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EDUCATION

May 2007

The University of British Columbia, Vancouver, British Columbia, Canada

Ph.D. Degree in Electrical and Computer Engineering.

Thesis title: *Optical Code Division Multiplexing for Sub-Wavelength Switching Systems*

Research Areas: *Optical Communications, Optical Transmission, Optical Networks, MC-CDMA, OFDM, Wireless LAN, QoS Mechanisms*

My thesis research focuses on designing physical layer transmission methods for applying Optical Fiber CDMA as a switching method in GMPLS networks. Work in my thesis includes a design of an optical transmission method using PPM, an Optical Orthogonal Code generation method and a network and switching architecture for code labeling in optical GMPLS core networks.

My work as a Research Assistant during my PhD required me to participate in the design and implementation of a WLAN 802.11a/802.11n prototype access point for educational purposes. My work was focused on the simulation and analytical modeling for the baseband PHY. The model includes an OFDM baseband transceiver employing a soft decision Viterbi decoder, an MMSE channel estimator/equalizer and a quasi-static fading channel model. Working in this project has exposed me to all the physical layer aspects of wireless communication systems. Also, in this project I have participating with a team performing different system implementation activities including an implementation of the PHY and parts of the MAC using VHDL on Xilinx FPGA and a Real Time firmware implementation of the MAC on XilKernel/VxWorks for PowerPC processor architecture.

Jan 2000

Cairo University, Cairo, Egypt

M. Sc. Degree in Electronics and Electronic Communications.

Thesis Title: *Performance Analysis of Wireless LAN Protocols*

Research Areas: *Wireless Communications, Network Protocols, Queuing Theory, Spread Spectrum Communications, Statistical Multiple Access Techniques*

My thesis research focused on modeling MAC layer for IEEE 802.11 wireless LANs. This allowed me to gain an in-depth understanding of the different aspects and variations of the 802.11 MAC and PHY functions and modules.

Jul 1993

Cairo University, Cairo, Egypt

B. Sc. Degree in Electronics and Electronic Communications. (Distinction with Honors.)

Graduation Project: *Design and Implementation of an Ethernet Card for PCs.*

My work on the graduation project was focused on the implementation of the Ethernet transceiver. This allowed me to have a hands on experience on analog system such as oscillators and line drivers. I was able to perform implementations using analog devices such as transistors, diodes and passive devices. I also had a chance to experience working on mixed signal systems such as PLLs.

ACADEMIC EXPERIENCE

Sep 2007 –

Qatar University, Doha, Qatar

Present

Associate Professor (Oct. 2015), **Assistant Professor** (Sep. 2007), **Dept. of Electrical Engineering**

Duties include:

- Initiating and leading the CubeSat project at the College of Engineering. The project will serve as venue for curriculum enhancement by involving students in the design and implementation of a pico-satellite. It also involves faculty and graduate students work focusing on research. The satellite is planned for LEO launching.
- Conducting research in the areas of Communications and Information Theory, Wireless Sensor Networks, Cooperative Communications, Physical Layer Secrecy, WiMax PHY, 3G LTE PHY, Channel Estimation for Distributed MIMO Systems, and Cross-Layer OFDMA Resource Optimization. Activities include simulation using MATLAB and OPNET, as well as mathematical modeling and prototype system implementation.
- Leading several research projects funded by Qatar National Research Fund (QNRF) under the National Priorities Research Program (NPRP) in the areas of communications and information

theory as well as wireless systems efficient prototyping.

- Leading multiple research project funded by Qatar University under the Internal Individual Research Grant program in the area of applications of wireless systems in sensing and monitoring in industry and health.
- Leading multiple undergraduate research experience projects (UREP) funded by Qatar National Research Fund focusing on efficient applications of wireless communications through establishment of simulation and prototyping platforms as students' senior design projects in diverse areas such we wireless power transfer, LTE-Advanced systems, and smart grids.
- Participating in department, college and university committees such as: (i) Chairing the college of engineering research committee, (ii) Chairing the department curriculum committee during preparation and granting of ABET accreditation, (iii) Chairing the department research committee, (iv) Representing the department to the college research committee, (v) Participating in the department recruitment committee, (vi) Participating in the department facilities committee, (vii) Participating in the department research and graduate studies committee, and (viii) Participating in the department students' mega projects committee.
- Teaching and enhancing the curriculum of the following undergraduate courses:
 - (1) Probability and Statistics (GENG 200)
 - (2) Electrical Engineering Seminar (ELEC 299)
 - (3) Electromagnetics (ELEC 311)
 - (4) Signals and Systems (ELEC 351)
 - (5) Communications Engineering (ELEC 341)
 - (6) Communications Engineering Lab (ELEC 342)
 - (7) Digital Communications (ELEC 444)
 - (8) Wireless Communications (ELEC 447)
 - (9) Selected Topics in Communications (ELEC 446)
 - (10) Computer Networks (ELEC 469)
- Teaching and enhancing the curriculum of the following graduate courses:
 - (1) Advanced Communication Engineering (ELEC 556)
 - (2) Advanced Special Topics II (ELEC 652)
- Completed supervision/co-supervision of M.Sc. and Ph.D. theses:
 - (1) Seyed Ali Mousavifar, "Improving Lifetime in Wireless Selective Relay Networks," **M.Sc.** University of British Columbia, Vancouver, BC, Canada, 2009.
 - (2) Mahmoud Elsaadany, "Opportunistic Cognitive Relaying for Wireless Networks: Performance Analysis and Optimization," **M.Sc.** Cairo University, Giza, Egypt, 2010.
 - (3) Mohammad Shahmohammadi, "On fundamental limits and design of explicit schemes for multi-user networks," **Ph.D.** Ohio State University, Columbus, OH, USA, 2011.
 - (4) Mohammed Hafez, "Blind Signal-to-Noise-Ratio Estimation in General Fading Environments," **M.Sc.** Alexandria University, Alexandria, Egypt, 2013
 - (5) Ahmed El-Shafie, "On Orthogonal Band Allocation For Multi-User Mutli-Band Cognitive Radio Networks," **M.Sc.** Nile University, Giza, Egypt, 2014.
 - (6) Ahmed Wagdy, "On the Degrees of Freedom of SISO X Channel with Alternating CSIT," **M.Sc.** Nile University, Giza, Egypt, 2014.
 - (7) Duaa Abumaali, "On the DoF of Interference Channels with Relays," **M.Sc.** Qatar University, Doha, Qatar, 2016.
 - (8) Aparna Krishna, "On Statistical Analysis of Electromagnetic Propagation in Jet Engines," **Ph.D.** Qatar University, Doha, Qatar, 2017.
 - (9) Ahmed Badawy, "On Practical Physical Layer Secrecy," **Ph.D.** Politecnico di Torino, Turin, Italy, 2017.
 - (10) Basem Mahmoud, "On Bridging the Gap between Information Theoretic Secrecy and Cryptography," **M.Sc.** Nile University, Giza, Egypt, 2018.
 - (11) Abdallah Fayed, "On the Capacity Bounds of Secrecy Constrained and Interference Limited Channels," **M.Sc.** Nile University, Giza, Egypt, 2018.
- Current supervision/co-supervision of M.Sc. and Ph.D. theses:
 - (1) Mohammed Amir Khalil, "Theoretical Bounds on Caching," **Ph.D.** Memorial University, Corner Brook, NL, Canada.
 - (2) Mohammed Hafez, "On Secure Directional Modulation Communications," **Ph.D.** University of South Florida, Tampa, FL, USA.
 - (3) Muhammad Shehab, "UAVs in Wireless Systems," **Ph.D.** Qatar University, Doha, Qatar.
 - (4) Omar Almarri, "On the Performance of Full-Duplex Channel Sensing," **M.Sc.** Qatar

- University, Doha, Qatar.
- (5) Nour Abuaysheh, "Cybersecurity in Smartgrids with Distributed Renewable Energy Generation," **M.Sc.** Qatar University, Doha, Qatar.
 - (6) Gehad Desouky, "Efficient Protocols for Coordinated Distributed Generation with Renewable Energy Sources," **M.Sc.** Qatar University, Doha, Qatar.

Sep 2006 – **The University of British Columbia**, Vancouver, B.C.

Aug 2007

Post Doctoral Fellow, Dept. of Electrical & Computer Engineering

Duties include (*By this time I have finished my departmental defense*):

- Conducting research in the areas of MC-CDMA, Optical CDMA, UWB, WiMax PHY, WiMax MAC, Channel Estimation, Receiver Synchronization & Clock Recovery and OFDMA. Activities include simulation using MATLAB and OPNET, as well as mathematical modeling and prototype system implementation
- Leading the PHY research and development team of the WiMax project
- Design and implementation of several Matlab models for the 802.16e baseband algorithms
- Participated in system design of the 802.16e PHY.

Feb 2003 – **The University of British Columbia**, Vancouver, B.C.

Aug 2006

Research Assistant, Dept. of Electrical & Computer Engineering

Duties include:

- Conducting research in the areas of CDMA, Wireless LAN Phy, WLAN MAC, and OFDM. Activities include simulation using MATLAB and OPNET, as well as mathematical modeling and prototype system implementation
- Project management of the development of an SDR based reference design of an 802.11n prototype system using C over XilKernel RTOS on a PowerPC architecture on the Xilinx Vertex II Pro FPGA
- Design and implementation of several Matlab models for the 802.11a and 802.11n baseband algorithms
- Implementation of parts of the MAC for the 802.11e on XilKernel using C
- Participated in system design of the 802.11n prototype system
- Implementation of an algorithm for channel estimation in MIMO-OFDM systems using Matlab and C
- Design and implementation of an algorithm for Optical Orthogonal Code design using a rejected delay reuse greedy method
- Design and implementation of a low complexity near-optimal algorithm for channel assignment in multi-user fading wireless channels
- Design and implementation of a multidimensional quad-Gaussian integration method using Matlab and C
- Design and implementation of an efficient and QoS preserving traffic aggregation algorithm in all-optical backbone switching networks using OPNET simulator and C.

Feb 2003 – **The University of British Columbia**, Vancouver, B.C.

Aug 2006

Teaching Assistant, Dept. of Electrical & Computer Engineering

Duties include:

- Conducting tutorials and/or lab sessions for the following courses
 - EECE 571N (Advanced Networking) (invited lectures on WLAN)
 - EECE 490 (Optical Networks)
 - EECE 356 (Electronic Circuits II)
 - EECE 280 (Electrical and Computer Engineering Laboratory I)
 - EECE 281 (Electrical and Computer Engineering Laboratory II).

Jan 1994 – **National Telecommunication Institute (NTI)**, Cairo, Egypt

Jan 2000

Research Associate

Duties include:

- Participated in defining the Egyptian standards for the safety specifications of cellular base stations located in urban areas
- Taught Computer Networks / Data Communication courses addressing network protocols such as TCP/IP, Frame relay, ATM, CSMA/CD Token Ring
- Participated in national research projects in telephone/data networks planning and design using simulation software, OPNET Modeler and OPNET Planner, PLANITU, COMNET and wrote software components using C++.

Sep 1995 – **American University in Cairo (AUC)**, Cairo, Egypt
 Jan 1997 **Teaching Assistant, Applied Science Department**

Duties include:

- Conducting tutorial and lab sessions for the following courses
 - PHYS 215 (Electronic Circuits)
 - PHYS 221 (Electronics LAB)
 - PHYS 319 (Digital Logic Design LAB).

PATENTS AND PUBLICATIONS

Patents (granted)

- [1] D. Trinchero, R. Stefanelli, A. Abu-Dayya, M. Hasna, A. Kadri, and **T. Khattab**, "A system for remote leak detection and/or path tracking for underground fluid transportation pipelines", EU patent EP 2352002 B1, 30 Oct, 2013.
- [2] **T. Khattab**, A. Mohamed, A. Abu-Dayya, B. Uthman, and L. Streletz, "System for non-invasive automated monitoring, detection, analysis, characterisation, prediction or prevention of seizures and movement disorder symptoms", EU patent EP 2399513 B1, 26 Apr, 2017.
- [3] M. Hafez, H. Arslan and **T. Khattab**, "Low complexity flexible beam-width for directional modulation," US patent number US 10135506, 20 Nov, 2018.
- [4] A. Badawy, **T. Khattab**, D. Trinchero, T. Elfouly and A. Mohamed, "Method and apparatus for simple angle of arrival estimation," US patent number US 10386447, 20 Aug, 2019.

Patents (filed)

- A. Badawy, **T. Khattab**, T. Elfouly, Carla Fabiana Chiasserini, A. Mohamed and D. Trinchero, "Method for generating a secret key for encrypted wireless communications," US patent application US 20170338956 A1, 23 Nov, 2017.
- A. Badawy, T. Elfouly, **T. Khattab**, Carla Fabiana Chiasserini, D. Trinchero and M. H. Ahmed, "Non-Coherent Ultra-Wideband Receiver," US patent application, 17 Jan, 2018.
- **T. Khattab**, M. Hafez, A. Shikfa and H. Arslan, "Method and apparatus for location based secure data transmission," Submitted to QU patenting office, 20 Aug, 2019.

Books (published)

- **T. Khattab**, "Optical Code Division Multiplexing: A Mechanism for Sub-Wavelength Switching in All-Optical Networks", VDM Verlag Dr. Müller, 30 Nov, 2008, ISBN 3639093216

Journals (published)

- [1] A. M. Salama, I. Samy, A. El Shafie, A. Mohamed and **T. Khattab**, "Centralized and Distributed Cognitive Relay-Selection Schemes for SWIPT Cognitive Networks," in *IEEE Transactions on Communications*, doi: 10.1109/TCOMM.2019.2936562
- [2] E. Yaacoub, K. Abualsaud, **T. Khattab**, M. Guizani and A. Chehab, "Secure mHealth IoT Data Transfer from the Patient to the Hospital: A Three-Tiers Approach," in *IEEE Wireless Communications*, doi: 10.1109/MWC.2019.1800590.
- [3] R. Shakeri, M. Al-Garadi, A. Badawy, Amr Mohamed, **T. Khattab**, A. Al-Ali, K. Harras and M. Guizani, "Design Challenges of Multi-UAV Systems in Cyber-Physical Applications: A Comprehensive Survey, and Future Directions," in *IEEE Communications Surveys & Tutorials*, doi: 10.1109/COMST.2019.2924143
- [4] H. Shehata and **T. Khattab**, "Energy Detection Spectrum Sensing in Full-Duplex Cognitive Radio: The Practical Case of Rician RSI," in *IEEE Transactions on Communications*, doi: 10.1109/TCOMM.2019.2916069.
- [5] M. Al-Sa'd, A. Al-Ali, A. Mohamed, **T. Khattab** and A. Erbad, "RF-based drone detection and identification using deep learning approaches: An initiative towards a large open source drone database," *Future Generation Computer Systems*, vol. 100, pp. 86-97, 2019.
- [6] M. Hafez, **T. Khattab** and H. Arslan, "DFT-Based Multi-Directions Directional Modulation," in *IEEE Wireless Communications Letters*, vol. 8, no. 4, pp. 1232-1235, Aug. 2019.
- [7] E. Yaacoub, M. Al-Husseini, A. Chehab, K. Abualsaud, **T. Khattab** and M. Guizani, "3D Beamforming With Massive Cylindrical Arrays for Physical Layer Secure Data Transmission," in *IEEE Communications Letters*, vol. 23, no. 5, pp. 830-833, May 2019.
- [8] K. Abualsaud, T. M. Elfouly, **T. Khattab**, E. Yaacoub, L. S. Ismail, M. H. Ahmed, and M. Guizani, "A survey on Mobile Crowd-sensing and its Applications in the Iot Era," *IEEE Access*, vol. 7, pp. 3855–3881, 2019.
- [9] A. Krishna, A. F. Abdelaziz, and **T. Khattab**, "Patch Antenna Array Designs for Wireless Communication Applications inside Jet Engines," *IEEE Transactions on Antennas and Propagation*, vol. 67, pp. 971–979, Feb 2019.
- [10] A. El Shafie, **T. Khattab**, A. El-Keyi, "Energy-efficient cooperative cognitive relaying schemes for cognitive radio networks," *Physical Communication*, vol. 30, pp. 179-192, 2018.

- [11] M. Hafez, A. El Shafie, M. Shaqfeh, **T. Khattab**, H. Alnuweiri, and H. Arslan, "Thresholds Optimization for One-bit Feedback Multi-user Scheduling," *IEEE Wireless Communications Letters*, vol. 7, pp. 646–649, Aug. 2018.
- [12] F. Foukalas, R. Shakeri and **T. Khattab**, "Distributed Power Allocation for Multi-Flow Carrier Aggregation in Heterogeneous Cognitive Cellular Networks," in *IEEE Transactions on Wireless Communications*, vol. 17, no. 4, pp. 2486–2498, April 2018. doi: 10.1109/TWC.2018.2796594.
- [13] C. G. Tsinos, F. Foukalas, **T. Khattab** and L. Lai, "On Channel Selection for Carrier Aggregation Systems," in *IEEE Transactions on Communications*, vol. 66, no. 2, pp. 808–818, Feb. 2018. doi: 10.1109/TCOMM.2017.2757478.
- [14] M. Hafez, M. Yusuf, **T. Khattab**, T. Elfouly and H. Arslan, "Secure Spatial Multiple Access Using Directional Modulation," in *IEEE Transactions on Wireless Communications*, vol. 17, no. 1, pp. 563–573, Jan. 2018. doi: 10.1109/TWC.2017.2768419.
- [15] A. Taherpour, H. Mokhtarzadeh and **T. Khattab**, "Optimized Error Probability for Weighted Collaborative Spectrum Sensing in Time- and Energy-Limited Cognitive Radio Networks," in *IEEE Transactions on Vehicular Technology*, vol. 66, no. 10, pp. 9035–9049, Oct. 2017. doi: 10.1109/TVT.2017.2706142.
- [16] H. Khakzad, A. Taherpour, R. Shakeri and **T. Khattab**, "Dynamic interference-limited relay sharing in cognitive radio networks by using hierarchical modulation," in *IET Communications*, vol. 11, no. 12, pp. 1903–1912, 8 24 2017. doi: 10.1049/iet-com.2016.0816.
- [17] S. Stefanatos, F. Foukalas and **T. Khattab**, "On the Achievable Rates of OFDM With Common Phase Error Compensation in Phase Noise Channels," in *IEEE Transactions on Communications*, vol. 65, no. 8, pp. 3509–3521, Aug. 2017. doi: 10.1109/TCOMM.2017.2705071
- [18] P. D. Diamantoulakis, K. N. Pappi, S. Muhaidat, G. K. Karagiannidis and **T. Khattab**, "Carrier Aggregation for Cooperative Cognitive Radio Networks," in *IEEE Transactions on Vehicular Technology*, vol. 66, no. 7, pp. 5904–5918, July 2017. doi: 10.1109/TVT.2016.2635112
- [19] S. Sedighi, A. Taherpour, S. Gazor and **T. Khattab**, "Eigenvalue-Based Multiple Antenna Spectrum Sensing: Higher Order Moments," in *IEEE Transactions on Wireless Communications*, vol. 16, no. 2, pp. 1168–1184, Feb. 2017. doi: 10.1109/TWC.2016.2640299
- [20] A. Badawy, T. Salman, T. Elfouly, **T. Khattab**, A. Mohamed and M. Guizani, "Estimating the number of sources in white Gaussian noise: simple eigenvalues based approaches," in *IET Signal Processing*, vol. 11, no. 6, pp. 663–673, 8 2017. doi: 10.1049/iet-spr.2016.0128
- [21] A. Elmahdy, A. El-Keyi, Y. Mohasseb, T. ElBatt, M. Nafie, K. Seddik and **T. Khattab**, "Degrees of Freedom of the Full-Duplex Asymmetric MIMO Three-Way Channel With Unicast and Broadcast Messages," in *IEEE Transactions on Communications*, vol. 65, no. 8, pp. 3276–3287, Aug. 2017. doi: 10.1109/TCOMM.2017.2664866
- [22] A. Badawy, **T. Khattab**, D. Trincherro, T. Elfouly, and A. Mohamed, "A Simple Cross Correlation Switched Beam System (XSBS) for Angle of Arrival Estimation," in *IEEE Access*, vol.5, pp.3340–3352, doi: 10.1109/ACCESS.2016.2613932, Feb. 2017.
- [23] A. El Shafie, **T. Khattab** and A. Sultan Salem, "Relay-Assisted Primary and Secondary Transmissions in Cognitive Radio Networks," in *IEEE Access*, vol.4, pp.6386–6400, doi: 10.1109/ACCESS.2016.2613932, Feb. 2017.
- [24] L. Samara; M. Mokhtar; O. Ozdemir; R. Hamila; **T. Khattab**, "Residual Loop-Back Self-Interference Analysis for Full-Duplex OFDM Transceivers under Phase Noise and I/Q Imbalance," in *IEEE Communications Letters*, vol.21, no.2, pp.314–317. doi: 10.1109/LCOMM.2016.2620431, Feb. 2017.
- [25] S. Sedighi; A. Taherpour; S. Gazor; **T. Khattab**, "Eigenvalue-Based Multiple Antenna Spectrum Sensing: Higher Order Moments," in *IEEE Transactions on Wireless Communications*, vol.16, no.2, pp.1168–1184. doi: 10.1109/TWC.2016.2640299, Feb. 2017.
- [26] Ahmed Badawy, Tarek Elfouly, Carla-Fabiana Chiasserini, **Tamer Khattab**, Daniele Trincherro, "Exploiting spectrum sensing data for key management," *Computer Communications*, vol.97, pp.31–39, doi: 10.1016/j.comcom.2016.10.008, Jan. 2017.
- [27] T. A. Tsiftsis, F. Foukalas, G. K. Karagiannidis and **T. Khattab**, "On the Higher Order Statistics of the Channel Capacity in Dispersed Spectrum Cognitive Radio Systems Over Generalized Fading Channels," in *IEEE Transactions on Vehicular Technology*, vol.65, no.5, pp. 3818–3823, doi: 10.1109/TVT.2015.2436341, May. 2016.
- [28] A. Krishna, **T. Khattab**, A. F. Abdelaziz and M. Guizani, "Swinging with the Jet Set: Analysis of Electromagnetic Fields Inside Jet Engines--From Numerical and Experimental Analysis to Statistical Analysis," in *IEEE Microwave Magazine*, vol. 17, no. 11, pp. 61–72, doi: 10.1109/MMM.2016.2600947, Nov. 2016.
- [29] Ahmed El Shafie and **Tamer Khattab**, "Throughput of a cooperative energy harvesting secondary user in cognitive radio networks," *Transactions on Emerging Telecommunications Technologies*, vol.27, no.10, pp.1365–1379, doi: 10.1002/ett.3060, Oct. 2016.
- [30] Ahmed Badawy, Tarek Elfouly, **Tamer Khattab**, Carla-Fabiana Chiasserini, Amr Mohamed and Daniele Trincherro, "Robust secret key extraction from channel secondary random process," *Wireless Communications and Mobile Computing*, vol.16, no.11, pp.1389–1400, doi: 10.1002/wcm.2695, Aug. 2016.

- [31] A. El Shafie, **T. Khattab**, A. El-Keyi and M. Nafie, "Maximum Secondary Stable Throughput of a Cooperative Secondary Transmitter–Receiver Pair: Protocol Design and Stability Analysis," in *IEEE Transactions on Vehicular Technology*, vol.65, no.7, pp.4937–4951, doi: 10.1109/TVT.2015.2464821, Jul. 2016.
- [32] Ahmed Badawy, Tarek Elfouly, **Tamer Khattab**, Amr Mohamed, Mohsen Guizani, "Unleashing the secure potential of the wireless physical layer: Secret key generation methods," *Physical Communication*, vol.19, pp.1–10, doi: 10.1016/j.phycom.2015.11.005, Jun. 2016.
- [33] Karim Allidina, **Tamer Khattab**, Mourad N. El-Gamal, "On dual peak detection UWB receivers in noise and interference dominated environments," *AEU - International Journal of Electronics and Communications*, vol.70, no.2, pp.121–131, doi: 10.1016/j.aeue.2015.10.002, Feb. 2016.
- [34] Ahmed El Shafie, **Tamer Khattab**, Amr El-Keyi and Mohamed Nafie, "On the coexistence of a primary user with an energy harvesting secondary user: a case of cognitive cooperation," *Wireless Communications and Mobile Computing*, vol.16, no.2, pp.166–176, doi: 10.1002/wcm.2507, Feb. 2016.
- [35] Z. Pourgharehkhani, A. Taherpour, J. Sala, and **T. Khattab**, "Correlated Multiple Antennas Spectrum Sensing Under Calibration Uncertainty," *IEEE Transactions on Wireless Communications*, vol.14, no.12, pp.6777–6791, doi: 10.1109/TWC.2015.2459706, Dec. 2015.
- [36] S. Sedighi, A. Taherpour, J. Sala-Alvarez and **T. Khattab**, "On the Performance of Hadamard Ratio Detector-Based Spectrum Sensing for Cognitive Radios," *IEEE Transactions on Signal Processing*, vol.63, no.14, pp.3809–3824, doi: 10.1109/TSP.2015.2434330, Jul. 2015.
- [37] M. Hafez, **T. Khattab** and H. Shalaby, "Blind SNR Estimation of Gaussian-Distributed Signals in Nakagami Fading Channels," *IEEE Transactions on Wireless Communications*, Vol.14, no.7, pp. 3509–3518, doi: 10.1109/TWC.2015.2403325, Jul. 2015.
- [38] M. Moussa, F. Foukalas and **T. Khattab**, "Interference cancellation through interference alignment for downlink of cognitive cellular networks," *IET Electronics Letters*, vol.51, no.1, pp.54–56, doi: 10.1049/el.2014.2656, Jan. 2015.
- [39] A. El Shafie and **T. Khattab**, "On Orthogonal Band Allocation for Multiuser Multiband Cognitive Radio Networks: Stability Analysis," *IEEE Transactions on Communications*, vol.63, no.1, pp.37–50, doi: 10.1109/TCOMM.2014.2369045, Jan. 2015.
- [40] F. Foukalas and **T. Khattab**, "To Relay or Not To Relay in Cognitive Radio Sensor Networks," *IEEE Transactions on Vehicular Technology*, vol.64, no.11, pp.5221–5231, doi: 10.1109/TVT.2014.2376944, Nov. 2015.
- [41] A. Abdelaziz, D. Trincherro, and **T. Khattab**, "Statistical Analysis of Electromagnetic Field Inside a Jet Engine Using the Reverberation Chamber Approach," *Progress In Electromagnetics Research M*, vol.24, pp.157–165, Mar. 2012.
- [42] M. ElKashlan and **T. Khattab**, "Generalized dynamic spectrum access: An order statistics design perspective," *AEU - International Journal of Electronics and Communications*, Elsevier, vol.63, no.12, pp.1054–1060, doi: 10.1016/j.aeue.2008.08.005, Dec. 2009.
- [43] M. ElKashlan, **T. Khattab**, R. Schober, and C. Leung, "Statistics of General Order Selection in Correlated Nakagami Fading Channels," *IEEE Transactions on Communications*, vol.56, no.3, pp.344–346, doi: 10.1109/TCOMM.2008.050646, Mar. 2008.
- [44] **T. Khattab** and H. Alnuweiri, "Optical CDMA for All-Optical Sub-Wavelength Switching in Core GMPLS Networks," *IEEE Journal of Selected Areas in Communications*, vol.25, no.5, pp.905–921, doi: 10.1109/JSAC.2007.070605, Jun. 2007.
- [45] **T. Khattab** and H. Alnuweiri, "Optical Orthogonal Code Construction using Rejected Delays Reuse for Increasing Sub-Wavelength Switching Capacity," *IEEE Journal of Lightwave Technology*, vol.24, no.9, pp.3280–3287, doi: 10.1109/JLT.2006.879207, Sep. 2006.
- [46] A. Kaheel, **T. Khattab**, A. Mohamed, and H. Alnuweiri, "Quality-of-Service Mechanisms in IP-over-WDM Networks," *IEEE Communication Magazine*, vol.40, no.12, pp.38–43, doi: 10.1109/MCOM.2002.1106157, Dec. 2002.
- [47] **T. Khattab**, M.T. El-Hadidi, and H.M. Mourad, "Analysis of Wireless CSMA/CA Network Using Single Station Superposition (SSS)," *AEU - International Journal of Electronics and Communications*, Elsevier, vol.56, no.2, pp.73–83, doi: 10.1078/1434-8411-54100076, Mar/Apr 2002.

Selected Refereed Conference Papers

- E. Yaacoub, A. Chehab, M. Al-Husseini, K. Abualsaud, **T. Khattab** and M. Guizani, "Joint Security and Energy Efficiency in IoT Networks Through Clustering and Bit Flipping," *2019 15th International Wireless Communications & Mobile Computing Conference (IWCMC)*, Tangier, Morocco, 2019, pp. 1385–1390.
- G. Essam, H. Shehata, **T. Khattab**, K. Abualsaud and M. Guizani, "Novel Hybrid Physical Layer Security Technique in RFID Systems," *2019 15th International Wireless Communications & Mobile Computing Conference (IWCMC)*, Tangier, Morocco, 2019, pp. 1299–1304.
- A. ElSamadouny, H. Shehata, **T. Khattab**, K. Abualsaud and M. Guizani, "On Correlation-Based Channel Sensing with IQ Imbalance," *2019 15th International Wireless Communications & Mobile Computing Conference (IWCMC)*, Tangier, Morocco, 2019, pp. 817–820.

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 - S. A. Mousavifar, C. Leung, and **T. Khattab**, "*Lifetime Maximization for Greedy Selective Relay Strategies*," GCC Conference and Exhibition (GCC), 2009 IEEE, 17-19 Mar, 2009, Kuwait City, Kuwait
 - **T. Khattab**, M. Elkashlan, and H. Alnuweiri, "*A New Simple Method for Calculating the Bit Error Rate of OCDMA Systems*," IEEE Symposium on Computers and Communications (ISCC), 2007 IEEE, 1-4 Jul, 2007, Aveiro, Portugal
 - M. Elkashlan, **T. Khattab**, and H. Alnuweiri, "*A New Simple Order-Based Multiple Access Scheme*," IEEE Symposium on Computers and Communications (ISCC), 2007 IEEE, 1-4 Jul, 2007, Aveiro, Portugal
 - **T. Khattab** and H. Alnuweiri, "*A Greedy Algorithm for Deriving Optical Orthogonal Codes using Rejected Delays Reuse*," Global Telecommunications Conference (GLOBECOM), 2005 IEEE, 28 Nov-2 Dec, 2005, St. Louis, MO, USA
 - **T. Khattab** and H. Alnuweiri, "*Cross-Layer Throughput Analysis for Optical Code Labelled GMPLS Networks*," International Conference on Broadband Networks (BROADNETS), 2005 IEEE/ACM, 3-7 Oct, 2005, Boston, MA, USA
 - M. Elkashlan, **T. Khattab**, C. Leung and R. Schober, "*Order Statistics for Correlated Fading Channels*," Pacific Rim Conference on Communications, Computers and Signal Processing (PACRIM), 2005 IEEE, 24-26 Aug, 2005, Victoria, BC, Canada
 - S. Khan, **T. Khattab** and H. Alnuweiri, "*Analysis and Modeling of Physical Layer Alternatives in OFDM Based WLANs*," International Conference on Wireless Networks, Communications, and Mobile Computing (WIRELESSCOM), 2005 IEEE, 13-16 Jun, 2005, Maui, HI, USA
 - **T. Khattab** and H. Alnuweiri, "*Optical GMPLS Networks with Code Switch Capable Layer for Sub-Wavelength Switching*," Global Telecommunications Conference (GLOBECOM), 2004 IEEE, 29 Nov-3 Dec, 2004, Dallas, TX, USA
 - **T. Khattab**, A. Mohamed, A. Kaheel, and H. Alnuweiri, "*Optical Packet Switching with Packet Aggregation*," IEEE International Conference on Software, Telecommunications, and Computer Networks (SOFTCOM) 8-11 Oct, 2002, Split, Croatia
 - A. Mohamed, A. Kaheel, **T. Khattab**, and H. Alnuweiri, "*Evaluation of Optical Packet Switch as Edge Device Using OPNET Modeler*," OPNETWORK Aug, 2002, Washington DC, USA

AWARDS

- IEEE International Wireless Communications & Mobile Computing conference Best Paper Award (2019)
- Qatar University, College of Engineering Best Senior Design Project Award (2019)
- Qatar University, College of Engineering Dean's Research Award (2015)
- Qatar National Research Fund award for Outstanding Research in the Undergraduate Research Experience Program, UREP, (2014).
- University of British Columbia Research Assistantship (2003 – 2006)
- University of British Columbia Ph.D. Tuition Award (2003 – 2005)
- Best innovative approach award from Alcatel Canada (2001)
- Most effective internal tool development team-lead from IBM wtc. (1998)
- Cairo University M.Sc. Tuition Award (1995 – 1999)
- Cairo University Faculty of Engineering Undergrad Excellence Award (1988 – 1993)

EDITORIAL AND TECHNICAL REVIEW COMMITTEES

Journal Editorial

- IEEE Open Journal of the Communications Society (Editor)
- IEEE Communications Letters (Editor)

Journal Review

- IEEE Transactions on Communications
- IEEE Transactions on Wireless Communications
- IEEE Transactions on Signal Processing
- IEEE Communications Magazine
- IEEE Journal of Lightwave Technology
- IEEE Journal of Selected Areas in Communications
- IEEE Communications Letters
- IEEE Photonics Technology Letters
- IEEE Journal of Selected Topics in Quantum Electronics.

Conferences TPC

- IEEE Personal Indoor Mobile Radio Communications (PIMRC)
- IEEE International Conference on Computers and Communications (ICC)
- IEEE Global Telecommunications Conference (GLOBECOM)
- IEEE Symposium on Computers and Communications (ISCC)
- IEEE Vehicular Technology Conference (VTC)
- IEEE Wireless Communications and Networking (WCNC)
- IEEE International Conference of Telecommunications (ICT)

Research Funding Review

- NSERC Canada Collaborative Research and Development (CRD) grants technical committee (invited reviewer)
- NSERC Canada Idea to Industry (I2I) grants technical committee (invited reviewer)
- ictQatar Innovations prototyping fund in the area of optical communications and processing (expert opinion and invited reviewer).

RESEARCH FUNDRAISING EXPERIENCE

- Principle Investigator (PI) of a National Priorities Research Program (NPRP): "Optimized Security for eHealth Internet of Things Systems," Qatar National Research Fund (QNRF) for 600K \$US (2018 – 2020), grant number NPRP10-1205-160012.
- Lead Principle Investigator (LPI) for a National Priorities Research Program (NPRP): "Towards a Smart Mobile System: Exploiting Users' Predictability," Qatar National Research Fund (QNRF) for 900K \$US (2016 – 2018), grant number NPRP 7-923-2-344
- Lead Principle Investigator (LPI) for a National Priorities Research Program (NPRP): "P-SpARC: A Framework for Pervasive-Spectrum Aggregating Radio with Cognition," Qatar National Research Fund (QNRF) for 900K \$US (2014 – 2016), grant number NPRP 6-1326-2-532
- Co-Principle Investigator (Co-PI) of a National Priorities Research Program (NPRP): "Information Theory Enabled Secure Wireless Networking: Scaling Laws, Network Control, and Implementation," Qatar National Research Fund (QNRF) for 900K \$US (2013 – 2015), grant number NPRP 5-559-2-227.
- Lead Principle Investigator (LPI) for a National Priorities Research Program (NPRP): "Efficient Control of Stochastic Cognitive Radio Networks," Qatar National Research Fund (QNRF) for 1,05K \$US (2010-2013), grant number NPRP 09-1168-2-455
- Co-Lead Principle Investigator (Co-LPI) for a National Priorities Research Program (NPRP): "Research, Design and Implementation of the Physical Layer of the Long Term Evolution Mobile Station," Qatar National Research Fund (QNRF) for 700K \$US (2010-2012), grant number NPRP 09-231-2-095, Lead Principle Investigator (LPI) Essam Sourour, Alexandria University, Egypt
- Co-Lead Principle Investigator (Co-LPI) for a National Priorities Research Program (NPRP) grant: "Cognitive Radio Channels: Detection, Medium Access, Cooperation, and Secrecy," Qatar National Research Fund (QNRF) for 1,050K \$US (2009-2012), grant number NPRP 08-522-2-211, Lead Principle Investigator (LPI) Hesham El Gamal, Ohio State University, USA
- Co-Lead Principle Investigator (Co-LPI) for a National Priorities Research Program (NPRP) grant: "Towards More Efficient and Smart Jet Engines," Qatar National Research Fund (QNRF) for 1,050K \$US (2009-2012), grant number NPRP 08-700-2-296, Lead Principle Investigator (LPI) Mourad El Gamal, McGill University, Canada
- Lead Principle Investigator (LPI) for a National Priorities Research Program (NPRP) grant: "Energy Efficient Wireless Sensor Networks: A Cooperative Communications Perspective," Qatar National Research Fund (QNRF) for 400K \$US (2008-2010), grant number NPRP 1-7-7-3
- Co-Principle Investigator (Co-PI) for a National Priorities Research Program (NPRP) grant : "On Line Machine Monitoring System Using FE Modeling and Vibration Measurements," Qatar National Research Fund (QNRF) for 1,050K \$US (2009-2012), grant number NPRP 08-102-2-026, Lead Principle Investigator (LPI) Mohamed Gadala, University of British Columbia, Canada
- Co-Principle Investigator (Co-PI) for a National Priorities Research Program (NPRP) grant: "Wireless Sensor Networks for the Survey of Gas and Water Distribution Networks," Qatar National Research Fund (QNRF) for

- 1,050K \$US (2009-2012), grant number NPRP 08-372-2-142, Lead Principle Investigator (LPI) Daniele Trinchero, Politecnico di Torino, Italy
- Co-Principle Investigator (Co-PI) for a National Priorities Research Program (NPRP) grant: "Wireless Mesh Networking Research: From Theory to Practice," Qatar National Research Fund (QNRF) for 1,050K \$US (2009-2012), grant number NPRP 08-374-2-144, Lead Principle Investigator (LPI) Y. Charlie Hu, Purdue University, USA
- Co-Principle Investigator (Co-PI) for an industrial funded grant: "Broadband Wireless Initiative," Ooredoo (Qatar telecommunications carrier) for 3,500,000 QR (2009 – 2014), grant number QUEx-Qtel-09/10-10
- Principle Investigator (PI) for an Internal Research grant: "Physical Layer Optimization of Unified Broadcasting 7 mobile System: Studies & Performance Analysis," Qatar University Internal Grants Program for 125K QR (2012-2014), grant number QUUG-CENG-DEE-11/12-1
- Principle Investigator (PI) for an Internal Research grant: "*Applications of Wireless Sensor Networks in the State of Qatar*," Qatar University Internal Grants Program for 80K QR (2008-2009), grant number 07008E
- Co-Principle Investigator (Co-PI) for an Undergraduate Research Experience Program (UREP) grant: "Contactless Power/Data Transfer for Electric Vehicles," Qatar National Research Fund (QNRF) for 60K \$US (2013-2014), grant number UREP 12-082-2-035
- Principle Investigator (PI) for an Undergraduate Research Experience Program (UREP) grant: "Plug and Play Single Phase Photovoltaic AC Module Integrated Converter with Wireless Coordination," Qatar National Research Fund (QNRF) for 60K \$US (2013-2014), grant number UREP 11-138-2-049
- Principle Investigator (PI) for an Undergraduate Research Experience Program (UREP) grant: "Hybrid Cellular-TMC GPS: A Method for Traffic Congestion Avoidance in Doha," Qatar National Research Fund (QNRF) for 40K \$US (2009-2010), grant number UREP 06-081-2-019
- Principle Investigator (PI) for an Undergraduate Research Experience Program (UREP) grant: "*Development of a Simulator for 3GPP Long Term Evolution (LTE) OFDM Baseband Transceiver*," Qatar National Research Fund (QNRF) for 20K \$US (2008-2009), grant number UREP 4-4-29

OTHER RESEARCH RELATED ACTIVITIES

- Delivered technical presentations on group research work for local and global industries: Qualcomm (CA, USA), Spectrum Signal Processing (BC, Canada), PMC-Sierra (BC, Canada), UTStarcom (BC, Canada), Newport Media Inc. (CA, USA), SysDSOft (Cairo, Egypt), RasGas (Qatar), QAPCO (Qatar), Ooredoo (Qatar) and Vodafone (Qatar)
- Took a major role in preparing grant application for NSERC, Telus Inc. and Sierra Wireless Inc. Collaborative Research and Development grant: "*Gigabit Wireless Multimedia Networks*" (2006-2009)
- Actively participated in writing grant application for NSERC and Spectrum Inc. Collaborative Research and Development grant: "*New Architectures and Protocols for Tightly-Coupled Multimedia Conferencing over the Mobile Internet*" (2003-2006).

AFFILIATIONS

- Founding Chair of IEEE ComSoc and ITSoc joint section in Qatar
- Observing member of the 802.11n standards group
- Volunteering committee member of the IEEE NOMS 2006 conference, Vancouver, BC, Canada
- Observing member of the IETF CCAMP task force for GMPLS
- Member of IEEE (1995 – present)
- Member of IEEE Photonics Society
- Member of IEEE Communications Society
- Member of IEEE Information Theory Society
- Member of IEEE Signal Processing Society
- Member of the Egyptian Wireless Communications Standards Group (1994 – 1998)
- Member of the New York Academy of Science and Technology (1995 – 1996)
- Member of the Egyptian Syndicate for Engineers (1993 – present).

INDUSTRIAL EXPERIENCE

Jan 2009 – **Qatar Mobility Innovation Center (QMIC), Doha, Qatar**
Present **Senior Member of the Technical Staff**

Duties included:

- Development of strategic direction in research and development in the area of broadband wireless communications
- Participation in research proposal preparation teams
- Leading a research team in the area of signal processing for healthcare applications
- Leading active development team in the areas of wireless sensors applications in human movement detection and classification
- Participating in a research team working on the use of wireless sensors for water leakage detection in domestic water distribution networks

Feb 2000 – **Alcatel Lucent, Vancouver, B.C., Canada**
Jan 2003 **Firmware Designer, Network and Service Management R&D**

Duties included:

- Analysis, design and implementation of the multi-process multithreaded market leading network management software (Alcatel 5620 NM) using UML methods and C/C++ on Solaris
- Design and implementation of the network management module for the market leading multi-protocol DSL multiplexing switch (Alcatel 7300 ASAM) using UML, TC shell scripting and C/C++ on Solaris
- Modification of the process management module for the Alcatel 5620 using shell scripting and C on Solaris
- Design and implementation of an automated card support system for the Alcatel 5620 using UML and C++ on Solaris
- Design and implementation of market leading service management software (Alcatel 5620 SM) using UML, Java and JSP technology on Windows NT.

Feb 1998 – **IBM WTC, Cairo, Egypt**
Jan 2000 **Client-Server Applications Team Lead, Egypt Development Group**

Duties included:

- Analysis, design and implementation of a multi-platform client/server multithreaded project
- Object oriented modeling and development of multiple OO frameworks using Rational Rose modeling tool, VisualAge for Java Enterprise 1.0 and 2.0 under Windows NT and SUN/IBM JDK 1.1. *
- Database design and development using SQL on DB2
- NLS (National language support) concepts and business knowledge
- Lotus Notes programming using Notes Java APIs.

Feb 1997 – **Cable Network Egypt (CNE), Cairo, Egypt**
Jan 1998 **Transmission System Engineer**

Duties included:

- Support and operation of the play out center of 6 channels for a private satellite based encoded TV transmission system.

Dec 1996 – **Connect All (Running Own Business), Cairo, Egypt**
May 1998 **Founder and Chief Technology Engineer**

Duties included:

- Design, planning and installation of LAN systems for different applications
- Installation and support for Point of Sales Systems for food and beverage control.

Feb 1994 – **IBM WTC, Cairo, Egypt**
Jan 1997 **Software Designer, Egypt Development Group**

Duties included:

- Analysis, design and implementation of several multi-platform client/server projects
- Object oriented modeling and development of multiple OO frameworks using OMT modeling tool and IBM CSet++, VisualAge C++ under OS/2 and Windows 95
- Database design and development using DB2/2
- NLS (National language support) concepts
- IBM REXX programming.

Aug 1993 – **Giza Systems Engineering (DIGITAL only Dealer), Cairo, Egypt**

Jan 1994 **Hardware Maintenance Engineer**

Duties included:

- Maintenance of PCs, Main Frames, and Mini Computers
- VMS system support.

ACTIVITIES AND INTERESTS

I enjoy playing soccer, squash, chess, swimming as well as traveling and reading.

CITIZENSHIP

Canadian