghar, Mohamed Ali Kaafar, Balachander Krishnamurthy, and Anirban Mahanti, "[Towards Seamless Tracking-Free Web: Improved Detection of Trackers via One-class Learning](#)", in proceeding of Privacy Enhancing Technology Symposium (PETS), 2017.
- 6) Shehroze Farooqi, **Muhammad Ikram**, Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Mohamed Ali Kaafar, M. Zubair Shafiq, Fareed Zaffar, "[Characterizing Key Stakeholders in an Online Black-Hat Marketplace](#)", in proceeding of IEEE APWG Symposium on Electronic Crime Research (eCrime), 2017.
- 7) **Muhammad Ikram**, Narseo Vallina Rodriguez, Suranga Seneviratne, Mohamed Ali Kaafar, Vern Paxson, "[An analysis of the Privacy and Security Risks of Android VPN Permission-enabled Apps](#)", in proceeding of ACM SIGCOMM Internet Measurements Conference (IMC), 2016.

Technical Reports

- 1) Shehroze Farooqi, **Muhammad Ikram**, Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Mohamed Ali Kaafar, M. Zubair Shafiq, Fareed Zaffar, "[The 1%: Identification and Role of Key Stakeholders in a Black-Hat Marketplace](#)", 2017.
- 2) **Muhammad Ikram**, Lucky Onwuzurike, Shehroze Farooqi, Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Mohammad Ali Kaafar, M. Zubair Shafiq, "[Combating Fraud in Online Social Networks: Detecting Stealthy Facebook Like Farms](#)", 2016.
- 3) Shehroze Farooqi, **Muhammad Ikram**, Emiliano De Cristofaro, Arik Friedman, Guillaume Jourjon, Mohamed Ali Kaafar, M. Zubair Shafiq, Fareed Zaffar, "[Characterizing Seller-Driven Black-Hat Marketplaces](#)", 2015.

Under Review Papers

- 1) **Muhammad Ikram**, Rahat Masood, Gareth Tyson, Mohamed Ali Kaafar, Roya Ensafi, "The Chain of Implicit Trust: An Analysis of the Web Third-party Resources Loading", submitted to the [World Wide Web \(WWW\)](#), 2019.
- 2) **Muhammad Ikram**, Benjamin Zi Hao Zhao, Hassan Asghar, Mohamed Ali Kaafar, "A Decade of Mal-Activity Reporting: A Retrospective Analysis of Internet Malicious Activity Blacklists", submitted to [Passive and Active Measurement \(PAM\)](#), 2019.
- 3) Steve Sprecher, Horse Boxer, Matthew Bernhard, Alex Holland, **Muhammad Ikram**, Roya Ensafi "Internet Pinball: The Security and Privacy Impact of Redirects", submitted to [IEEE Symposium on Security and Privacy \(S&P\)](#), 2019.
- 4) Zhushou Tang, Sen Chen, Ke Tang, Minhui Xue, **Muhammad Ikram**, Yuan Tian, Tielei Wang, and Haojin Zhu, "iOS, Your OS, Everybody's OS: Vetting and Measuring Network Services of iOS Apps", submitted to [Usenix Security Symposium](#), 2019.
- 5) Victor Ongkowijaya, Anne Edmundson, Matthew Bernhard, Steven Sprecher, Leonid Evdokimov, **Muhammad Ikram**, and Roya Ensafi, "An Evaluation of Russian Censorship", submitted to [Usenix Security Symposium](#), 2019.
- 6) **Muhammad Ikram**, Pierrick Beaume, and Mohamed Ali Kaafar, "DaDiDroid: An Obfuscation Resilient Tool for Detecting Android Malware via Behavior Modeling of Weighted Directed Call Graph", submitted to [IEEE/IFIP International Conference on Dependable Systems and Networks \(DSN\)](#), 2019.

In Media

News Papers

- 1) My research work: "[An analysis of the Privacy and Security Risks of Android VPN Permission-enabled Apps](#)" was featured by the top tech news websites and media outlets: [Electronic Frontier Foundation \(EFF\)](#), [SlashDot](#), [Security Week](#), [ZDNet \(1, 2\)](#), [ITwire](#), [ArsTechnica](#), [LifeHacker](#), [Digital Trends](#), [ABC News](#), and number of others ([Full list of URLs to media coverage](#)).
- 2) Due to our [research project](#), the VPN apps' developers leverage on third-party security auditors to ensure security/privacy claims and tighten the security to thwart potential abusers or malicious actors, more [details](#).
- 3) Our comprehensive analysis of [security and privacy issues in mobile VPN apps](#) triggered user awareness and [complaint](#) has been registered at Federal Trade Commission (FTC), US, to address and regulate the abusive methods employed in HotSpot Shield Free VPN app by AnchorFree.
- 4) My research work "[Combating fraud in online social networks: detecting stealthy Facebook Like Farms](#)" was featured by [The Register](#).

Honors and Awards

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|-------------------|---|
| 07/2018 – to date | OTF Fellowship (250K USD) , <i>grated by OTF to investigate server-side discriminations at scale.</i> |
| 10/2018 – 09/2018 | Travel Grant (2K USD) , <i>granted by OTF to attend and present my research project at OTF-Summit in Taiwan.</i> |
| 09/2014 – 01/2018 | PhD Scholarship (Tuition Fee and Monthly Stipend) , <i>granted by UNSW and Data61-CSIRO.</i> |
| 07/2017 – 07/2017 | Student Travel Grant (2.5K USD) , <i>granted by Data61-CSIRO and UNSW, for attending PETS'17.</i> |
| 07/2017 – 07/2017 | Student Travel Grant (2.5K USD) , <i>granted by Data61-CSIRO and UNSW, for attending SOUPS'17.</i> |
| 09/2016 – 09/2016 | Student Travel Grant (1.5K USD) , <i>granted by Data61-CSIRO and UNSW, for IMC'16.</i> |
| 10/2015 – 11/2015 | Student Travel Grant (1.5K USD) , <i>granted by ACM and NICTA, for attending IMC'15.</i> |
| 03/2008 – 01/2010 | M.Sc Scholarship Stipend (20K USD) , <i>granted by IITA, ministry of IT, South Korea.</i> |
| 03/2008 – 01/2010 | M.Sc Scholarship Tuition Fee Scholarship , <i>granted Ajou University, South Korea.</i> |

- 03/2002 – 03/2007 **Position Holder Scholarship**, secured top position (1%) in B.Sc eng., granted by UET, Peshawar, Pakistan.
- 03/2002 – 03/2007 **B.Sc Tuition Fee and Stipend Scholarship**, granted got 3rd position out of 50K+ students in intermediate school exams, granted by BISE Mardan, Pakistan.
- 03/2002 – 03/2007 **Position Holder Bronze Medal and Scholarship**, got 3rd position out of 50K+ students in intermediate school exams, granted by BISE Mardan, Pakistan.

Mentoring and Advising Students

- Master Theses**
- 1) Ben Zhou, Longitudinal Analysis of Malicious Activities on the Web, Dec., 2017. (co-advised with Prof. Dali Kaafar at Data61)
 - 2) Malcolm Parsons, Security Analysis of Peer-to-Peer Overlays, Dec., 2011. (co-advised with Prof. Thorsten Strufe at TU Darmstadt)
 - 3) Carola Schwinn, Resilient Monitoring Scheme for Mobile Crowd Missions, Jan. 2013. (co-advised with Prof. Thorsten Strufe at TU Darmstadt)
 - 4) Mohsen Amoozrezaei, Cheating Resistant P2P-based Gaming Overlays, Feb. 2013. (co-advised with Prof. Thorsten Strufe at TU Darmstadt)
- Bachelor Theses**
- 1) Oleksi Donet, Evaluation and Improvement of Routing Table-based Countermeasures in Kad Networks, Oct. 2012. (co-advised with Prof. Thorsten Strufe at TU Darmstadt)
 - 2) Sven Ferse, Evaluation and Improvement of Identity-based Countermeasures in Kad Networks, Oct. 2012. (co-advised with Prof. Thorsten Strufe at TU Darmstadt)
 - 3) Michael Markert, Amplifying Eclipse Attacks versus structured Peer-to-Peer Networks, Oct. 2012. (co-advised with Prof. Thorsten Strufe at TU Darmstadt)
 - 4) Johannes Schwandke, Comparative Robustness Study of a Peer-to-Peer based SynchroPhasor Network Middleware, Oct. 2012. (co-advised with Prof. Thorsten Strufe at TU Darmstadt)
- Internees**
- 1) Noha Liozon, The Chains of Implicit Trust: An Analysis of the Web Third-party Resources Loading, Dec. 2017. (co-advised with Prof. Dali Kaafar at Data61)
 - 2) Pierrick Beaume, DaDiDroid: An Obfuscation Resilient Tool for Detecting Android Malware via Behavior Modeling of Weighted Directed Call Graph, Dec. 2017. (co-advised with Prof. Dali Kaafar at Data61)

Community Services

- 1) I reviewed papers submitted to conferences/journals: AsiaCCS'17, PETS'14, , PETS'15, PETS'16, PETS'17, PETS'18, DSN'17, IMC'17, NSDI, Computer Communications, IEEE Transactions on Parallel and Distributed Systems.
- 2) I volunteered to organize conferences: [WoWMoM'14](#), [CoNext'14](#), [PAM'17](#).
- 3) I am a program committee member of [IEEE International Workshop on Artificial Intelligence for Mobile](#), 2019.

References

- o **Mohamed Ali (Dali) Kaafar**, Group Leader, Information Security Group, Macquarie University and CSIRO-Data61. Email: Dali.Kaafar@data61.csiro.au.
- o **Roya Ensafi**, Research Assistant Professor, Computer Science & Engineering, University of Michigan, USA. Email: ensafi@umich.edu.
- o **Vern Paxson**, Professor, International Computer Science Institute (ICSI) and UC Berkeley, Berkeley, California, USA. Email: vern@icir.org
- o **Zubair Shafiq**, Assistant Professor, Dept. of Computer Science, The University of Iowa, USA. Email: zubair.shafiq@uiowa.edu.