



PROF. KHALID A. DARABKH' VITAE

Mailing Address:

Computer Engineering Department,
School of Engineering,
The University of Jordan,
Amman 11942,
Jordan.

Contact Information:

Office Phone: +962-6-535-5000 Ext. 23012,
Cell Phone: +962-79-6969219,
Email: k.darabkeh@ju.edu.jo.

Background (Short bio):

Received the B.Sc. degree in Computer Engineering from Yarmouk University in 2002 with honors. During the training term, which was a BSc curriculum requirement at Yarmouk University, he was honored by both the Computer and Communication Systems Co. and Yarmouk University as of being the first trainee who not only got employed during the training term, but also started training its technical staff (engineers and technicians). He received the M.S.E. degree in Electrical and Computer Engineering from New York Institute of Technology, USA, in 2003 with distinction. Due to obtaining the University of Jordan Scholarship, he received the PhD degree in Computer Engineering from the University of Alabama in Huntsville (UAH), USA, in 2007 with honors. He was selected for inclusion in the Who's Who Among Students in American Universities and Colleges. He was honored by UAH for being not only so outstanding, but also finishing the PhD requirements along with publishing a massive number of reputable scientific articles in record time. He has joined the Computer Engineering Department at the University of Jordan as an Assistant Professor since 2007 and promoted exceptionally for professorship in 2016. He authored and co-authored of at least two hundred highly esteemed research articles. He is among World's Top 2% Scientists List, for various disciplines, compiled by Stanford University in 2020, 2021 and 2022. Prof. Darabkh is the recipient of the Distinguished Researcher Award of the scientific faculties/schools at the University of Jordan for his distinctive research quality and quantity during the period 2018-2022. Prof. Darabkh is the recipient of 2020 Federation of Arab Scientific Research Councils Reward – Theme of Invention and Innovation. Prof. Darabkh is the recipient of Ali Mango

Distinguished Researcher Award for Scientific Colleges and Research Centers in Jordan for his distinctive research quality and quantity during the period 2012-2016. He is further the recipient of the Most Cited Researchers Award at the University of Jordan at Scopus during 2017-2021. He is among Top 5 JU Researcher's List who published the highest number of quality manuscripts in Scopus. He was honored by the Jordanian Engineers Association, Abdul Hameed Shoman Foundation, as well as the University of Jordan repeatedly for research excellence (prolific quality of research) and its global impact which got reflected on the reputation and international rankings of the University of Jordan. Prof. Darabkh serves on the Editorial Board of Telecommunication Systems, published by Springer, Computer Applications in Engineering Education, published by John Wiley & Sons, and Journal of High Speed Networks, published by IOS Press. Moreover, he is a member of many professional and honorary societies, including Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi, and Sigma Xi. He was listed among those of IBC Leading Scientists of the World, Cambridge, England as well as IBC 2000 Outstanding Scientists, Cambridge, England. He was selected for inclusion in the Marquis Who's Who in Science and Engineering and Marquis Who's Who in the World. He was further selected for inclusion in the Who's Who in Engineering Higher Education. Additionally, he serves as a TPC member of highly reputable IEEE conferences such as GLOBECOM, ICC, LCN, VTC-Fall, PIMRC, ISWCS, ATC, ICT, and IAEAC. Not only to this extent, but rather he is Sun Certified Programmer for Java Platform (SCJP), Oracle Database Administrator Certified Associate (OCA), as well as Oracle Java Developer Certified Trainer (OJDC-T). He was the first certified trainer in Jordan for OJD track.

In June 2022, the Royal Decree was issued appointing him to the Board of Trustees of Tafila Technical University. In October 2022, Dr. Darabkh was appointed to the Board of Directors of the Scientific Research and Innovation Fund at the Ministry of Higher Education and Scientific Research, as well as appointed to the Higher Academic Committee of the Scientific Research and Innovation Fund at the Ministry of Higher Education and Scientific Research. In February 2023, Dr. Darabkh was appointed to the Advisory Board of the US-Jordanian Universities Cooperation Network (UCN, Rawabet Network). Dr. Darabkh was elected the Chairman of the Business Development and Investment Committee at the Board of Trustees of Tafila Technical University. He was also appointed the Chairman of many specialized committees at the Higher Education Accreditation and Quality Assurance Commission in Jordan. He was also elected on the Board of Directors of the Investment Fund at Tafila Technical University and the Academic Committee of the Board of Trustees of Tafila Technical University. He has been selected on the Permanent Committee for Investment Opportunities at the University of Jordan since 2021. He has also been nominated by the University of Jordan as a representative in the Council

of Ethics of Scientific Research at Princess Sumaya University for Technology since 2018. Due to his high academic and research reputation, Dr. Darabkh was appointed to the evaluation committee of the Abdul Hameed Shoman Prestigious and Distinguished Award for Arab Researchers in the Communications and Wireless Networks Sector for the year 2020. He supervised/co-supervised and examined at least 100 masters' theses in most of Jordanian universities. As administrative experience at the University of Jordan, he served as Assistant Dean for Computer Affairs in the College of Engineering from Sept 2008 to Sept 2010. Additionally, he served as Acting Head of the Computer Engineering Department from June 2010 to Sept 2012. At the end, he is engaged in research mainly on Internet of things, Software-defined networks, vehicular networks, flying ad-hoc networks, Fog networking, Full duplex cognitive radio networks, queuing systems and networks, multimedia transmission, channel coding, steganography and watermarking, as well as innovative and interactive learning environments.

Personal Information:

- Name: Khalid A. Darabkh
- Date of Birth: August 31, 1978
- Nationality: Jordanian
- Marital Status: Married with four children

**EDUCATION
(DEGREES):**

Sept. 2004–Feb. 2007 The University of Alabama in Huntsville AL, USA

- **Ph.D.** in Computer Engineering (with honors)

Dissertation Title:

Improving TCP and UDP Performance over Wireless Networks Using Quality of Delivery (QoD) Aware Wireless Systems

Jan. 2003–Dec. 2003 New York Institute of Technology NY, USA

- **M.S.E.** in Electrical and Computer Engineering (with honors)

Oct. 1996–Feb. 2002 Yarmouk University Irbid, Jordan

- **B.Sc.** in Computer Engineering (with honors)

**PROFESSIONAL
CERTIFICATIONS:**

- Sun Certified Programmer for Java Platform (SCJP), Sun Microsystems Co, USA.
- Oracle Database Administrator Certified Associate (OCA), Oracle Co, USA.
- Oracle Java Developer Certified Trainer (OJDC-T), Oracle Co, USA.

**INSTITUTE and INDUSTRY
EXPERIENCE:**

June 2016–Present The University of Jordan Amman, Jordan

- **Professor in the Computer Engineering Department (Exceptional Promotion)**

- June 2012–May 2016 The University of Jordan Amman, Jordan
- **Associate professor in the Computer Engineering Department**
- May 2007– May 2012 The University of Jordan Amman, Jordan
- **Assistant professor in the Computer Engineering Department**
- June 2010–Sept. 2012 The University of Jordan Amman, Jordan
Summer Terms: 2008 & 2009
- **Acting Chair of the Computer Engineering Department**
- Sept. 2008–Sept. 2010 The University of Jordan Amman, Jordan
- **Assistant Dean of Engineering and Technology for Computer Affairs**
- Sept. 2003-Aug. 2004 The University of Jordan Amman, Jordan
- **Teaching Assistant**
- Jan. 2000–Aug. 2003 Computer and Communication Systems Co. Amman, Jordan
- **Software Training Engineer**

**Awards,
Distinctions,
Appointments, and
Nominations**

- In June 2022, he was appointed by royal decree in the Board of Trustees of Tafila Technical University for a period of 4 years.
- Recipient of the Distinguished Researcher Award of the scientific faculties/schools at the University of Jordan for his distinctive research quality and quantity during the period 2018-2022.
- Recipient of the Most Cited Researchers Award at the University of Jordan at Scopus during 2017-2021.
- Recipient of 2020 Federation of Arab Scientific Research Councils Reward – Theme of Innovation.
- Recipient of Ali Mango Distinguished Researcher Award for Scientific Colleges and Research Centers in Jordan for his distinctive research quality and quantity during the period 2012-2016.
- Listed among World’s Top 2% Scientists, for various disciplines, compiled by the prestigious Stanford University in 2020, 2021, and 2022.
- Appointed to the Board of Directors of the Scientific Research and Innovation Fund at the Ministry of Higher Education and Scientific Research in Jordan for a period of two years, starting from October 2022.
- Appointed to the Advisory Board of the US-Jordanian Universities Cooperation Network (UCN, Rawabet Network) in February 2023.
- Appointed to the Higher Academic Committee of the Scientific Research and Innovation Fund at the Ministry of Higher Education and Scientific Research in Jordan for a period of two years, starting from October 2022.
- Nominated by the University of Jordan as a representative in the Council of

Ethics of Scientific Research at Princess Sumaya University for Technology since 2018.

- Appointed the Chairman of the Committee for the Development of Knowledge Fields for the Specialization of Electrical Engineering / Smart Systems Engineering and Communications / Bachelor's Program at the Higher Education Accreditation and Quality Assurance Commission in Jordan, 2022.
- Appointed to the evaluation committee of the Abdul Hameed Shoman Prestigious and Distinguished Award for Arab Researchers in the Communications and Wireless Networks Sector for the year 2020.
- Appointed the Chairman of the Committee for the Development of Knowledge Fields for the Specialization of Electrical Engineering / Internet of Things / Bachelor's Program at the Higher Education Accreditation and Quality Assurance Commission in Jordan, 2022.
- Appointed the Chairman of the Committee for evaluating the Application of Special Accreditation for the Major (Computer Engineering / Master's Program) at Yarmouk University at the Higher Education Accreditation and Quality Assurance Commission in Jordan, 2023.
- Appointed the Chairman of the Committee for the follow-up and verification of the special accreditation for the Computer Engineering and Computer Network Engineering and Security majors/Bachelor's Programs and Master's Programs at the University of Science and Technology at the Higher Education Accreditation and Quality Assurance Commission in Jordan, 2023.
- Appointed the Chairman and member of many committees for evaluating the applications of special accreditation and raise the intake capacity of many disciplines for bachelor's programs and merge some disciplines in Jordanian public and private universities at the Higher Education Accreditation and Quality Assurance Commission in Jordan.
- Honored by the University of Jordan for distinctive research contributions and their significant impacts over the globe and on stepping its rank universally 2019, 2020 and 2021.
- Honored by the Jordan Engineers Association for distinctive research contributions and their significant impacts over the globe, 2020.
- Honored by the University of Jordan as of being the researcher who published the highest number of quality manuscripts in Scopus during 2018.
- Listed among Top 5 JU Researchers who published the highest number of quality manuscripts in Scopus.
- Appointed to the Computer Engineering Recruitment Examination Committee at Jordanian Civil Service Bureau, since 2010.
- Academic Excellence and Outstanding Research Awards in Computer Engineering, Department of Electrical and Computer Engineering, The

University of Alabama in Huntsville.

- School of Graduate Studies Dean's List, Academic Years 2005, 2006, and 2007, The University of Alabama in Huntsville.
- Graduate Teaching Assistant, University of Alabama in Huntsville.
- The University of Jordan Scholarship to pursue PhD degree in University of Alabama in Huntsville.
- Honored by both the Computer and Compunctions Systems Co. and Yarmouk University as of being the first trainee who not only got employed during the training term, but also started training its technical staff (engineers and technicians).

**Honor societies
And recognitions:**

- Member of the following national honorary societies:
 - **Eta Kappa Nu**: National Electrical and Computer Engineering Honor Society.
 - **Tau Beta Pi**: National Engineering Honor Society.
 - **Phi Kappa Phi**: National University Honor Society.
 - **Sigma Xi**: National Scientific Research Honor Society.
 - **The National Scholars Honor Society**.
- Was recognized for the inclusion in the following:
 - **Who's Who Among Students in American Universities and Colleges**.
 - **Marquis Who's Who in Science and Engineering**
 - **Marquis Who's Who in the World**
 - **Who's Who in Engineering Higher Education**
 - **IBC Leading Scientists of the World, Cambridge, England.**
 - **IBC 2000 Outstanding Scientists, Cambridge, England.**

MEMBERSHIPS:

- The Society for Modeling and Simulation International (SCS), San Diego, California,
- International Society for Computers and Their Applications (ISCA), Cary, North Carolina,
- Institute of Electrical and Electronics Engineers (IEEE), member # 92058980
- International Association of Engineers.
- IEEE Computer Society Technical Committee on Computer Communications,
- IEEE Computer Society Technical Committee on Multimedia Computing
- IEEE Communications Society,
- Jordan Society of Engineering, Jordan.

**PROFESSIONAL and
ACADEMIC**

- Elected the Chairman of the Business Development and Investment Committee at the Board of Trustees of Tafila Technical University.
- Elected on the Board of Directors of the Investment Fund at Tafila

Activities/SERVICES

- Technical University
- Elected on the Academic Committee of the Board of Trustees of Tafila Technical University.
 - Selected on the Permanent Committee for Investment Opportunities at the University of Jordan since 2021.
 - Selected on the Editorial Board of Telecommunication Systems published by Springer, August/2015-Present.
 - Selected on the Editorial Board Journal of High Speed Networks, published by IOS Press, January 2018-Present.
 - Selected on the Editorial Board Computer Applications in Engineering Education Published by John Wiley & Sons, April/2015-Present.
 - Member of Nominating Committee at IEEE Jordan Section, 2011-2013.
 - IEEE Communication Chapter Vice Chair, Jordan Section, 2014-2015.
 - Technical Program Committee Member of the IEEE Global Communications Conference (GLOBECOM).
 - Technical Program Committee Member of the IEEE International Conference on Communications (ICC).
 - Technical Program Committee Member of the IEEE Conference on Local Computer Networks (LCN).
 - Technical Program Committee Member of IEEE VTC-Fall, USA.
 - Technical Program Committee Member of IEEE International Symposium on Personal, Indoor and Mobile Radio Communications - (PIMRC): Mobile and Wireless Networks track.
 - Technical Program Committee Member of the International Conference on Advanced Technologies for Communications (ATC).
 - Technical Program Committee Member of the International Conference on Telecommunication (ICT).
 - Technical Program Committee Member of the International Symposium on Wireless Communication Systems (ISWCS).
 - Technical Program Committee Member of the IEEE Advanced Information Technology, Electronic and Automation Control Conference (IAEAC).
 - Technical Program Committee Member of the IEEE International Wireless Communications and Mobile Computing Conference (IWCMC)
 - Member of Engineering Curricula Improvement Committee at the University of Jordan, September 2013- September 2016.
 - Chair and member of a lot of committees at the Computer Engineering Department, the University of Jordan, since 2007.
 - Chair and member of a lot of committees at the School of Engineering, the University of Jordan, since 2008.
 - Academic Advisor for Graduate and Undergraduate Programs in the Computer Engineering Department at the University of Jordan, 2010-2012.
 - Reviewer for several highly reputable journals and conferences, since

2007.

- Evaluator of several local and worldwide academic promotions, since 2016.
- Chairman and member of many verification and investigation committees at the Department of Computer Engineering, School of Engineering, as well as the University of Jordan.
- Establishing and Developing the Object-oriented Engineering Problem Solving laboratory in the Department of Computer Engineering, 2007 – 2014.
- During the term of the Assistant Dean for Computer Affairs and through obtaining local financial support, four laboratories equipped with the latest licensed hardware and software were developed to serve all departments of the School of Engineering, 2008-2010.
- During the term of the Chair of Computer Engineering Department, study plans were improved for the department's programs, laboratories were developed and new laboratories were established to strengthen the curriculum, as well as special accreditation for the department's programs obtained from the Jordanian Higher Education Accreditation and Quality Assurance Commission, 2010-2012.
- Developing the computer networks laboratory in the Department of Computer Engineering by developing modern experiments that keep pace with the latest technology and are compatible with the requirements of the labor market and making summaries/handouts for students to overcome all academic and practical challenges, Spring 2023.

Research and areas of interest:

Internet of things, Software-defined networks, vehicular networks, flying ad-hoc networks, Fog networking, Full duplex cognitive radio networks, queuing systems and networks, multimedia transmission, channel coding, steganography and watermarking, as well as innovative and interactive learning environments.

PUBLICATIONS

Peer Reviewed Journal Papers:

- [1] **Khalid A. Darabkh**, Thara A. Alzboun, and Marwa H. Al-Tahaine, "A Novel Routing Protocol for Stable Route Selection in IoT Networks," to appear in **The Journal of Supercomputing**, (WoS/JCR, 2022 IF = 3.3), **Springer**.
- [2] Lama N. Ibrahim, Mamoun F. Al-Mistarihi, Mahmoud A. Khodeir, Moawiah Alhulayil, and **Khalid A. Darabkh**, "Best Relay Selection Strategy in Cooperative Spectrum Sharing Framework with Mobile-Based End User," **Applied Sciences**, (WoS/JCR, 2022 IF = 2.7), **MDPI**, vol. 13, no. 14, 1-18, July 2023, <https://doi.org/10.3390/app13148127>
- [3] **Khalid A. Darabkh**, Asma'a B. Amareen, Muna Al-Akhras, and Wafa'a K. Kassab

“An Innovative Cluster-based Power-aware Protocol for Internet of Things Sensors Utilizing Mobile Sink and Particle Swarm Optimization,” to appear in *Neural Computing and Applications*, (WoS/JCR, 2022 IF = 5.102), **Springer**.

- [4] **Saadah Z. Sweidan, Nuhaila Bouanane, and Khalid A. Darabkh**, “ACS: An Innovative Alzheimer's Care System,” to appear in *Universal Access in the Information Society*, (WoS/JCR, 2022 IF = 2.629), **Springer**.
- [5] Zouhair Al-qudah, Wael Abu Shehab, **Khalid A. Darabkh**, and Ahmed Musa, “The road to achieve the capacity of the three-way degraded broadcast channel,” to appear in *Journal of the Franklin Institute*, (WoS/JCR, 2022 IF = 4.246), **Elsevier**.
- [6] **Khalid A. Darabkh**, Batool R. Awawdeh, Ramzi R. Saifan, Ala' F. Khalifeh, Sharhabeel H. Alnabelsi, and Haythem Bany Salameh, “Routing in Cognitive Radio Networks Using Adaptive Full-Duplex Communications over IoT Environment,” to appear in *Wireless Networks*, (WoS/JCR, 2020 IF = 2.701), **Springer**.
- [7] **Khalid A. Darabkh**, Hanan F. Khazaleh, Raed T. Al-Zubi, Sharhabeel H. Alnabelsi, and Haythem Bany Salameh, “Efficient Routing Protocol for Optimal Route Selection in Cognitive Radio Networks over IoT Environment,” to appear in *Wireless Personal Communications*, (WoS/JCR, 2020 IF = 2.017), **Springer**.
- [8] **Khalid A. Darabkh**, Muna Al-Akhras, Mohammed Atiquzzaman, and Jumana Zomot, “Routing Protocol for Low Power and Lossy Networks over Internet of Things (RPL-IoT): A Comprehensive Survey, Recent Advances, Recommendations, and Future Directions,” to appear in *Journal of Network and Computer Applications*, (WoS/JCR, 2020 IF = 6.281), **Elsevier**.
- [9] **Khalid A. Darabkh**, Muna Al-Akhras, Ala' F. Khalifeh, Iyad F. Jafar, and Fahed Jubair, “An Innovative RPL Objective Function for Broad Range of IoT Domains Utilizing Fuzzy Logic and Multiple Metrics,” to appear in *Expert Systems With Applications*, (WoS/JCR, 2020 IF = 6.945), **Elsevier**.
- [10] **Khalid A. Darabkh**, Bayan Z. Alkhader, Ala' F. Khalifeh, Fahed Jubair, and Mohammad Abdel-Majeed, “ICDRP-F-SDVN: An Innovative Cluster-Based Dual-Phase Routing Protocol Using Fog Computing and Software-Defined Vehicular Network,” to appear in *Vehicular Communications*, (WoS/JCR, 2020 IF = 6.910), **Elsevier**.
- [11] Zouhair Al-qudah and **Khalid A. Darabkh**, “A simple Encoding Scheme to Achieve the Capacity of Half-Duplex Relay Channel”, to appear in *Advances in Electronic and Electric Engineering (AEEE)*, Scopus (Q2), Faculty of Electrical Engineering and Computer Science, VSB-Technical University of Ostrava.

- [12] Haythem Bany Salameh, Rasha AL-Bzour and **Khalid A. Darabkh**, "Exploiting Device-to-device (D2D) Transmission Strategy for Throughput Enhancement in WLANs," to appear in **Wireless Networks**, (WoS/JCR, 2020 IF = **2.602**), Springer.
- [13] Raed T. Al-Zubi, **Khalid A. Darabkh**, Yazid M. Khattabi, Mohannad T. Abu Issa, "Markov-Based Analysis for Cooperative HARQ-Aided NOMA Transmission Scheme in 5G and Beyond," to appear in **Transactions on Emerging Telecommunications Technologies** (WoS/JCR, 2020 IF = **2.638**), John Wiley & Sons, Ltd.
- [14] Sharhabeel H. Alnabelsi, Haythem Bany Salameh, Ramzi R. Saifan, and **Khalid A. Darabkh**, "A Multi-layer Hyper-graph Routing with Jamming-awareness for Improved Throughput in Full-duplex Cognitive Radio Networks," to appear in **Journal of King Saud University - Computer and Information Sciences** (WoS/JCR, 2020 IF = **13.473**), Elsevier.
- [15] Sharhabeel H. Alnabelsi, Haythem Bany Salameh, and **Khalid A. Darabkh**, "Full-duplex Routing with Low-Complexity Sequential-Decision for Throughput Enhancement in Dynamic Access Networks," to appear in **Pervasive and Mobile Computing** (WoS/JCR, 2020 IF = **3.453**), Elsevier.
- [16] **Khalid A. Darabkh**, Jumana N. Zomot, Zouhair Al-qudah, and Ala' F. Khalifeh, "Impairments-Aware Time Slot Allocation Model for Energy-constrained Multi-Hop Clustered IoT Nodes Considering TDMA and DSSS MAC Protocols," to appear in **Journal of Industrial Information Integration** (WoS/JCR, 2020 IF = **10.615**), Elsevier, vol. 25, p. 100243, January 2022.
- [17] Iyad Jafar, **Khalid A. Darabkh**, and Fahed Jubair, "Separable High Capacity Reversible Data Hiding Algorithm for Encrypted Images," **International Arab Journal of Information Technology (IAJIT)** (WoS/JCR, 2020 IF = **0.96**), vol. 19, no. 5, September 2022.
- [18] Saadeh Z. Sweidan, Sarah S. Abu Laban, Njood A. Alnaimat, and **Khalid A. Darabkh**, "SIAAA-C: A Student Interactive Assistant Android Application with Chatbot during Covid-19 Pandemic," to appear in **Computer Applications in Engineering Education** (WoS/JCR, 2020 IF = **1.532**), John Wiley & Sons, Inc.
- [19] Ala' F. Khalifeh, Abdullah Y. AlQammaz, Laith Abualigah, Ahmad M. Khasawneh, and **Khalid A. Darabkh**, "An Artificial Intelligence-Based Weather Prediction Model and its Application on Smart Irrigation," to appear in **Journal of Intelligent and Fuzzy Systems** (WoS/JCR, 2020 IF = **1.851**), IOS Press.

- [20]Zouhair Al-qudah, Mohd H.S. Alrashdan, and **Khalid A. Darabkh**, “On the Capacity Region of the Multiple Access Half-Duplex Relay Channel,” to appear in *International Journal of Communication Systems* (WoS/JCR, 2020 IF = **2.047**), John Wiley & Sons, Inc.
- [21]Ala’ Khalifeh, Mai Saadeh, **Khalid A. Darabkh**, and Prabagarane Nagaradjane, “Radio Frequency Based Wireless Charging for Unsupervised Clustered WSN: System Implementation and Experimental Evaluation,” *Energies* (WoS/JCR, 2020 IF = **3.004**), MDPI, vol. 14, no. 7, 2021.
- [22]Saadeh Z. Sweidan, Sondos M. Alshareef and **Khalid A. Darabkh**, SCATAA-CT: Smart Course Attendance Tracking Android Application in Classroom Teaching,” to appear in *International Journal of Computer Applications in Technology (IJCAT)*, Scopus Q2, Inderscience publishers.
- [23]Raed T. Al-zubi, Mohammad Q. Alawad, Abdulraheem A. Kreishan, and **Khalid A. Darabkh**, “ERP-DDA: Event Reporting Protocol Based on Distributed Data Aggregation for Wireless Sensor Networks, to appear in *Information Technology and Control* (WoS/JCR, 2020 IF = **1.228**), Kaunas University of Technology.
- [24]Ala’ Khalifeh, **Khalid A. Darabkh**, Ahmad Khasawneh, Issa Alqaisieh, Shams Alrubaye, Ahmed AlAbdala, Mohamed Salameh, Anwar Alassaf, Samer Al-HajAli, Radi Al-Wardat, Novella Bartolini, Giancarlo Bongiovanni, Kishore Rajendiran, “Wireless Sensor Networks for Smart Cities: Network Design, Implementation and Performance Evaluation,” *Electronics* (WoS/JCR, 2020 IF = **2.397**), MDPI, vol. 10, no. 2, Jan 2021.
- [25]**Khalid A. Darabkh**, Oswa M. Amro, Raed T. Al-Zubi, and Haythem Bany Salameh, “Yet Efficient Routing Protocols for Half- and Full-Duplex Cognitive Radio Ad-Hoc Networks over IoT Environment,” *Journal of Network and Computer Applications* (WoS/JCR, 2020 IF = **6.281**), Elsevier, vol. 173, p.102836, January 2021.
- [26]Raed T. Al-Zubi, Abdulraheem A. Kreishan, Mohammad Q. Alawad, and Khalid A. Darabkh, “SIICERP: Solution for Intra/Inter-Cluster Event-Reporting Problem in Cluster-Based Protocols for Wireless Sensor Networks,” to appear in *International Journal of Electrical and Computer Engineering (IJECE)*, Scopus Q2, Institute of Advanced Engineering and Science (IAES), vol 12, no. 1, February 2022.
- [27]**Khalid A. Darabkh**, Oswa M. Amro, Raed T. Al-Zubi, Haythem Bany Salameh, Ramzi Saifan, “JavaSim-IBFD-CRNs: Novel Java simulator for In-Band Full-Duplex

Cognitive Radio Networks over Internet of Things Environment,” *Journal of Network and Computer Applications* (WoS/JCR, 2020 IF = 6.281), Elsevier, vol. 172, p.102833, December 2020.

- [28]Raed Al-Zubi, Safaa Ali AL-Sarayrah, Mohammed Hawa, **Khalid A. Darabkh**, Iyad F. Jafar, and Sharhabeel H. Alnabelsi, “TCP-CLD: Cross-Layer Design for Improving TCP Performance over Cognitive Radio Networks,” *International Journal on Communications Antenna and Propagation* (IRECAP), Scopus Q2, **Praise Worthy Prize**, vol. 10, no. 6, pp.399-407, December 2020, <https://doi.org/10.15866/irecap.v10i6.19057>.
- [29]Zouhair Al-qudah and **Khalid A. Darabkh**, “Achievable Rates of Gaussian Cognitive Interference Channel with Common Interference,” *IET Communications* (WoS/JCR, 2020 IF = 1.664), *IET*, vol. 14, no. 16, 06, pp. 2802 – 2812, October 2020.
- [30]Ala’ Khalifeh, Husam Abid, and **Khalid A. Darabkh**, “Optimal Cluster Head Positioning Algorithm for Wireless Sensor Networks,” *Sensors* (WoS/JCR, 2020 IF = 3.576), *MDPI*, vol. 20, no. 13, pp. 1-26, 2020.
- [31]Mamoun F. Al-Mistarihi, Mariam M. Harb, **Khalid A. Darabkh**, and Arwa Sh. Aqel, “On the Performance Analysis of Dual Hop Relaying Systems Using Differential Amplify-and-Forward Along with Post-Detection Selection Combining Techniques over Nakagami-m Fading Channels,” *Transactions on Emerging Telecommunications Technologies* (WoS/JCR, 2020 IF = 2.638), *John Wiley & Sons, Ltd*, vol. 31, no. 11, November 2020.
- [32]Raed T. Al-Zubi, Mohannad T. Abu Issa, Ahmad A. Zghoul, **Khalid A. Darabkh**, Yazid Khattabi, “Analysis of System Outage Probability in Underlay Cognitive Two-Way Amplify-and-Forward Relay Networks,” *Computer Communications*, (WoS/JCR, 2020 IF = 3.167), *Elsevier*, vol. 160, pp. 253-262. July 2020.
- [33]Raed T. Al-zubi, Mohannad T. Abu Issa, Omar Jebreil, **Khalid A. Darabkh**, Yazid Khattabi, “Outage Performance of Cognitive Two-Way Amplify-and-Forward Relay Network under Different Transmission Schemes,” *Transactions on Emerging Telecommunications Technologies* (WoS/JCR, 2020 IF = 2.638), *John Wiley & Sons, Ltd*, vol. 31, no. 8, August 2020.
- [34]**Khalid A. Darabkh**, Wafa’a K. Kassab, and Ala’ F. Khalifeh, “LiM-AHP-G-C: Life Time Maximizing Based on Analytical Hierarchal Process and Genetic Clustering Protocol for the Internet of Things Environment,” *Computer Networks* (WoS/JCR, 2020 IF = 4.474), *Elsevier*, vol.176, p. 107253, July 2020.

- [35]Wafa'a Kassab and **Khalid A. Darabkh**, "A-Z Survey of Internet of Things: Architectures, Protocols, Applications, Recent Advances, Future Directions and Recommendations," *Journal of Network and Computer Applications* (WoS/JCR, 2020 IF = **6.281**), Elsevier, vol. 163, p.102663, August 2020.
- [36]Zouhair Al-qudah, Amin Alqudah, and **Khalid A. Darabkh**, "Transmission over Gaussian MIMO Half-Duplex Relay Channel," *Physical Communication* (WoS/JCR, 2020 IF = **1.81**), Elsevier, vol. 40, p. 101089, June 2020.
- [37]Haythem Bany Salameh, Noor Al-Nusair, Sharhabeel H. Alnabelsi, and **Khalid A. Darabkh**, "Channel Assignment Mechanism for Cognitive Radio Network with Rate Adaptation and Guard Band Awareness: Batching Perspective," *Wireless Networks* (WoS/JCR, 2020 IF = **2.602**), Springer, vol. 26, no. 6, pp. 4477-4489, 2020.
- [38]Mamoun F. Al-Mistarihi, Rami Mohaisen, and **Khalid A. Darabkh**, "Performance Evaluation of Decode and Forward Cooperative Diversity Systems over Nakagami-m Fading Channels with Non-Identical Interferers," *International Journal of Electrical and Computer Engineering (IJECE)*, Scopus Q2, Institute of Advanced Engineering and Science (IAES), vol. 10, no. 5, pp.5316 – 5328, October 2020.
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PhD DISSERTATIONS SUPERVISED

- There are no PhD programs available in the computer engineering department at the University of Jordan.

**MASTER'S THESES
SUPERVISED AND
EXAMINED**

1. Supervised the master's thesis entitled "Efficient Techniques for Mobile Target Tracking in Wireless Sensor Networks", Student Shereen Subhi, December 2011.
2. Supervised the master's thesis entitled "Queue Management for Wired/Wireless Multimedia Communication Systems", Student Abeer Awad, May 2013.
3. Supervised the master's thesis entitled "Energy-Efficient Clustering Algorithms for Target Tracking in Wireless Sensor Networks", Student Wala Rawashdeh, August 2014.
4. Supervised the master's thesis entitled "Energy-Aware and Layering-Based Clustering and Routing Algorithms for Gathering Data in Wireless Sensor Networks", Student Noor Maaita, December 2014.
5. Supervised the master's thesis entitled "A New Fuzzy Logic Scheme for Improving the Performance of On-Demand Multicast Routing Protocol in Mobile Ad Hoc Networks", Student Ola Saqour, December 2014.
6. Supervised the master's thesis entitled "Efficient and Adaptive Computation Control for Variable Complexity Fano Algorithm over Wireless Networks", Student Fatima Al-Qudah, August 2014.
7. Supervised the master's thesis entitled "An Efficient Image Steganographic Algorithm Based on Pixel-Value Differencing", Student Ahlam Al-Dhamari, May 2015.
8. Supervised the master's thesis entitled "An Improved Adaptive-Head Clustering Algorithm for Target Tracking in Wireless Sensor Networks", Student Wijdan El-btoosh, May 2016.
9. Supervised the master's thesis entitled "New Clustering and Routing Algorithms for Gathering Data in Wireless Sensor Networks," Student Riham Z. Muqat, August 2016.
10. Supervised the master's thesis entitled "Balanced Energy-Aware Clustering and Routing Algorithms for Wireless Sensor Networks," Student Mohammad EL- Yabroudi, August 2016.
11. Supervised the master's thesis entitled "An Adaptive Clustering Algorithm for Balanced Energy Consumption in Wireless Sensor Networks," Student Laith Y. Al-Jdayeh, December 2016.
12. Supervised the master's thesis entitled "Energy-Aware and Density-Based Clustering and Routing Algorithms for Gathering Data in Wireless Sensor Networks," Student Saja Odetallah, December 2016.
13. Supervised the master's thesis entitled "Error and Energy-Aware Target Tracking Algorithm for Wireless Sensor Networks," Student Nareman Al-Sarayrah, May 2017
14. Supervised the master's thesis entitled "A Modified Ad-Hoc On Demand Distance Vector (AODV) Routing Algorithm for Mobile Ad-Hoc Networks," Student Mohammed Judeh.
15. Supervised the master's thesis entitled "A Cross-Layer Algorithm for

- Improving Ad-Hoc on Demand Distance Vector Protocol,” Student Mohammed Al-Fawares.
16. Supervised the master’s thesis entitled “New Energy-Aware Clustering and Routing Algorithms for Wireless Sensor Networks,” Student Wafaa Kassab.
 17. Supervised the master’s thesis entitled “Fuzzy Logic Approaches for Enhancing Energy Consumption in Wireless Sensor Networks,” Student Jumana Zomot.
 18. Supervised the master’s thesis entitled “Optimized Mobile Sink for Improving Data Delivery in Wireless Sensor Networks,” Student Enas Al-zu'bi.
 19. Co-supervised the master’s thesis entitled “Routing in Full-duplex Cognitive Radio Networks over Channels with Different Data Rates,” Student Oswa Amr
 20. Supervised the master’s thesis entitled “A New Efficient Routing Protocol for Vehicular Adhoc Networks,” Student Bayan Khader.
 21. Supervised the master’s thesis entitled “Cross Layer Designs for Efficient Sensor Routing over Internet of Things and Cloud Computing,” Student Muna Al-akhras.
 22. Supervised the master’s thesis entitled “Efficient Sensor Network Clustering using Particle Swarm Optimization with Mobile Sink over Internet of Things,” Student Asma'a Amareen.
 23. Supervised the master’s thesis entitled “Improving Data Delivery Utilizing Local and Global Mobile Sinks over Internet of Things,” Student Alaa Qushou.
 24. Co-supervised the master’s thesis entitled “Efficient Mechanism For Optimal Route Selection In Cognitive Radio Networks,” Student Hanan Al-khazaleh.
 25. Supervised the master’s thesis entitled “An Efficient Cluster-based Routing Protocol for Vehicular Adhoc Networks,” Student Ragad Sulaiman.
 26. Supervised the master’s thesis entitled “Routing in Cognitive Radio Networks using Adaptive Full-Duplex Communications,” Student Batool Awawdeh.
 27. Co-supervised the master’s thesis entitled “A Novel Routing Protocol in Cognitive Radio Ad-Hoc Network,” Student Marwa Hussein.
 28. Supervised the master’s thesis entitled “Power-aware routing protocol based on virtual hexagonal cells and double mobile sinks in power-constrained IoT Network,” Student Reem Elyyan.
 29. Supervises the master’s thesis entitled “An Improved Routing Protocol for Low Power and Lossy Networks over Internet of Things,” Student Israa Alhuniti.
 30. Supervised the master’s thesis entitled “Optimal Path Selection for Mobile Sink in Clustered IoT Network,” Student Balqis Momani.
 31. Supervised the master’s thesis entitled “On the Design of Smart Cities

- Using Soft Computing and Low Power and Lossy Networks (LLNs),” Student Heba Al-Edwan.
32. Supervised the master’s thesis entitled “A Routing Protocol for Stable and Efficient Route Selection in Cognitive Radio Ad-hoc Networks,” Student Thara Al-Zboun.
 33. Supervised the master’s thesis entitled “An Efficient Cross-layer Based Routing Protocol with Adaptive Mobility and Power-awareness in IoT Networks,” Student Khaled Alqudah.
 34. Examined the master’s thesis entitled “Distributed Architecture for Electronic Referral Systems Utilizing Computational Intelligence for Decision Support, Student Majed Al-Zghoul, The University of Jordan, August 2012.
 35. Examined the master’s thesis entitled “Optimum Number of Active Sensors for Efficient Power and Area Coverage in Wireless Sensor Networks”, Student Emad Al-Nawafah, Jordan University of Science and Technology, December 2012.
 36. Examined the master’s thesis entitled “Energy Efficient Adaptive Prediction-based Algorithm for Target Tracking in Wireless Sensor Networks”, Student Muath Wahdan, Jordan University of Science and Technology, December 2012.
 37. Examined the master’s thesis entitled “A Power Conserving and Bandwidth Balancing Framework for Data Centers using Virtual Machines Reallocation”, Student Suhib AlHiyari, The University of Jordan, May 2014.
 38. Examined the master’s thesis entitled “Performance Evaluation of Different Predication Schemes in Reversible Image Data Hiding”, Student Sawsan Al-Hiary, The University of Jordan, May 2014.
 39. Examined the master’s thesis entitled “Performance evaluation and enhancement of scheduling algorithms in point-to-multipoint WIMAX networks using variable bit rate traffic”, Student Samah Z. Rahamnah, The University of Jordan, August 2014.
 40. Examined the master’s thesis entitled “Adaptive Rate Encoding Scheme for Performance Enhancement of VOIP System in E-health Applications”, Student Maha Z. Mouasher, The University of Jordan, August 2014.
 41. Examined the master’s thesis entitled “Dynamic Reconfiguration Algorithms for Resource Management in LTE-Advanced Technology”, Student Ayman A. Atallah, The University of Jordan, December 2014.
 42. Examined the master’s thesis entitled “An Improved Image Segmentation Algorithm Based on the Geodesic Active Contour Models”, Student Boshra M. Al-Tarawneh, The University of Jordan, May 2015.
 43. Examined the master’s thesis entitled “Improving the Efficiency of Predication-based Reversible Data Hiding Algorithms”, Student Enas N. Jaara, The University of Jordan, May 2015.

44. Examined the master's thesis entitled "Investigating Parallel Implementations of Electronic Voting Verification and Tallying Processes", Student Israa A. Saadeh, The University of Jordan, May 2015.
45. Examined the master's thesis entitled "Enhanced Cross Layer Based Intrusion Detection System for Securing Wireless Adhoc Networks from Black Holes Attack", Student Salem B. Esoh, Jordan University of Science and Technology, May 2015.
46. Examined the master's thesis entitled "Performance Evaluation of Modern Cop-move Forgery Detection Algorithms in Digital Images Based on Block Matching", Student Baraa A. Bashaireh, The University of Jordan, August 2015.
47. Examined the master's thesis entitled "Adaptive Web Proxy Caching Approach Based on Machine Learning", Student Eman M. Qteimat, The University of Jordan, August 2015.
48. Examined the master's thesis entitled "An Enhanced Security Model Architecture for SIP-based Network Applications", Student Mohammad S. Saidat, The University of Jordan, August 2015.
49. Examined the master's thesis entitled "Comparative Analysis of Different Encryption Techniques in Mobile Ad hoc Networks", Student Amal Q. Ahmad, The University of Jordan, August 2015.
50. Examined the master's thesis entitled "Tree-based Mobility-aware Routing Algorithm for Mobile Ad hoc Networks", Student Haytham S. Bani AbelGhany, The University of Jordan, November 2015.
51. Examined the master's thesis entitled "An Enhanced Hybrid Transport Layer Protocol for H.264 HD Video Streaming over WLANS", Student Nawal S. Al-Sboul, The University of Jordan, December 2015.
52. Examined the master's thesis entitled "A Cross Layer Design to Improve the Performance of Transmission Control Protocol over Multi-hop Cognitive Radio Networks", Student Safaa Ali Al-Sarayrah, The University of Jordan, January 2016.
53. Examined the master's thesis entitled "A New Non-coprime Moduli Set in Residue Number System Convertors", Student Mansour Y. Bader, The University of Jordan, January 2016.
54. Examined the master's thesis entitled "Investigation of Adaptive Behavioral Authentication for Mobile Device Applications", Student Dima Z. Zeidan, The University of Jordan, May 2016.
55. Examined the master's thesis entitled "Improved and Efficient Reversible Data Hiding Algorithms Using Dual Images", Student Sakhaa A. Obeidat, The University of Jordan, May 2016.
56. Examined the master's thesis entitled "Performance Evaluation of Analysis and Synthesis Sparse Modeling in Solving the Inverse Problem", Student Sawsan Elwan, The University of Jordan, December 2016.
57. Examined the master's thesis entitled "Investigating the Effect of Various

- Hybrid Encryption Techniques on The Performance of Wireless Sensor Networks”, Student Hussein Al-Fatlawi, The University of Jordan, December 2016.
58. Examined the master’s thesis entitled “Study Analysis and Performance Evaluation of Google QUIC Transmission Protocol”, Student Ma’moun Mansour, German Jordanian University, March 2017.
 59. Examined the master’s thesis entitled “Combining Different Hybrid Encryption Algorithms to Secure Outsourced Data in Public Cloud Storage”, Student Hayder K. Al-Janabi, The University of Jordan, April 2017.
 60. Examined the master’s thesis entitled “Preprocessing and Segmentation of Handwritten Arabic Documents for Writer-independent Automatic Recognition”, Student Ahamd S. Al-Hourani, The University of Jordan, April 2017.
 61. Examined the master’s thesis entitled “Improving the Efficiency of Separable Reversible Data Hiding Techniques in Encrypted Images”, Student Hammam Al-Awasa, The University of Jordan, August 2017.
 62. Examined the master’s thesis entitled “Probabilistic and Deterministic Path Selection in Cognitive Radio Networks”, Student Anoud El-Ruhibe, The University of Jordan, August 2017.
 63. Examined the master’s thesis entitled “Lifetime-improvement Routing Protocol for Wireless Sensor Networks”, Student Noor Abedsalam, The University of Jordan, October 2017.
 64. Examined the master’s thesis entitled “Enhancing Energy efficiency of IEEE 802.15.4 for Wireless Sensor Networks”, Student Rabie Mohammed Tanash, German Jordanian University, November 2017.
 65. Examined the master’s thesis entitled “Sink Mobility Optimization for Data Gathering in Wireless Sensor Networks”, Student Rayeh R. Alghsoon, The University of Jordan, December 2017.
 66. Examined the master’s thesis entitled “Automatic System for Grading Paper Based Multiple Choice Exams”, Student Rose M. AL-Zuo’bi, Yarmouk University, December 2017.
 67. Examined the master’s thesis entitled “A Contrast-Enhancing Reversible Image Data Hiding Algorithm”, Student Hamzah Maghaydah, The University of Jordan, July 2018.
 68. Examined the master’s thesis entitled “A Cloud Model for Integrated Healthcare Informatics Solution: Health Gate Cloud (HGC)”, Student Mohammad Daradkah, Princess Sumaya University for Technology, August 2018.
 69. Examined the master’s thesis entitled “A Framework for E-Healthcare Services in Jordan Exploiting Cloud Computing and Internet of Things”, Student Odai Mukhaimer, Princess Sumaya University for Technology, August 2018.
 70. Examined the master’s thesis entitled “A Joint Power Control and Spectrum

- Assignment Scheme in Cognitive Radio Networks with Dual Receiver Single Transmit Radio”, Student Nusiebah A. Abusanad, Yarmouk University, November 2018.
71. Examined the master’s thesis entitled “Secure, Scalable and Power Aware Protocols for IoT”, Student Wasan K. Al Bayaydeh, The University of Jordan, December 2018.
 72. Examined the master’s thesis entitled “Bandwidth Usage Forecasting & Network Anomaly Detection Based on Neural Network Approach”, Student Omima Masha’leh, German Jordanian University, January 2019.
 73. Examined the master’s thesis entitled “Mobility and Energy Aware Mobile Ad-hoc on Demand Distance Vector Routing Protocol”, Student Majd Alzghoul, The University of Jordan, April 2019.
 74. Examined the master’s thesis entitled “Analysis and Synthesis of Efficient Intrusion Detection System in Internet of Things”, Student Samah Al-Ameri, The University of Jordan, April 2019.
 75. Examined the master’s thesis entitled “Performance Analysis of Resource Allocation in Cognitive Radio Networks (CRNs) using Game Theoretic Approach over Nakagami- m Fading Channel”, Student Shaima’ Abidrabbu, Jordan University of Science and Technology, July 2019.
 76. Examined the master’s thesis entitled “An Improved Greedy Perimeter Stateless Routing (GPSR) Protocol for Mobile Ad-hoc Networks”, Student Samer Abu Zant, The University of Jordan, December 2019.
 77. Examined the master’s thesis entitled “Performance Analysis of Relay assisted Cooperative Diversity Systems Using Best-Path Selection Technique over Fading channels”, Student Arwa Aqel, Jordan University of Science and Technology, January 2020.
 78. Examined the master’s thesis entitled “Performance Analysis of 5G Heterogeneous Networks Under the Impact of Aggregate Interference Over Nakagami- m Fading Channels,” Student Areen Mahmoud Abedrabbo, Jordan University of Science and Technology, August 2020.
 79. Examined the master’s thesis entitled “Factor-based Hybrid Approach in Block Chain Technology: Proof of Stake and Proof of Space (PoSS),” Student Tharaa Ali Alalwan, The University of Jordan, December 2020.
 80. Examined the master’s thesis entitled “Design and Implementation of a Novel Reversible Data Hiding Algorithm in Encrypted Images,” Student Sadaf K. Alkharabsheh, Princess Sumaya University for Technology, January 2021.
 81. Examined the master’s thesis entitled “Rate Control and Spectrum Assignment in Cognitive Radio Networks,” Student Renad Ali Bataineh, Yarmouk University, May 2021.
 82. Examined the master’s thesis entitled “An Efficient Pairing Strategy for Power Domain Non-Orthogonal Multiple Access Based Cognitive Radio Networks: A Maximum Minimum Channel Gain Approach” Marah Ahmad

Al-Hayek, Yarmouk University, March 2022.

83. Examined the master's thesis entitled "Probabilistic Reputation-Based Authentication Approach in VANET," Student Tamara Al-Zyoud, The University of Jordan, May 2022.
84. Examined the master's thesis entitled "Secure, Reliable, Verifiable and Non-repudable Contract in the field of Oil Industry Based on Blockchain Technology," Student Alaa F. Al Alaween, The University of Jordan, May 2022.
85. Examined the master's thesis entitled "A Robust Wireless Sensor Network Architecture Against Denial-of-Service Attack," Student Mo'men AlMana'seh, German Jordanian University, January 2023.
86. Examined the master's thesis entitled "Probabilistic History-based Distributed Sensing Protocol in Cognitive Radio Network," Student Rami Atef Yousef AL-zyadat, The University of Jordan, April 2023.
87. Examined the master's thesis entitled "Video Anomaly Detection in Surveillance Cameras Using Deep learning," Student Lamees Al-Hourani, The University of Jordan, May 2023.
88. Examined the master's thesis entitled "Hybrid THZ/MMWAVE Transmission Scheme with Adaptive Combining for Mobile Networks", Student Mohammad Hasan Abu Aqoulah, Jordan University of Science and Technology, June 2023.

MASTER'S THESES CO-SUPERVISED – DIFFERENT UNIVERSITIES

89. Co-supervised the master's thesis entitled "A New Efficient Routing Protocol for Vehicular Adhoc Networks," Student Mira Ismail Ibrahim Maaytah (ID, 136080), **Jordan University of Science and Technology**, Spring 2023.
90. Co-supervised the master's thesis entitled "A Novel Cluster-based Speed-aware Routing Protocol for Vehicular Ad-hoc Networks," Student Bayan Abdullah Meshaal Odat (ID, 150732), **Jordan University of Science and Technology**, Spring 2023.

Grants (Funded Proposals)

- JU-2404, Role: Sole Investigator, "Smart Cities Optimization Using Artificial Intelligence in Power-Constrained Mobile IoT Nodes," USD 20, 375, June 2021-Dec 2023, Deanship of Scientific Research – The University of Jordan.
- Role: Sole Investigator, "Industrial Transformation and Keeping Pace with Change: Amman Towards a Smart and Sustainable City: Design and Development," Submitted to Scientific Research Fund – Ministry of Higher Education and Scientific Research, 2022, Budget Requested: USD 154, 285.
- Role: Sole Investigator, "Java Simulator: A simulator for In Band Full Duplex Cognitive Radio Networks," submitted to Abdul Hamid Shoman Fund for Scientific Research, Budget Requested: USD 28, 570.

TECHNICAL SKILLS

- Programming Languages and Simulation Tools: Pascal, C, C++, Java, Matlab, C# .NET, Visual Basic, PERL, SQL, Assembly (8085, x86-Intel Core 2, MIPS), NS₂ network simulator, HTML, and PHP.
- Scripting Languages: Linux Bash Shell Script and JavaScript.
- Statistical Analysis: MiniTab.
- Databases: ORACLE, SQL Server, and MS-Access.
- Platforms: DOS, Windows 95-Vista, UNIX, and Linux.
- Development Frameworks: Oracle Java Developer, Microsoft J++, JBuilder, Eclipse, X-Code, BlueJ, Visual Studio .NET, Sun JDK, Rational Rose, Microsoft Office Suite, and AutoCAD.
- Parallel Programming: Pthreads, Java-Threads, Open MP, MPI, and PVM.
- Hardware Description Languages: VHDL and Verilog
- Typography: LaTeX and MS Office.

Languages:

- Fluent in both spoken and written English and Arabic.

References:

- Available upon requests.