

Muhammad Ikram  
Senior Lecturer  
School of Computing  
Future Communications Research Centre  
**Email:** muhammad.ikram@mq.edu.au  
**Phone:** +61 2 9850 8439



## Biography

Dr Muhammad Ikram is a Senior Lecturer in Cybersecurity at the School of Computing, Macquarie University. He is a member of the Information Security and Privacy (ISP) group at Macquarie University and a Project Lead at Macquarie Cybersecurity Hub (MCHUB). Before joining Macquarie University, he was a joint postdoctoral research fellow at the University of Michigan (USA) and Macquarie University.

He completed his PhD in Electrical Engineering and Telecommunication from UNSW, Master in Information and Computer Engineering from Ajou University (Korea), and Bachelor in Computer Engineering from the University of Engineering and Technology Peshawar (Pakistan).

Ikram's current research interests are focused on data-driven analysis of privacy and security issues in mobile and Web applications. He has been thinking and working to build techniques leveraging machine-learning algorithms to fight against security and privacy issues and fraud detection targeting online services.

Ikram has published more than 30 high-quality publications in top-notch conferences ( Usenix Security [A\*-ranked, 1], NDSS [A\*-ranked, 1], WWW [A\*-ranked, 1, 2], IMC [A-ranked, 1], PETS [A-ranked, 1], and AsiaCCS [A-ranked, 1]) and journals (ACM Transaction on Privacy and Security [1, 2], ACM Communications, and The British Medical Journal [Impact Factor: 30.223, 1]. Awarded The Best Paper Award by ACM Asia Computer Communication Security (AsiaCCS) in 2019 and The Outstanding Paper Award by European Alliance for Innovation (EAI) Mobile and Ubiquitous Systems ( Mobiquitous) in 2021.

Ikram's has been regularly interviewed by news and media outlets (e.g., The Guardian) and his work has been featured in top security and privacy magazines. For instance, his work on Web resource loading has been featured by more than 50 news and media outlets reaching to ~11 million audiences.

Ikram is serving as a technical program committee member (WWW [A\*-ranked], PETS [A-ranked]), reviewer (CCS [A\*-ranked], PETS), and organizer (PETS) of top security and privacy conferences.

## Qualifications

Electrical Engineering and Telecommunication, PhD, Design and analysis of secure and privacy preserving systems, The University of New South Wales

1 Sept 2014 → 16 May 2018

Award Date: 16 May 2018

Information and Communication Engineering, Master of Science, Power efficient clustering for wireless multimedia sensor network, Ajou University

19 Mar 2008 → 22 Feb 2010

Award Date: 22 Feb 2010

Computer Engineering, Bachelor of Science, Simulation and implementation of CDMA transceiver., NWFP University of Engineering and Technology

16 Dec 2002 → 1 May 2007

Award Date: 1 May 2007

30 Sept 2020 HDR30: HDR Supervision Orientation 2020-2023, HDR31

## Employment

### Senior Lecturer

Senior Lecturer

School of Computing

Macquarie University

1 Jan 2023 → present

### Future Communications Research Centre

Macquarie University

1 Jan 2023 → 31 Dec 2027

### Research Scientist

Networks Research Group Data61

Eveleigh, Australia

1 Sept 2019 → 1 Oct 2020

### **Postdoc Researcher**

University of Michigan

Ann Arbor, MI 48109-5201, United States

1 Jul 2018 → 31 Aug 2019

## **Research outputs**

### **Measuring, characterizing, and analyzing the free web games ecosystem**

Qayyum, H., Ikram, M., Kaafar, D. & Tyson, G., 2 Apr 2024, (E-pub ahead of print) In: IEEE Transactions on Games.

### **Use of cryptography in malware obfuscation**

Asghar, H. J., Zhao, B. Z. H., Ikram, M., Nguyen, G., Kaafar, D., Lamont, S. & Coscia, D., Mar 2024, In: Journal of Computer Virology and Hacking Techniques. 20, 1, p. 135-152 18 p.

### **Towards automatic annotation and detection of fake news**

Akhtar, M. M., Karunanayake, I., Sharma, B., Masood, R., Ikram, M. & Kanhere, S. S., 21 Jul 2023, (Accepted/In press) *The 48th IEEE Conference on Local Computer Networks (LCN)*.

### **A longitudinal study of the top 1% toxic Twitter profiles**

Qayyum, H., Zi Hao Zhao, B., Wood, I. D., Ikram, M., Kaafar, M. A. & Kourtellis, N., 2023, *WebSci '23: proceedings of the 15th ACM Web Science Conference 2023*. New York: Association for Computing Machinery (ACM), p. 292-303 12 p.

### **An empirical analysis of security and privacy risks in android cryptocurrency wallet apps**

Ikram, M., Kaafar, D. & Sentana, I. W. B., 2023, *Applied cryptography and network security: 21st International Conference, ACNS 2023, Kyoto, Japan, June 19–22, 2023, proceedings, part II*. Tibouchi, M. & Wang, X. (eds.). Cham: Springer, Springer Nature, p. 699-725 27 p. (Lecture Notes in Computer Science; vol. 13906).

### **Discussion submission to the 2023-2030 Australian Cyber Security Strategy**

Macquarie University Cyber Security Hub, Kaafar, D., Selvadurai, N., Abedin, B., Vatsalan, D., Asghar, H., Ikram, M., Zhao, B. & Chen, M., 2023, 13 p.

### **Exploring the distinctive tweeting patterns of toxic twitter users**

Qayyum, H., Ikram, M., Zhao, B. Z. H., Wood, I. D., Kourtellis, N. & Kaafar, M. A., 2023, *2023 IEEE International Conference on Big Data: proceedings*. He, J., Palpanas, T., Hu, X., Cuzzocrea, A., Dou, D., Slezak, D., Wang, W., Gruca, A., Lin, J. C-W. & Agrawal, R. (eds.). Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), p. 3624-3633 10 p.

### **On mission Twitter profiles: a study of selective toxic behavior**

Qayyum, H., Ikram, M., Zhao, B. Z. H., Wood, I. D., Kourtellis, N. & Kaafar, M. A., 2023, *2023 IEEE International Conference on Big Data: proceedings*. He, J., Palpanas, T., Hu, X., Cuzzocrea, A., Dou, D., Slezak, D., Wang, W., Gruca, A., Lin, J. C-W. & Agrawal, R. (eds.). Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), p. 3634-3643 10 p.

### **Privacy threats during a pandemic: a Twitter case study**

Sharma, B., Karunanayake, I., Masood, R. & Ikram, M., 5 Oct 2022, (Submitted). 7 p.

### **SoK: use of cryptography in malware obfuscation**

Asghar, H., Zhao, B., Ikram, M., Nguyen, D. L. G., Kaafar, D., Lamont, S. & Coscia, D., 31 Aug 2022, (Submitted).

**You install, they misbehave! Auditing and attributing suspicious behaviours of Android health applications**

Sentana, I. W. B., Nguyen, D. L. G., Qayyum, H., Salman, S., Ikram, M. & Kaafar, D., 29 Aug 2022, (Submitted). 11 p.

**Don't be a victim during pandemic! Analysing user perceptions and exposure to suspicious online content**

Sharma, B., Karunanayake, I., Masood, R. & Ikram, M., 24 Aug 2022, (Submitted) p. 1-10. 10 p.

**Machine learning-based automatic annotation and detection of COVID-19 fake news**

Akhtar, M. M., Sharma, B., Karunanayake, I., Masood, R., Ikram, M. & Kanhere, S. S., 14 Aug 2022, (Submitted). 9 p.

**A deep dive into the consistently toxic 1% of Twitter**

Qayyum, H., Zhao, B. Z. H., Wood, I. D., Ikram, M., Kaafar, M. A. & Kourtellis, N., 16 Apr 2022, (Submitted) 16 p. (arXiv).

**5G-enabled pseudonymity for cooperative intelligent transportation system**

Basta, N., Ding, M., Ikram, M. & Kaafar, D., 20 Mar 2022, (Submitted) IEEE Vehicular Technology Magazine, p. 1-8 8 p.

**A study of third-party resources loading on web**

Ikram, M., Masood, R., Tyson, G., Kaafar, M. A. & Ensafi, R., 7 Mar 2022, (Submitted).

**Analysing security and privacy threats in the lockdown periods of COVID-19 pandemic: Twitter dataset case study**

Sharma, B., Karunanayake, I., Masood, R. & Ikram, M., 21 Feb 2022, (Submitted) In: Computers and Security. p. 1-23 23 p.

**A First look at Android Apps' third-party resources loading**

Qayyum, H., Salman, M., Nguyen, D. L. G., Sentana, I. W. B., Ikram, M., Tyson, G. & Kaafar, M. A., 2022, *Network and System Security: 16th International Conference, NSS 2022, Denarau Island, Fiji, December 9–12, 2022. Proceedings.* Yuan, X., Bai, G., Alcaraz, C. & Majumdar, S. (eds.). Cham: Springer, Springer Nature, p. 193-213 21 p. (Lecture Notes in Computer Science; vol. 13787).

**An empirical assessment of security and privacy risks of web-based chatbots**

Waheed, N., Ikram, M., Hashmi, S. S., He, X. & Nanda, P., 2022, *Web Information Systems Engineering – WISE 2022: 23rd International Conference, Biarritz, France, November 1-3, 2022 : proceedings.* Chbeir, R., Huang, H., Silvestri, F., Manolopoulos, Y., Zhang, Y. & Zhang, Y. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 325-339 15 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 13724 LNCS).

**The Liability of Telecommunications Carriers and Service Providers for Harmful User-Generated Content, White Paper, 2022**

Selvadurai, N., Ikram, M. & Gacutan, J., 2022, 15 p.

**Towards a zero-trust micro-segmentation network security strategy: an evaluation framework**

Basta, N., Ikram, M., Kaafar, M. A. & Walker, A., 2022, *Proceedings of the IEEE/IFIP Network Operations and Management Symposium 2022: network and service management in the era of cloudification, softwarization and artificial intelligence.* Varga, P., Granville, L. Z., Galis, A., Godor, I., Limam, N., Chemouil, P., François, J. & Pahl, M-O. (eds.). Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), 7 p.

**Analyzing security issues of android mobile health and medical applications**

Tangari, G., Ikram, M., Sentana, I. W. B., Ijaz, K., Kaafar, M. A. & Berkovsky, S., Oct 2021, In: Journal of the American Medical Informatics Association : JAMIA. 28, 10, p. 2074-2084 11 p.

**Security and privacy in IoT using machine learning and blockchain: threats and countermeasures**

Waheed, N., He, X., Ikram, M., Usman, M., Hashmi, S. S. & Usman, M., Feb 2021, In: ACM Computing Surveys. 53, 6, p. 1-37 37 p., 122.

**BlockJack: towards improved prevention of IP prefix hijacking attacks in inter-domain routing via Blockchain**

Sentana, I. W. B., Ikram, M. & Ali Kaafar, M., 2021, *Proceedings of the 18th International Conference on Security and Cryptography, SECRYPT 2021.* di Vimercati, S. D. C. & Samarati, P. (eds.). Setúbal, Portugal: SciTePress, p. 674-679 6

p. (Proceedings of the International Conference on Security and Cryptography; no. 18).

**Empirical security and privacy analysis of mobile symptom checking apps on Google Play**

Sentana, I. W. B., Ikram, M., Kaafar, M. A. & Berkovsky, S., 2021, *Proceedings of the 18th International Conference on Security and Cryptography, SECRYPT 2021*. di Vimercati, S. D. C. & Samarati, P. (eds.). Setúbal, Portugal: SciTePress, p. 665-673 9 p. (Proceedings of the International Conference on Security and Cryptography; no. 18).

**Mobile health and privacy: cross sectional study**

Tangari, G., Ikram, M., Ijaz, K., Kaafar, M. A. & Berkovsky, S., 2021, In: *The BMJ*. 373, p. 1-12 12 p., n1248.

**Measuring and analysing the chain of implicit trust: a study of third-party resources loading**

Ikram, M., Masood, R., Tyson, G., Kaafar, M. A., Loizon, N. & Ensafi, R., Apr 2020, In: *ACM Transactions on Privacy and Security (TOPS)*. 23, 2, p. 1-27 27 p., 8.

**BlockJack: Blocking IP prefix hijacker in inter-domain routing**

Sentana, I. W. B., Ikram, M. & Kaafar, M. A., 2020, *CoNEXT Student Workshop 2020 - Proceedings of the 2020 Student Workshop, Part of CoNEXT 2020*. New York, NY: Association for Computing Machinery, Inc, p. 1-2 2 p. (CoNEXT Student Workshop 2020 - Proceedings of the 2020 Student Workshop, Part of CoNEXT 2020).

**Decentralized control: a case study of Russia**

Ramesh, R., Raman, R. S., Bernhard, M., Ongkowijaya, V., Evdokimov, L., Edmundson, A., Sprecher, S., Ikram, M. & Ensafi, R., 2020, *Proceedings, 2020 Network and Distributed System Security Symposium*. Reston, VA: Internet Society, p. 1-18 18 p.

**iOS, your OS, everybody's OS: vetting and analyzing network services of iOS applications**

Tang, Z., Tang, K., Xue, M., Tian, Y., Chen, S., Ikram, M., Wang, T. & Zhu, H., 2020, *Proceedings of the 29th USENIX Security Symposium*. Berkeley, CA: USENIX Association, p. 2415-2432 18 p.

**A decade of mal-activity reporting: a retrospective analysis of Internet malicious activity blacklists**

Zhao, B. Z. H., Ikram, M., Asghar, H. J., Kaafar, M. A., Chaabane, A. & Thilakarathna, K., Jul 2019, *Proceedings of the 2019 ACM Asia Computer Communication and Security (AsiaCCS)*. New York: Association for Computing Machinery (ACM), p. 193-205 13 p.

**A cartography of web tracking using DNS records**

Su, J., Li, Z., Grumbach, S., Ikram, M., Salamatian, K. & Xie, G., 15 Jan 2019, In: *Computer Communications*. 134, p. 83-95 13 p.

**A longitudinal analysis of online ad-blocking blacklists**

Hashmi, S. S., Ikram, M. & Kaafar, M. A., 2019, *Proceedings - 2019 IEEE 44th Local Computer Networks Symposium on Emerging Topics in Networking, LCN Symposium 2019*. Andersson, K., Tan, H-P. & Oteafy, S. (eds.). Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), p. 158-165 8 p. (Proceedings - 2019 IEEE 44th Local Computer Networks Symposium on Emerging Topics in Networking, LCN Symposium 2019).

**DaDiDroid: an obfuscation resilient tool for detecting Android malware via weighted directed call graph modelling**

Ikram, M., Beaume, P. & Kaafar, M. A., 2019, *Proceedings of the 16th International Joint Conference on e-Business and Telecommunications: Volume 2: SECRYPT*. Obaidat, M. S. & Samarati, P. (eds.). Setúbal: SciTePress, Vol. 2. p. 211-219 9 p.

**On optimization of ad-blocking lists for mobile devices**

Hashmi, S. S., Ikram, M. & Smith, S., 2019, *Proceedings of the 16th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services*. New York: Association for Computing Machinery (ACM), p. 220-227 8 p. (ACM International Conference Proceeding Series).

**The chain of implicit trust: an analysis of the Web third-party resources loading**

Ikram, M., Masood, R., Tyson, G., Kaafar, M. A., Loizon, N. & Ensafi, R., 2019, *Proceeding WWW '19 The World Wide Web Conference*. New York: Association for Computing Machinery (ACM), p. 2851-2857 7 p.

#### **Incognito: a method for obfuscating Web data**

Masood, R., Vatsalan, D., Ikram, M. & Kaafar, M. A., 2018, *The Web Conference 2018 - Proceedings of the World Wide Web Conference, WWW 2018*. Switzerland: Association for Computing Machinery (ACM), p. 267-276 10 p. (The Web Conference 2018 - Proceedings of the World Wide Web Conference, WWW 2018).

#### **Web tracking cartography with DNS records**

Su, J., Li, Z., Grumbach, S., Ikram, M., Salamatian, K. & Xie, G., 2018, *IEEE 37th International Performance Computing and Communications Conference (IPCCC)*. Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), p. 1-8 8 p.

#### **A first look at mobile Ad-Blocking apps**

Ikram, M. & Kaafar, M. A., 8 Dec 2017, *2017 IEEE 16th International Symposium on Network Computing and Applications: NCA 2017*. Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), p. 1-8 8 p.

#### **Towards seamless tracking-free web: Improved detection of trackers via one-class learning**

Ikram, M., Asghar, H. J., Kaafar, M. A., Mahanti, A. & Krishnamurthy, B., 2017, In: *Proceedings on Privacy Enhancing Technologies*. 2017, 1, p. 79-99 21 p.

#### **Characterizing seller-driven black-hat marketplaces**

Farooqi, S., Ikram, M., Irfan, G., De Cristofaro, E., Friedman, A., Jourjon, G., Kaafar, M. A., Shafiq, M. Z. & Zaffar, F., 7 May 2015, (Submitted) In: *arXiv e-prints*. 1505.01637.

#### **Combating fraud in online social networks: detecting stealthy Facebook like farms**

Ikram, M., Onwuzurike, L., Farooqi, S., De Cristofaro, E., Friedman, A., Jourjon, G., Kaafar, M. A. & Shafiq, M. Z., 2015, (Submitted) In: *arXiv e-prints*. 13 p., 1506.00506.

#### **Power efficient clustering for wireless multimedia sensor network**

Jo, S-K., Ikram, M., Jung, I., Ryu, W. & Kim, J., 2014, In: *International Journal of Distributed Sensor Networks*. 10, 4, p. 1-9 9 p., 148595.

#### **Power-driven image compression in wireless sensor networks**

Jo, S., Ikram, M., Jung, I., Ryu, W. & Kim, J., 2013, In: *Advanced science and technology letters*. 42, p. 28-33 6 p.

#### **Service overlays**

Panitzek, K., Ikram, M. & Stein, M., 2013, *Benchmarking peer-to-peer systems: understanding quality of service in large-scale distributed systems*. Effelsberg, W., Steinmetz, R. & Strufe, T. (eds.). Berlin: Springer, p. 113-140 28 p. (Lecture Notes in Computer Science; vol. 7847).

#### **Smooth resilient service provision in large heterogeneous networks**

Panitzek, K., Ikram, M., Mühlhäuser, M. & Strufe, T., 2012, In: *PIK-Praxis der Informationsverarbeitung und Kommunikation*. 35, 3, p. 167-173 7 p.

#### **A simple lightweight authentic bootstrapping protocol for IPv6-based low rate wireless personal area networks (6LoWPANs)**

Ikram, M., Chowdhury, A. H., Zafar, B., Cha, H-S., Kim, K-H., Yoo, S-W. & Kim, D-K., 2009, *Proceedings of the 2009 International Conference on Wireless Communications and Mobile Computing: Connecting the World Wirelessly*. New York: Association for Computing Machinery (ACM), p. 937-941 5 p.

#### **On improved relay nodes placement in two-tiered wireless sensor networks**

Zafar, B., Mir, Z. H., Shams, S. M. S., Ikram, M., Baig, W. A., Kim, K-H. & Yoo, S-W., 2009, *MILCOM 2009-2009 IEEE Military Communications Conference*. Institute of Electrical and Electronics Engineers (IEEE), p. 1-7 7 p. 901180

#### **Route-over vs mesh-under routing in 6LoWPAN**

Chowdhury, A. H., Ikram, M., Cha, H-S., Redwan, H., Shams, S. M. S., Kim, K-H. & Yoo, S-W., 2009, *Proceedings of the 2009 international conference on wireless communications and mobile computing: connecting the world wirelessly*. New

York: Association for Computing Machinery (ACM), p. 1208-1212 5 p.

Survey of indexing schemes for information retrieval on flash memory based wireless sensor networks  
Redwan, H., Chowdhury, M. A. H., Ikram, M. & Kim, K-H., 2009, *Proceedings of the 2009 conference on Information Science, Technology and Applications: ISTA '09*. New York: Association for Computing Machinery (ACM), p. 14-21 8 p.

(VVOF) velocity vector-based opportunistic forwarding in vehicular sensor network  
Yu, D., Ikram, M. & Ko, Y-B., 2009, *2009 9th International Symposium on Communications and Information Technology*. Institute of Electrical and Electronics Engineers (IEEE), p. 627-628 2 p.

A lightweight mutual authentication scheme for mobile radio frequency identification (mRFID) systems  
Ikram, M., Chowdhury, M. A. H., Redwan, H., Koh, J-B., Kim, K-H. & Kim, D-K., 2008, *2008 IEEE International Performance, Computing and Communications Conference*. Institute of Electrical and Electronics Engineers (IEEE), p. 289-296 8 p.

Secure and survivable group communication over MANET using CRTDH based on a virtual subnet model  
Chowdhury, M. A. H., Ikram, M. & Kim, K-H., 2008, *2008 IEEE Asia-Pacific Services Computing Conference*. Institute of Electrical and Electronics Engineers (IEEE), p. 638-643 6 p.

## Projects

### **MQCSH: Macquarie University Cyber Security Hub**

Kaafar, D., Selvadurai, N., Wiggins, M., Sheedy, E., Asghar, H., Ikram, M., Shevchenko, P., Berkovsky, S., Bayl-Smith, P., Zhang, X., Yang, J., Modabber, S. & Goldbarsht, D.  
2/12/16 → ...

### **MISC\_University of Michigan: Server-Side Blocking: Watching provider discrimination**

Ikram, M.  
1/07/18 → 31/12/19

### **The obligation of telecommunications service providers to provide 'clean pipes'**

De Vos, M., Selvadurai, N. & Ikram, M.  
1/06/20 → 30/09/22