

Dr. Khawla Alnajjar

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Dept. of Electrical Engineering
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Nationality: UAE

Research Profile:

University of Sharjah: <http://www.sharjah.ac.ae/en/academics/Colleges/eng/dept/ecep/Pages>

Google Sites: <https://sites.google.com/site/khawlaalnajjar/>

Google Scholar:

http://scholar.google.com/citations?user=uZvz_esAAAAJ&hl=en

Scopus ID:

<https://www.scopus.com/authid/detail.uri?authorId=54894294500>

Research Gate:

https://www.researchgate.net/profile/Khawla_Alnajjar

ORCID number: 0000 – 0002 – 4218 – 9687

Education

Jun 2015. **Ph.D.** in Electrical and Electronic Engineering,
University of Canterbury, New Zealand
Dissertation: *Receiver Design for Massive MIMO*.
Advisor: Prof. Peter J. Smith.
Co-advisor: Dr. Graeme K. Woodward.
Thesis Examiners Committee: Dr. Michal Maithaiou and Dr. Kevin W Sowerby.
Oral Examination Chair: Prof. Maan Alkaisi.

Feb 2013 **P.D.** in Electrical Engineering.
Columbia University in the City of New York.
Supervisors: Prof. Xiaodong Wang
and Prof. Richard W. Longman.

Feb 2011 **MSc** in Electrical Engineering.
Columbia University in the City of New York.
Supervisor: Prof. Xiaodong Wang.

Jan 2008 **BSc** in Electrical Engineering, Communication Engineering track.
United Arab Emirates University, Al Ain, UAE.
Senior Thesis Advisor: Dr. Mohammed Abdel Hafez.

Work Experience

- Sept. 2016 - present Assistant Professor,
Dept. of Electrical Engineering,
University of Sharjah, Sharjah, UAE.
- Sept. 2015 - Aug. 2016 Visiting academic (Assistant Prof.),
Dept. of Electrical and Computer Engineering,
University of Sharjah, Sharjah, UAE.
- Nov. 2014 Visiting Scholar,
Macquarie University, Sydney, Australia,
Project: *Array design for massive MIMO*.
- May 2012 - Aug. 2012 Internship at Wireless Research Center,
University of Canterbury Christchurch, New Zealand,
Project: *LTE Interference Management using MIMO and SISO*.
- Feb. 2012 - May 2012 LMT Arabic Tutorials,
Columbia University,
New York, US.
- Aug. 2010 – Dec. 2012 Lab Assistant and Grader,
Columbia University, New York, US,
Signal and Systems, Commun. Theory, and MIMO Wireless Commun.
- Jun 2011 - April 2012 Internship at AT&T Shannon lab,
New Jersey, US,
Project: *Interference Alignment*.
- May 2010 - Aug. 2010 Internship at Total,
Pau, France,
Project: *Optimization Green Energy*.
- Aug. 2008 Jan. 2013 National TA,
United Arab Emirates University,
Al Ain, UAE.
- Aug. 2008 Jan. 2013 Academic Assistant,
United Arab Emirates University, Al Ain, UAE,
Freshman Lab, Intro. to Eng. Ethics and Design, and Calculus for Eng.
- Sep. 2006 - Dec. 2006 Internship at Dassault Aviation,
Paris, France,
Project: *Validation of a New Test Bench Comp. PCB Program*.
- Jun 2006 - July 2006 Internship at General Information Authority
Abu Dhabi, UAE
Project: *GIA Web site development support and update*.

Professional Experience at University of Sharjah (UoS)

Courses taught at UoS (Sept. 2015-present):

- 0402348: Signals & Control Systems
- 0402444: Digital Signal Processing
- 0402540: Communication System Engineering (**Graduate Level**).
- 0402346: Telecommunication Systems I
- 04023471: Telecommunication Systems I Lab
- 0403300: Professional & Social Issues in Engineering.
- 0402241: Random Signal Theory.
- 0402240: Signals and Systems.
- 0402341: Multimedia Technology Lab.
- 0402343: Random Signal & Systems.
- 0402493: Senior Seminar in Electrical and Electronics Engineering.
- 0402340: Engineering Computer and Linear Algebra.

Selected Administrative Experience at UoS

Women in Research Committee,	2020-current.
Media Committee, COE department,	2019-current.
Social Affairs Committee, COE,	2019-2020.
Innovation Committee, EE department,	2019-current.
New Program Committee, COE & COCI	2019-2020.
Achievement & Publicity, Community Service, and Exhibitions Committee, EE department,	2017-current.
A liaison officer for in Peer Education Program for CoE,	2017- current.
Engineering Innovation and Entrepreneurship Committee, CoE,	2017-2020.
Graduate Research & Research Committee, EE department,	2017-2019.
Student Disciplinary Committee, CoE,	2017-2019.
A Coordinator of Innovation and Entrepreneurship Course,	2017 - 2018.
Student Activities Committee (IEEE-WIE), EE department,	2015-current.
Chairing and examining Senior Design Projects, EE department,	2015-current.

Selected Funded Research Projects at UoS

- Targeted project, “Road Safety and Traffic Accidents Management System in the Internet of Vehicles Paradigm”, 2020 - current.
- Competitive Grant project “Advanced Signal Processing Algorithms and Performance Analysis for Next Generation Wireless Systems”, No. 18020403109, Oct. 2018 - present, Amount: AED 50,000.

- Funded Targeted Project “Optimal Resource Management for Cloud-Based Fifth Generation Wireless Networks”, 2016-2020, Amount: AED 130,000.
- Distributed and Networked Systems Research Group Operating Grant number 150410, 2015-present, Amount: AED 100,000 per year.
- Seed Research Grant No. 1602040224-P., “Massive MIMO Transceiver Design”, 2016 - 2020, Amount: AED 25,000.

List of Examined/ Supervised Graduate Students at UoS

- Hassan Vakani, graduated Msc student, *Thesis Examiner*, 2021. Thesis entitled: “Towards Improving the Imperceptibility of Steganography Schemes: Adaptive Scaling Approach.”
- Sam Ansari, current PhD student, 2020-current.
- Oruba Mazen Abdelkarim Alfawaz, graduated Msc student, *Supervisor*, 2019-2020. Thesis entitled: “Parallel Implementation of Receivers and Channel Estimation Using Multithreading for MIMO Systems and AF-TWRNs.”
- Nour Abdelrahman Suliman Mohamed, graduated Msc, *Co-supervisor*, 2020-2021. Thesis entitled: “Detecting Secret Messages in Images using Neural Networks (NN).”
- Ahmed I. Salameh, graduated Msc, *Thesis Examiner*, 2019. Thesis entitled: “Spectrally Efficient Channel and Carrier Frequency Offset Estimation for Two-way Relay Networks.”

List of Supervised Undergraduate Senior Design Projects at UoS

Data Acquisition System for water quality monitoring based on IoT framework,	Fall 2021 - current.
portable sanitation robot,	Fall 2021 - current.
Aviary monitoring and control system,	Fall 2021 - current.
Smart system for improving agricultural crops,	Spring 2020 - Fall 2020.
Smart device for bank note Detection,	Spring 2020 - Fall 2020.
Smart speech-generating device for medical purposes,	Spring 2018 - Fall 2018.
Smart device for the blind,	Spring 2017- Fall 2017.
Attendance system based on biometrics and RFID,	Fall 2016-Spring 2017.
Mini smart airport trolley,	Fall 2016- Spring 2017.
Vehicle collision avoidance,	Fall 2015- Spring 2016.
Portable attendance system using smart card,	Fall 2015- Spring 2016.
Queuing application,	Fall 2015- Spring 2016.

Professional Activities

Reviewer for Journals:

- IEEE Access.
- IEEE Transactions on Signal Processing.

- IEEE Signal Processing Letters.
- IEEE Transactions on Wireless. Communications.
- IEEE Transactions on Wireless Communications Letters.
- IEEE Transactions on Communications.
- IEEE Transactions on Wireless Communications Letters.
- IEEE Wireless Communications Letters. IEEE Communications Letters.
- IEEE Transactions on Vehicular Technology.
- EURASIP Journal on Advances in Signal Processing.
- Physical Communication (Elsevier).
- Journal of Circuits, Systems, and Computers.
- UET Journal.
- Almadar Journal of Communication, IT, and Applications (AJCITA).

Reviewer for Conferences:

- CCIOT.
- ECONF'20.
- ISSPIT.
- IEEE ICCSPA 2020.
- IEEE ICECTA'2019.
- IEEE 3ICT'19.
- 2019 IEEE Student Day. Competition/ AURAK.
- IEEE MENACOMM.
- IEEE PIMRC 2018.
- 2018 ICSigSys.
- ICMSAO'17.
- IEEE WCNC 2017.
- UAEGSRC 2017.
- UAEGSRC 2016.
- IEEE ICC 2014 WCS.

Technical/Organizing Program Committee:

- A member of Technical Committee in CCIOT, University of Ryukyu, Okinawa, Japan, Sep 2021.
- A member of organizing committee and reviewer committee in the 2st Forum for Women in Research, University of Sharjah, August 2021.

- A member of organizing committee in the 1st Forum for Women in Research Empowering Women in Scientific Research: Challenges, Opportunities and Recommendations, University of Sharjah, August 2020.
- A member of organizing committee in the 5th International Forum on Innovation and Entrepreneurship, University of Sharjah, Feb 2020.
- A member of organizing committee for Etihad Aviation Group Fikra University competition, University of Sharjah, Sep 2019.
- A member of judging committee in the 2nd Engineering undergraduate senior design project exhibition, University of Sharjah, May 2019.
- A session chair, International Conference on Electrical and Computing Techno. and Applications,(ICCSPA2019), American University of Sharjah, Sharjah, March 2019.
- A session chair, International Conference on Electrical and Computing Techno. and Applications (ICECTA2017), American University of Ras Al Khaimah, Ras Al Khaimah, 2017.

Selected Honors, Awards and Fundings

- Recipient of Young Emirati Researchers Prize (YERP) award, Ministry of Higher Education and National Research Foundation in UAE, in Jan. 2017, Amount: AED 30,000.
- Recipient the second best paper award from the IEEE International Symposium on Telecommunication technologies (ISTT), Malaysia, in Nov. 2016.
- Recipient of Rashid Award for Scientific Excellence, UAE, in Nov. 2015, Amount: AED 30,000.
- Recipient the best paper award from the IEEE Conf. on Information and Communication Technology Research (ICTRC), UAE, in May 2015.
- Recipient Young Emirati Postgraduate Research Students Mobility Award (YEPRSMA), National Research Foundation in UAE, in Jun 2014, Amount: AED 27,000
- Recipient UAE Ministry of Higher Education (MOHE) Award, UAE, in July 2013.
- Recipient of a Intel Award, New Zealand, in May 2013.
- Recipient of a UC Doctoral Scholarship Award, New Zealand, in Feb 2013.
- Received UAEU grants for graduate studies from 2009-2012.
- Selected to study the French language in Fall 2008 at INSA de Lyon, France in Fall 2008-2009.

- Selected to study English and US culture at the English Language Institute in the University Of Alabama US in Summer 2008.
- Selected to contribute to engineering projects in the Third Engineering Students Gathering in Sultan Qaboos University in Oman in Spring 2008.
- Selected by the Electrical Engineering Collage at UAE University to take industrial training at Dassault Aviation, France in 2008.
- Recipient of Sheikha Fatima Bint Mubarak award in 2008.
- Recipient of CNNA1 certificate in Dec 2007.
- Electrical Engineering High Honour List almost every semester.
- Ranked fifteenth among local students in the UAE (Abu Dhabi) in High School Stage.
- Selected to attend the Olympic mathematical competition during secondary school.

Research Interests

- Wireless Communications
- Next Generation Communication and Networking
- Telecommunications and signal processing
- Stochastic Models in Information
- Information and Coding Theory
- Random Signals and Noise
- Digital Control Systems and Control Theory
- Power Systems Stability and Control

Selected Publications

Submitted Papers:

- M. Saad, A. A. El-Moursey, O. Alfawaz, **K. A. Alnajjar** and S. Abdallah, “Wireless link scheduling via parallel genetic algorithm, *submitted for journal publication*, 2021.
- P. J. Smith, R. Senanayake, P. A. Dmochowski, **K. A. Alnajjar**, and A. Giorgetti, “The impact of channel type on spectrum sensing”, *submitted for journal publication*, 2021.
- **K. A. Alnajjar**, A. Jarndal and M. El-Tarhuni, “Performance evaluation of linear detectors for mmWave MIMO systems using ray-tracing channel model”, *submitted for journal publication*, 2021.

Journal Articles (published)

1. S. Abdallah, M. Saad, **K. A. Alnajjar**, A. A. El-Moursey, "Joint timing-offset and channel estimation for physical layer network coding in frequency selective environments, *IET Commun.*, 2021.
2. A. A. El-Moursy, S. Abdallah, M. Saad and **K. A. Alnajjar**, "Parallel two-way relay channel estimation in cloud-based 5G radio access networks", *IEEE Access*, No. 8, pp 144077-144091, Aug. 2020.
3. S. Abdallah, M. Saad, **K. A. Alnajjar** and M. Masood, "Semi-blind joint timing-offset and channel estimation for amplify-and-forward two-way relaying", 19 No. 4, pp 144077-144091, *IEEE Transaction on Wireless Commun.*, 2020.
4. **K. A. Alnajjar**, N. Abdulrahman, F. Mahdi and M. Alramsi "Vehicle collision avoidance", *part of the Commun. in Comp. and Inform. Science book series (CCIS, vol. 1264)*, Springer, Cham., Nov. 2019.
5. A. Tajer, S. Sihag and **K. A. Alnajjar**, "Non-linear state recovery in power system under bad data and cyber attack", *Journal of Modern Power Systems and Clean Energy*, Vol.7, No. 5, pp 1071-1080, Sep. 2019.
6. **K. A. Alnajjar** and M. El-Tarhuni, "A C-V-BLAST spread spectrum massive MIMO NOMA Scheme for 5G Systems with channel imperfections", *Elsevier Physical Commun.*, Vol. 35, 100720, Aug.2019.
7. A. Tajer and M. Fadel and **K. A. Alnajjar**, "Resource allocation under sequential resource access", *IEEE Transactions on Commun.*, Vol. 66, No. 11, Nov. 2018.
8. A. Jarndal and **K. A. Alnajjar**, "MM-Wave wideband propagation model for wireless commun. in built-up environments", *Elsevier Physical Commun.*, Vol. 28, pp 97-107, Jun 2018.
9. **K. A. Alnajjar** and M. El-Tarhuni, "Joint C-V-BLAST and DS-NOMA for massive MIMO", *in Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommun. Engineering (LNICST)*, 211, pp. 484-492, 2018.
10. **K. A. Alnajjar**, P. J. Smith, P. Whiting and G. K. Woodward, "Size and array shape for massive MIMO", *IEEE Wireless Commun. Lett.*, vol. 4, Dec. 2015.
11. **K. A. Alnajjar**, P. J. Smith and G. K. Woodward, "Co-located and distributed antenna systems: Deployment options for massive MIMO", *IET Microwave, Antenna & Propagation*, 7pp, Aug. 2015.
12. R. W. Longman, **K. A. Alnajjar** and X. Ji, "Comments on how a new engineering field develops: A case study from iterative learning and repetitive control", *in Lecture Notes in Electrical Engineering*, 293, pp. 1273-1279, 2014.

Conference Peer-Reviewed and Proceeding Papers:

1. S. Ansari, **K. A. Alnajjar**, S. Abdallah, M. Saad and A. A. ElMoursy, "Parameter Tuning of MLP, RBF, and ANFIS Models Using Genetic Algorithm in Modeling and Classification Applications", *in Proc. IEEE inform.Techno. Conf. (ICIT)*, July 2021.

2. N. Mohamed, T.Rabie, I. Kamel and **K. A. Alnajjar**, “Detecting secret messages in images using neural networks”, in *Proc. IEEE SIOT, Electronics and Mechatronics Conf. (IEMTRONICS)*, April. 2021.
3. I. Ahmed, K. Shahid, F. Debretsion, H. Khammari and **K. A. Alnajjar**, “Energy Efficiency of Multiuser Sparse Massive MIMO System using Orthogonalized Hybrid Beamforming”, *accepted in IEEE Vehicular Techno. Conf.: (VTC2021-Spring)*, April-May 2021.
4. O. Alfawaz, M. A.Eddin, **K. A. Alnajjar** and A. A. ElMoursy, “Improved parallel ZF-VBLAST detector for MIMO system”, *2020 IEEE conf. on Commun., Signal Processing and their Applications (ICCSPA)*, pp. 1-5, Mar. 2021.
5. S. Ansari, **K. A. Alnajjar**, S. Abdallah and M. Saad, “Automatic digital modulation recognition based on machine learning algorithms”, *IEEE conf. on Commun., Computing, Cybersecurity, and Informatics (CCCI)*, pp.1-6, Nov. 2020.
6. O. Alfawaz, A. A. ElMoursy, **K. A. Alnajjar** and S. Abdallah, “ Parallel semi-blind joint timing-offset and channel estimation for AF-TWRNs”, *IEEE conf. on Commun., Computing, Cybersecurity, and Informatics (CCCI)*, pp.1-6, Nov. 2020.
7. S. Abdallah, M. Saad and **K. A. Alnajjar** , “Joint channel and timing-offset estimation in two-way relays”, in *Proc. IEEE Symposium on Signal Processing and Inform.Techn. (ISSPIT)*, Dec. 2019.
8. **K. A. Alnajjar**, N. Abdulrahman, F. Mahdi and M. Alramisi “Vehicle collision avoidance”, in *Proc. Springer conf. on Advanced Commun. Systems and Inform. Security (ACOSIS 2019)*, Nov. 2019.
9. **K. A. Alnajjar** and O. Hegy, “Attendance system based on biometrics and RFID,” in *Proc. IEEE conf. on Image Inform. Processing (ICIIP 2019)*, Nov. 2019.
10. **K. A. Alnajjar** and M. El-Tarhuni, “Performance of 5G NR with interference alignment”, in *Proc. IEEE conf. on Commun., Signal Processing and their Applications (ICCSPA)*, March. 2019.
11. **K. A. Alnajjar**, S. Abdallah, M. Saad and A. A. ElMoursy, “Low complexity receivers for massive MIMO cloud radio access systems”, in *Proc. IEEE conf. on Signal Processing and Inform. Security (ICSPIS)*, Nov. 2018.
12. **K. A. Alnajjar** and M. El-Tarhuni, “Performance evaluation for synchronous and asynchronous coded C-V-BLAST massive MIMO NOMA system,” in *Proc. IEEE conf. on Wireless and Optical Commun. (WOCC)*, May 2018.
13. **K. A. Alnajjar**, “Analysis of PR-V-BLAST receiver for massive MIMO under correlated channel”, in *Proc. IEEE conf. on Electrical and Computing Techno. and Applications (ICECTA2017)*, Nov. 2017.
14. **K. A. Alnajjar** and M. El-Tarhuni, “Joint C-V-BLAST and DS-NOMA for massive MIMO”, in *Proc. Springer conf. on 5G for Future Wireless Networks (5GWN)*, 2017.

15. **K. A. Alnajjar** and S. Abdallah, “Performance of low complexity receivers for massive MIMO with channel estimation and correlation”, *IEEE International Symposium on Telecommun. techno. (ISTT)*, Nov. 2016. (**Second Best Paper Award**)
16. **K. A. Alnajjar**, P. J. Smith, G. K. Woodward and D. A. Basnayaka, “Design and analysis of a reduced complexity MRC V-BLAST receiver for massive MIMO”, in *Proc. IEEE Conf. on Signal Processing advances in Wireless Commun. (SPAWC)*, July 2016.
17. **K. A. Alnajjar**, “Inverse approximation of linear receivers for massive MIMO”, in *Proc. IEEE Conf. on Inform. and Commun. Techno. Research (ICTRC)*, May 2015.
18. **K. A. Alnajjar**, P. J. Smith and G. K. Woodward, “Low complexity V-BLAST for massive MIMO with adaptive modulation and power control”, in *Proc. IEEE Conf. on Inform. and Commun. Techno. Research (ICTRC)*, May 2015 (**Best Oral Paper Award**).
19. **K. A. Alnajjar**, P. J. Smith and G. K. Woodward, “Performance of massive MIMO V-BLAST with channel correlation and imperfect CSI”, in *Proc. IEEE Conf. on Australian Telecommun. Networks and Applications Conference (ATNAC)*, Nov. 2014.
20. **K. A. Alnajjar**, P. J. Smith and G. K. Woodward, “Low complexity V-BLAST for massive MIMO”, in *Proc. IEEE Conf. on Australian Commun.s Theory Workshop (AusCTW)*, Feb. 2014.
21. R. W. Longman, **K. A. Alnajjar** and X. Ji, “Comments on how a new engineering field develops: A case study from iterative learning and repetitive control”, in *Proc. Springer Conf. on Intelligent Techno. and Engineering systems (ICITES)*, Dec. 2013.
22. **K. A. Alnajjar**, N. Pau and G. K. Woodward. “Aligned precoder in Long Term Evolution using SISO and MIMO”, in *Proc. IEEE Conf. on Inform. Sciences and Systems (CISS)*, March. 2013.
23. **K. A. Alnajjar**, V. Aggarwal, V. A. Vaishampayan, and Xiaodong Wang. “Aligned precoder designs for interference channels based on chordal distance”, in *Proc. IEEE Conf. on Inform. Sciences and Systems (CISS)*, March, 2012.
24. **K. A. Alnajjar**, and I. Kalet. “Phase modulation by a Gaussian random process-the power spectral density”, in *Proc. IEEE Conf. on Microwaves, Commun., Antennas and Electronics Systems (COMCAS)*, 2011.

Languages

Arabic (native) English (fluent)
 French (Intermediate) Turkish (basic)

Membership societies

- IEEE Member (2003- current)
- Member of Cisco Networking Academy Program (2008)
- Member of UAE Society of Engineers (2006-2008)
- Member of Watani (2007-2008)

References

Provided upon Request.