Dr.Mohammed Baljon

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Summary of Qualifications:

Variety experience of Academia and Technical in Electrical, Computer and Internetworking Engineering, as well as Educational and IT industries, specifically:

- Teaching university courses, electrical circuits, digital signal processing, hardware/software technical courses, Computer Fundamentals, Computer Network, Routing, Switching and Internetworking Courses.
- Highly proficient with MATLAB, Simulink, Python, Latex, Optimization Techniques, Mathematica, AI, & Machine Learning Algorithms.
- In depth knowledge and research experience on 4G and 5G wireless communication systems), Computer Networks, Big Data Analysis, theoretical analysis, and optimization.
- In depth knowledge on LTE, LTE-A, GSM, Wi–Fi, ZigBee, IoT, massive MIMO, mm-wave propagation, energy harvesting systems, wireless power transfer, machine-to-machine communications, sensor networks, machine learning.
- Robust background on formulating engineering problems, analysis, solutions, and debugging skills.
- Ability to work both independently and within a team.
- IEEE and Elsevier computer and electrical engineering journals reviewer.

Work Experience

Professor Sep 2018- Present Majmaah University, College of Computer and Information Science (CCIS), Majmaah, Saudi Arabia

- Teach Undergraduate Course: Computer Fundamentals (IT112)
- Teach Undergraduate Course: Information Technology & Fundamentals of Networks (IT250)
- Teach Undergraduate Course: Data Transmission and Computer Networks (IT341)
- Teach Undergraduate Course: CCNA Routing and Switching (IT470)
- Teach Undergraduate Course: Ethics & Professional Practices (IT481)
- Teach Undergraduate Course: Graduation Project 1/ Graduation Project 2 (IT498/IT499)

- Conduct Computer Lab, create assignments and tests, grade coursework, and assist students in these courses.
- Teach Graduate Course: Information Security Law, Policy, and Security (IT603)

Post Doctoral fellow, November 2023- October 2024, Toronto Metropolitan University, Electrical Computer Biomedical Engineering Department (ECBE), Toronto, Canada.

- Analyze user and product requirements, design and develop prediction and detection systems and algorithms
- Research, design, develop, and integrate IoT networks and communications hardware and software, such as sensors, processors, and task scheduler and resource manager
- Develop and conduct design verification simulations, benchmark tests of components and algorithms
- Assess, document, and optimize the capacity and performance of the designed IoT and sensor communication network
- Co-supervise and assist the primary investigator with graduate project and thesis, in the areas of learning techniques for anomaly detection and automated household environmental quality assessment and prediction
- Work collaboratively with other researchers in a similar research area
- Write and present reports or articles as appropriate

PTeaching Associate/ Research Assistant Jan 2013- Dec 2017 Toronto Metropolitan University (formerly Ryerson University), Toronto, Canada Taught

- undergraduate courses including:
- Electric Circuits (EES512)
- Communication Systems (ELE635) Page 2 of 5
- Digital Communication Systems (ELE745) Computer
- Networks (COE768)

- Conducted breadboard experimental setup, created assignments, graded coursework, and assisted students in these courses
- Researched wireless communication papers and formulated analytical solutions in the field, including simulation in MATLAB and publication of papers in peer journals.

My Portfolio

Education:

- **PhD**

Electrical & Computer Engineering, **Toronto Metropolitan University (formerly Ryerson University), Toronto, Canada**
Thesis: "Resource Allocation for Energy Harvesting Communication Systems over Fading Channels" 2018 • **M.Eng.**
Computer and Internetworking, **Dalhousie University, Halifax, Canada**
Thesis: "Evaluation of Multi-hop Wireless Sensor Network by using Relay Nodes" NesC software Program, and TinyOS operating System. May 2011- March 2012. • **B.Sc.**
Electrical and Computer Engineering, **King Abdul-Aziz University, Jeddah, Saudi Arabia**, **2007**
Project: "Connection Interface between Robotic System and Personal Computer" by using Lab-view software-Hardware Program, September 2006- April 2007

Research Interests

- **The PhD dissertation** investigates an emerging communications paradigm (Energy Harvesting Network), which it requires stable and efficient power control schemes like other conventional communication systems. However, it is more complicated than conventional communication networks, in that it should not only consider the quality of service requirements of the network but also adapt to the randomness of the energy arrival. Hence, several optimal offline and online resource allocation strategies for point-to-point and two-hop EH communication networks over wireless fading channels are proposed.

- **The Master thesis** investigates the importance of using multi-hop wireless communication from the Network Layer perspective in order to enhance a network data delivery rate and accomplish a scalable wireless sensor network. Particularly, wireless sensor routing protocol has been designed and implemented for multi-hop transmission as well as evaluated from reliability and quality of service perspectives.

Current research interests include:

- Machine Learning, Data Mining
- Wireless communications and distributed radio resource management
- Green communication and computation
- WLAN/Cellular Interworking, Vehicular ad hoc and Sensor Networks

My Portfolio

Awards:

- Ryerson Graduate Award, Toronto, Canada, 2012 -15
- Access to Opportunity Program, Toronto Metropolitan University (formerly Ryerson University), Toronto, Canada, 2012 -2015
- TA/RA, Toronto Metropolitan University (formerly Ryerson University), Toronto, Canada, 2012 -2018

Teaching Contribution / Innovation:

- Apply auto self-assessments to assignments and Labs involving the Network Lab Simulator, such as Packet Tracer Software.

Teaching Pedagogy:

- Among the first few to introduce **project-based learning and scale** this up to the concept of **Giving a Presentation using Teamwork skills** right from the first year of graduation in BTech.

Certifications

- Cisco Certified Network Associate Exam, CCNA. 2011.
- Participated and elected as a youth delegation in Youth Summit G20, Canada, June 2010, Leadership.
- Leadership and Communication Skills Certificate by king Abdul-Aziz University, Academic Affairs, 2007

Faculty Development Programs Conducted

- Participation in ABET workshop in Majmaah University, Majmaah, Saudi Arabia, 20-23 March 2019
- Participation in LEAP Tech Conference, Riyadh, Saudi Arabia, 01-03 February 2022 and 06- 09 February 2023

Non-Academic Associations and Activities

- Head of the Department of Computer Engineering, College of Computer and Information Sciences, Majmaah University, Kingdom of Saudi Arabia, August 2019-September 2021.
- Introducing and Member of Quality and Accreditation Unit
- Organizing the scientific conference of IEEE INFOCOM, Toronto, Canada, 2014.

MTech Dissertation and BTech Project Supervision

- Majmaah University, Majmaah
  BTech Projects Supervised: 14

Current Membership in Professional Organizations:

1. IEEE (Since 2012)
2. ACM (Since 2009)
3. Saudi Computer Society (Since 2000)

Technical and Computer Skills:

- **Research**: Machine Learning, Big Data Analytics, Green Wireless Communication, Digital Communication, Wireless Network, Optimization Theory
- **Wireline Routing Protocols:** TCP/IP, RIP, OSPF, I-EI/BGP
- **Wireless Physical Layer Technique:** Multiplexing (FDMA, TDMA, CDMA), Field Spreading (FHSS, DSSS)
- **Wireless MAC Layer Protocol:** Contention- ALOHA, Reservation, CSMA/CA, Polling
  Wireless Network Routing Protocol: MANET, AODV, LEACH
- **Others:** Network Administration, LAN and WAN design
- Strong technical analysis and troubleshooting capabilities in: CCNA, TCP/IP,
- CISCO Routers and Switches, Wireless LAN, 802.11, VSAT, Satellite modems, VOIP Gateways
- Highly proficient with MATLAB Profiler, Simulink, Python, Latex, Optimization Techniques, Mathematica, AI, & Machine Learning Algorithms.
- Robust background on formulating engineering problems, analysis, solutions, and debugging skills

Undergraduate Courses Teaching:

- IT 112: Computer Fundamentals
- IT211: Machine Learning
- IT 250: Information Technology & Fundamentals of Networks
- IT 341: Data Transmission and Computer Networks
- IT 470: CCNA Routing and Switching
- IT 481: Ethics & Professional Practices
- IT498/IT499: Graduation Project 1 & 2
- EES512: Electric Circuits ELE635: Communication Systems
- EES745: Digital Communication Systems
- COE768: Computer Networks
- CS471: Big Data Analysis

Sponsored Projects and Grants

Received grant for the Institutional Finance Program in water and agriculture sustainability under Computer and information sciences research theme activities with two research proposals that are titled by “Improving Smart Agriculture with

IOT-based using Wireless Sensor Networks in Saudi Arabia” and “Rainfall Prediction Rate in Saudi Arabia Using Improved Machine Learning Techniques”. **Majmaah University, Majmaah, Saudi Arabia October 2020 – Dec 2021**

List of Publications:

- Mohammed Baljon, "**Machine learning applications in improving smart farms using agricultural data sets**", prepared for publication in approved journal. **(Journal Paper).**
- "**Novel distance-fitness learning scheme for ameliorating metaheuristic optimization", https://doi.org/10.1016/j.jestch.2025.102053**
- "**Reconfigured single- and double-diode models for improved modelling of solar cells/modules", https://doi.org/10.1038/s41598-025-86063-2**
- Mohammed Baljon, "**Stomach Disorder Detection and Analysis using Hybrid Learning Vector Quantization with African Buffalo Optimization Algorithm", https://doi.org/10.33889/ijmems.2024.9.1.005**
- Mohammed Baljon, Sunil Sharma, **"Rainfall Prediction Rate in Saudi Arabia Using Improved Machine Learning Techniques**", MDPI, Water, Vol. 15, No. 4, pp. 826-848, Feb 2023. **https://doi.org/10.3390/w15040826**
- Sharad Saxena, Shailendra Mishra, Mohammed Baljon, Shamiksha Mishra, Sunil Kumar Sharma, Prakhar Goel, Shubham Gupta, Vinay Kishore, "**IoT-Based Women Safety Gadgets (WSG): Vision, Architecture, and Design Trends", https://doi.org/10.32604/cmc.2023.039677**
- Asmita Yadav, Mohammed Baljon, Shailendra Mishra, Sandeep Kumar Singh, Sharad Saxena, Sunil Kumar Sharma, "**Developer load balancing bug triage: Developed load balance**", Expert System, e13006, May 2022. **https://doi.org/10.1111/exsy.13006**
- Amit Verma, Mohammed Baljon, Shailendra Mishra, Iqbaldeep Kaur, Ritika Saini, Sharad Saxena and Sanjay Kumar Sharma, "**Secure Rotation Invariant Face Detection System" for Authentication**." Computers, Materials & Continua, vol. 70, no.1, pp. 1955–1974, 2022. **https://doi.org/10.32604/cmc.2022.020084**
- M. Baljon, and S. Mishra, "**Cross-Layer Design for EH Systems with Finite Buffer Constraints**", CMC-Computers, Materials & Continua, Vol. 69, No. 1, pp. 129-144, June 2021. **https://doi.org/10.32604/cmc.2021.017509**
- M. Baljon, M. S. Li, H. B. Liang, and L. Zhao, "**SMDP-based resource allocation for wireless networks with energy harvesting constraints**", IEEE VTC Fall, September 2017, Toronto, Canada. **https://doi.org/10.1109/vtcfall.2017.8288138**
- M. Baljon and L. Zhao, "**Resource allocation for wireless networks with energy harvesting constraints over fading channels**", Journal Issue on Information and Communication Technology, Vol. 2, No. 1, pp9-19, August 2016. **https://doi.org/10.31130/jst.2016.20**

- M. Baljon, and L.Zhao, "**Resource Allocation for Two-hop Communication with Energy Harvesting Constraints**", IEEE Conference on Wireless Communications and Signal Processing (WCSP), October, 2015, Nanjing, China. **https://doi.org/10.1109/wcsp.2015.7341142**