

Dr. Mohammad Aljaafreh

(PhD, P.Eng)

Contact Information

- **Phone Numbers:** 819-329-2323 (Canada)
- **Emails:** Jaafreh@uOttawa.ca, m.aljaafreh@psut.edu.jo
- **Address:** 300 Lett Street, Ottawa, ON, K1R 0B8, Canada

Summary of Qualifications

- **Experience:** Over 12 years of academic experience as a professor, lecturer, and teaching assistant at Princess Sumaya University for Technology, the University of Ottawa, and the University of Doha. Industrial experience includes roles as a senior networks engineer at Quadra Systems Corporation, GJU's Systems Information and Technology Centre, and DND Government of Canada.
- **Languages:** Fluent in English and Arabic, with passive knowledge of French.
- **Achievements:** Developed and taught courses based on *ABET standards* and adhering to *CEAB standards*, ensuring program accreditation for engineering students and providing a solid foundation in electrical and computer engineering. Graduated with honors and high GPAs. Published research in prestigious international journals and conferences. Served as TPC and conference session chair and received multiple awards for academic and research excellence.
- **Professional Certificates:** EIT (PEO), CCNP, CCSP, CCNA-S, CCNA-Instructor, CCNA, CSSP, and ACMA.
- **Soft Skills:** Excellent communication, analytical, critical thinking, advisory, and teaching skills. Strong technical problem-solving and teamwork capabilities.

Educational Background

- **Ph.D. in Electrical and Computer Engineering** - University of Ottawa, Canada (2021), CGPA: 10/10 (A+)
- **M.A.Sc in Electrical and Computer Engineering** - University of Ottawa, Canada (2013), CGPA: 9.8/10 (A+)
- **Bachelor's in Computer Engineering** - Mutah University (2008), GPA: Excellent with 1st rank among 2007-2008 fellows (summa cum laude)

Academic Experience

- **Assistant Professor** - Princess Sumaya University for Technology (Sep 2023 – Present), Amman, Jordan
- **Research Scientist** - Mohamed bin Zayed University of Artificial Intelligence, UAE (Dec 2022 - Dec 2023)
- **Adjunct Professor** - School of Electrical Engineering and Computer Science, University of Ottawa, Canada (Sep 2021 - May 2023)
- **Assistant Professor** - Data Science and Artificial Intelligence, University of Doha for Science and Technology, Qatar (May 2022 - Sep 2022)
- **Part-time Lecturer** - School of Electrical Engineering and Computer Science, University of Ottawa, Canada (May 2018 - May 2021)

Industrial Experience

- **R&D Associate** - Cybersecurity, Department of National Defense, Royal Military College, Canada (Jan 2020 - Jan 2022)
- **Network Systems Engineer** - Quadra Systems Corporations, Canada (April 2013 - August 2016)
- **Network Administrator** - German Jordanian University, Jordan (July 2008 - August 2011)
- **IT Audit Assistant** - Central Bank of Jordan, Government of Jordan (April 2008 - June 2008)

Courses Taught

- **Princess Sumaya University for Technology:**
 - Introduction to IoT (272351)
 - IoT Programming and Applications (27351)
 - VR Development of Mobile Applications (23453)
 - Object-Oriented Programming (22242)
 - Programming Applications Lab (22210)
 - Communication Networks (23553)
 - Cloud Computing in IoT (27583)
 - Block Chain in IoT (27589)
 - Cybersecurity in Smart Cities (27589)
 - Special Topics in Communications Engineering: Multimedia Communications (27582)

- **University of Ottawa:**
 - Digital Systems (ITI 110)
 - Honor Project (CSI 4900)
 - Introduction to Computing I (ITI 1120)
 - Computer Graphics (CSI 4130)
 - Computer Architecture I (CEG 2136)
 - Digital Logic Design: Principles and Practices (ELG 5195, Graduate)
 - Multimedia Communication (ELG 5121, Graduate)
 - Network Security and Forensics (ELG 6999, Graduate)
- **University of Doha for Science and Technology:**
 - Fundamentals of IoT (DAI 401)
 - Computer Hardware (INF 101)

Professional Certifications and Training

- **Cisco Certifications:** CCNP, CCSP, Cisco Firewall Security Specialist, Cisco IOS Security Specialist, Cisco IPS Specialist, Cisco ASA Specialist, Cisco VPN Security Specialist, CCNA-I, CCNA-S, CCNA.
- **Other Certifications:** Certified SonicWALL Security Administrator (CSSP), Aruba Certified Mobility Associate (ACMA), Microsoft Certified Technology Specialist (MCTS) on Microsoft Exchange Server, McAfee Secure Gateway Specialist, Microsoft Certified Systems Engineer Training course, Servers Virtualization (VMware MS-Hyper-V) Training course, Microsoft Azure and Amazon AWS.

Specialized Skills

- Proficient in programming languages such as Python, R, Perl, Java, and C++.
- Experience with TensorFlow, PyTorch, OpenCV, Altera Quartus II, MATLAB, and network simulators like NS3, Riverbed Modeler, Packet Tracer, and GNS3.
- Expertise in Machine and Deep Learning, Data Science, IoT, IoS, and Digital Twin technologies.
- Proficient in working on MS Servers, UNIX, and Linux platforms.
- Skilled in Microsoft Office Suite, Project, and Visio.
- Extensive experience in leading projects, encouraging teamwork, and persistent learning.

Awards and Honors

- Ontario Graduate Scholarship (OGS) - University of Ottawa (Fall 2018 - Spring 2019, Winter 2016 - Fall 2017)
- Excellence Scholarship - University of Ottawa (Winter 2016 - Spring 2019)
- Admission Scholarship - University of Ottawa (Fall 2014 - Winter 2016)
- Faculty of Engineering Honor Award for top undergraduate students (2004-2007)

Membership in Professional Societies

- PEO Engineering Intern (EIT) - License number: 100548716
- Former President of the Electrical Engineering Graduate Students' Association (EEGSA)
- Institute of Electrical and Electronics Engineers (IEEE) - Member since 2011
- Jordanian Universities Internet Task Force (JUNET) - Member (2008-2011)
- Jordan Engineers Association (JEA) - Member (July 2008-2011)

List of Publications

Refereed Journal Papers

- Hikmat Adhami, **Mohammad Al Ja'afreh**, Mohamed Hoda, and Abdulmotaleb El Saddik. "Suitability of SDN and MEC to Facilitate Digital Twin Communication over LTE-A." *Digital Communications and Networks*, Elsevier, 2024.
- Muath A. Obaidat, Majdi Rawashdeh, **Mohammad Alja'afreh**, Meryem Abouali, Kutub Thakur, and Ali Karime. "Exploring IoT and Blockchain: A Comprehensive Survey on Security, Integration Strategies, Applications, and Future Research Directions, 2024.
- Aftab Hussain, Adnan Akhuzada, **Mohammad Alja'afreh**, and Abdulmotaleb El Saddik. "An Attention-based ResNet Architecture for Acute Hemorrhage Detection and Classification: Toward a Health 4.0 Digital Twin Study." *IEEE Access*, 2022.
- **Ja'afreh, M. A.**, Adhami, H., Alchalabi, A. E., Hoda, M., & El Saddik, A. (2021). "Toward integrating software-defined networks with the Internet of Things: a review." *Cluster Computing*, 1-18.
- El Saddik, Abdulmotaleb, Fedwa Laamarti, and **Mohammad Alja'afreh**. "The Potential of Digital Twins." *IEEE Instrumentation & Measurement Magazine*, 24.3 (2021): 36-41.

- Alowaidi, M., **Al-Ja’afreh, M.**, Karime, A., and El Saddik, A. “A Fuzzy Markup Language-Based Approach for a Quality of Location Inference as An Environmental Health Awareness.” *International Journal of Extreme Automation and Connectivity in Healthcare (IJEACH)*, 1(2), pp.1-21, 2019.
- **Al ja’Afreh, M. A.**, Eid, M., El Saddik, A., Mahmoodi, T., Liu, Q., Liu, X., Steinbach, E., & Strese, M. “Haptic Codecs for the Tactile Internet.” *Proceedings of the IEEE*, special issue on Tactile Internet, 2018.

Refereed Book Chapters and IEEE Standards

- **Mohammad Alja’Afreh**, Mohmad Hoda, and Abdulmotaleb El Saddik. “Prediction of Complications in Spine Surgery Using Machine Learning: A Study on NSQIP beyond Logistic Regression Model.” *IET Book Medical Information Processing and Security: Techniques and Applications*, 2022.
- Adhami, Hikmat, Al Ja’afreh, **Mohammad**, and El Saddik, Abdulmotaleb. “Ontology based framework for Tactile Internet Applications.” *Smart Multimedia*, Springer Cham, 2019, pp. 81-86.
- **Al Jaafreh, M.**, Alowaidi, M., Al Osman, H., & El Saddik, A. “Multimodal Systems Experiences and Communications: A Review Toward the Tactile Internet Vision.” *Recent Trends in Computer Applications*, Springer Cham, 2018, pp. 191-220.

Refereed Conference Papers

- **Alja’afreh, M.**, Hasan, O., Al-Mallah, R., Karime, A. (2024). ”Blockchain-Driven Networking and Communications in the Metaverse.” In *2024 the Sixth International Conference on Blockchain Computing and Applications (BCCA)*, Dubai
- **Alja’afreh, M.**, Bani Ahmad, O., Karime, A. (2024). ”Enhancing Privacy and Security in Digital Twin and Metaverse Technologies: Mathematical Models, Blockchain, and Future Directions.” In *2024 the Second International Conference on Intelligent Metaverse Technologies Applications (iMETA)*, Dubai.
- **Alja’afreh, M.**, Alouneh, S., Obaidat, M., Karime, A., & Elsaddik, A. (2023). “Metaverse through blockchain and intelligent networking: A comprehensive survey.” In *2023 the Fifth International Conference on Blockchain Computing and Applications (BCCA)*, Kuwait.
- **Alja’afreh, M.**, Al Mallah, R., Karime, A., & El Saddik, A. (2023). “Cybersecurity in the metaverse: Challenges and approaches.” In *International Conference on Intelligent Metaverse Technologies & Applications (iMETA)*, Estonia.
- El Ahmar, W., Massoud, Y., Kolhatkar, D., AlGhamdi, H., **M. Alja’afreh**, Ham-moud, R., & Laganiere, R. (2023). “Enhanced Thermal-RGB Fusion for Robust Object Detection.” In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pp. 365-374.

- **Alja’Afreh, M.**, Karime, A., Alouneh, S., & El Saddik, A. (2022). “A Detailed Analysis of Qualitative and Quantitative Factors in Realization of 6G Communication.” *In 2022 9th International Conference on Internet of Things: Systems Management and Security (IOTSMS)*, IEEE, pp. 1-10.
- **Alja’Afreh, M.**, Obaidat, M., & Alouneh, S. (2022). “Incorporating MPLS for Better SoC Utilization and Traffic Engineering.” *In 2022 Seventh International Conference on Fog and Mobile Edge Computing (FMEC)*, IEEE, pp. 1-7.
- **Alja’afreh, M.**, Obaidat, M., Karime, A., & Alouneh, S. (2022). “Optimizing System-on-Chip Performance Using AI and SDN: Approaches and Challenges.” *In 2022 Ninth International Conference on Software Defined Systems (SDS)*, IEEE, pp. 1-8.
- **Mohammad Aljaafreh**, Wassim Elhamr, Mohamd Hoda, and Ali Karime. “A Review on Industrial Blockchain.” *The Fourth International Conference on Blockchain Computing and Applications*, Texas, USA, 2022.
- Ranwa Al Mallah, Talal Halabi, **Mohammad Alja’Afreh**, and Ali Karime. “Artificial Intelligence for Cybersecurity in IoT-enabled Avionics: Challenges and Solutions.” *IEEE 8th World Forum on Internet of Things*, Yokohama, Japan, 2022.
- **Mohammad Aljaafreh**, Somaya Al Maadeed, Jihad M. AlJA’AM3, and Abdulmotaleb El Saddik. “Towards a Comprehensive Study of Fatigue Deducing Techniques for Evaluating the Quality of Experience of Haptic-Visual.” *IEEE International Conference on Informatics Conference*, Doha, Qatar, 2020.
- H. Adhami, **M. Aljaafreh**, and A. El Saddik. “Ontology-based framework for Tactile Internet Applications.” *2019 International Conference on SMART MULTIMEDIA*, San-Diego, USA, Dec. 2019.
- H. Adhami, **M. Aljaafreh**, and A. El Saddik. “Can We Deploy Tactile Internet Applications over Wi-Fi 3G and WiMAX: a Comparative Study based on Riverbed Modeler.” *2019 IEEE International Symposium on Haptic Audio and Visual Environments and Games (HAVE)*, Kuala Lumpur, Malaysia, Oct. 2019.
- **M. Aljaafreh**, H. Adhami, and A. El Saddik. “Experimental QoS Optimization for Haptic Communication Over The Tactile Internet.” *2018 IEEE International Symposium on Haptic Audio and Visual Environments and Games (HAVE)*, Dalian, P.R. China, Sept. 2018.
- Majed Abdullah Alowaidi, Ali Karime, **Mohammad Al Jaafreh**, Abdulmotaleb El Saddik. “Empirical Study of Noise and Air Quality Correlation Based on IoT Sensory Platform Approach.” *IEEE International Instrumentation and Measurement Technology Conference (I2MTC)*, 2018.
- **M. A. Ja’afreh**, M. Aloqaily, I. A. Ridhawi, and N. Mostafa. “A hybrid-based 3D streaming framework for mobile devices over IoT environments.” *Third International Conference on Fog and Mobile Edge Computing (FMEC)*, Barcelona, Spain, pp. 211-216, 2018.

- **Al Jaafreh, Mohammad**, Abdelwahab Hamam, and Abdulmotaleb El Saddik. “A Framework to Analyze Fatigue for Haptic-Based Tactile Internet Applications.” *2017 IEEE International Symposium on Haptic Audio and Visual Environments and Games (HAVE)*, IEEE, 2017.
- **M. Aljaafreh**, H. Maamar, A. Boukerche. “An Efficient Object Discovery and Selection Protocol in 3D Streaming- based Systems over Smart Mobile Devices.” *Proceeding of the IEEE Wireless Communications and Networking Conference (WCNC)*, 2013.
- **M. Aljaafreh**, H. Maamar, A. Boukerche. “3D Streaming over Thin Mobile Devices: Challenges and Visions.” *Poster in NSERC-DIVA 2nd Workshop*, 2012. NSERC-DIVA

Google Scholar Profile

For a detailed list of publications, please refer to my Google Scholar profile.

References

- **Voicu Z. Groza, Ph.D.** - EECS, University of Ottawa, Professor and Chairman of Computer Engineering Program, Email: vgroza@uottawa.ca, Phone: +1613-882-2159
- **Abdulmotaleb El Saddik, Ph.D.** - Mohamed bin Zayed University of Artificial Intelligence, Professor and Acting Chair of Computer Vision and Robotics, Email: a.elsaddik@mbzuai.ac.ae, Phone: +971507422103
- **Muath Obaidat, Ph.D.** - Professor, Department of AI and Cybersecurity, University of Doha for Science and Technology, Email: mobaidat@jjay.cuny.edu, Phone: +1 201-230-4565
- **Ali Karime, Ph.D.** - Department of Electrical Engineering, Royal Military College of Canada, Email: ali.karime@rmc-cmr.ca, Phone: +613-864-2284
- **Luae ' Al-Tarawneh, Ph.D.** - Head of Communications and IoT Engineering Department, Email: l.altarawneh@psut.edu.jo, Phone: (+9626) 535 9949 Ext.5507