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Electrical Engineering Department
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EDUCATION

- | | |
|-----------|--|
| 2009–2013 | Ph.D. , Electrical and Computer Engineering, University of Waterloo
Thesis: <i>Cooperative Communication over Underwater Acoustic Channels</i>
Supervisors: Dr. Murat Uysal and Dr. Oussama Damen |
| 2007–2009 | Master of Applied Science , Electrical and Computer Engineering, University of Waterloo
Thesis: <i>Cooperative Diversity for Fading Channels in the Presence of Impulsive Noise</i>
Supervisor: Dr. Murat Uysal |
| 2000–2005 | Bachelor of Science with First Honors , Electrical Engineering, King Fahd University of Petroleum and Minerals |

RESEARCH INTERESTS

Broadly in physical layer aspects of next-generation wireless communication systems, performance analysis and system-level design, cooperative communication systems, non-terrestrial networks using unmanned aerial vehicles (UAVs), wireless geophone networks, underwater acoustic communication, communications in impulsive noise, diversity techniques, and information theory.

PUBLICATIONS

Publications in peer-reviewed ISI journals

- Y. Awad and S. Al-Dharrab, “Malicious UAV detection over Rician fading channel: Performance analysis,” accepted in *IEEE Access*.
- Y. Nabil, H. ElSawy, S. Al-Dharrab, H. Mostafa, and H. Attia, “Radar-aided millimeter-wave cellular networks: Beamwidth design tradeoffs,” accepted in *IEEE Access*.
- Y. Nabil, H. ElSawy, S. Al-Dharrab, H. Attia, and H. Mostafa, “Ultra-reliable device-centric uplink communications in airborne networks: A spatiotemporal analysis,” in *IEEE Transactions on Vehicular Technology*, vol. 72, no. 7, pp. 9484-9499, Jul. 2023.
- Y. Nabil, H. ElSawy, S. Al-Dharrab, H. Mostafa, and H. Attia, “Data aggregation in regular large-scale IoT networks: Granularity, reliability, and delay tradeoffs,” in *IEEE Internet of*

Things Journal, vol. 9, no. 18, pp. 17767-17784, Sep. 2022.

- V. Reddy, G. L. Stüber, S. Al-Dharrab, W. Mesbah, and A. Muqaibel, “Energy-efficient mm-wave backhauling via frame aggregation in wide area geophone networks,” in *IEEE Transactions on Wireless Communications*, vol. 20, no. 10, pp. 6954-6970, Oct. 2021.
- V. Reddy, A. Bazzi, G. L. Stüber, S. Al-Dharrab, W. Mesbah, and A. Muqaibel, “Fundamental performance limits of mm-wave cooperative localization in linear topologies,” in *IEEE Wireless Communications Letters*, vol. 9, no. 11, pp. 1899-1903, Nov. 2020.
- A. Othman, W. Mesbah, N. Iqbal, S. Al-Dharrab, A. Muqaibel, and G. L. Stüber, “Sum-rate maximization and data delivery for wireless seismic acquisition” in *Wireless Networks*, vol. 26, pp. 6095-6110, Jul. 2020.
- N. Iqbal, S. Al-Dharrab, A. H. Muqaibel, W. Mesbah, and G. L. Stüber, “Cross-layer design and analysis of wireless geophone networks utilizing TV white space,” in *IEEE Access*, vol. 8, pp. 118542-118558, Jun. 2020.
- H. Attia, S. Gaya, A. Alamoudi, F. Alshehri, A. Al-Suhaimi, N. Alsulaim, A. Al Naser, M. Jamal Eddin, A. Alqahtani, J. Rojas, S. Al-Dharrab, and F. Al-Dirini, “Wireless geophone sensing system for real-time seismic data acquisition,” in *IEEE Access*, vol. 8, pp. 81116-81128, Apr. 2020.
- V. A. Reddy, G. L. Stüber, S. Al-Dharrab, W. Mesbah, and A. Muqaibel, “A wireless geophone network architecture using IEEE 802.11af with power saving schemes,” in *IEEE Transactions on Wireless Communications*, vol. 18, no. 12, pp. 5967-5982, Dec. 2019.
- Z. Long, Y. Alaudah, M. Qureshi, Y. Hu, Z. Wang, M. Alfarraj, G. AlRegib, A. Amin, M. Deriche, S. Al-Dharrab, and H. Di, “A comparative study of texture attributes for characterizing subsurface structures in seismic volumes,” in *Interpretation*, vol. 6, no. 4, pp. T1055-T1066, Nov. 2018.
- S. Al-Dharrab, A. Muqaibel, and M. Uysal, “Performance of multicarrier cooperative communication systems over underwater acoustic channels,” in *IET Communications*, vol. 11, no. 12, pp. 1941-1951, Sep. 2017.
- A. Muqaibel, A. Abdalla, M. Alkhodary, and S. Al-Dharrab, “Aspect-dependent efficient multipath ghost suppression in TWRI with sparse reconstruction,” in the *International Journal of Microwave and Wireless Technologies*, vol. 9, no. 9, pp. 1829-1852, Jun. 2017.
- S. Al-Dharrab, M. Uysal, and T. Duman, “Cooperative underwater acoustic communications,” in *IEEE Communications Magazine*, vol. 51, no. 7, pp. 146-153, Jul. 2013.
- S. S. Ikki, S. Al-Dharrab, and M. Uysal, “Error probability of DF relaying with pilot-assisted channel estimation over time-varying fading channels,” in *IEEE Transactions on Vehicular Technology*, vol. 61, no. 1, pp. 393-397, Jan. 2012.
- S. Al-Dharrab and M. Uysal, “Cooperative diversity in the presence of impulsive noise,” in *IEEE Transactions on Wireless Communications*, vol. 8, no. 9, pp. 4730-4739, Sep. 2009.

Publications in peer-reviewed conference proceedings

- S. Al-Dharrab, “Detection performance of malicious UAV using massive IoT networks,” accepted in *97th IEEE Vehicular Technology Conference (IEEE VTC)*, Florence, Italy, 20-23 June 2023.

- Y. Nabil, H. ElSawy, S. Al-Dharrab, H. Attia, H. Mostafa, A. Khalil, and I. Qamar, “Mobile aerial base stations for ultra-reliable and energy-efficient downlink communications,” in *IEEE International Conference on Smart Mobility (IEEESM’2023)*, Thuwal, Saudi Arabia, March 19-21, 2023, pp. 85-90.
- Y. Nabil, H. ElSawy, S. Al-Dharrab, H. Attia, and H. Mostafa, “A stochastic geometry analysis for joint radar communication system in millimeter-wave band,” accepted in *IEEE International Conference on Communications (ICC)*, Rome, Italy, May 2023.
- A. Almehdar, A. Hamida, K. Aliyu, S. Alawsh, A. Muqaibel, S. Al-Dharrab, W. Mesbah, and G. L. Stüber, “DOA estimation in wireless seismic surveys using deep learning” in *IEEE International Conference on Communications, Signal Processing and their Applications (ICC-SPA)*, Sharjah, UAE, Mar. 2021, pp. 1-6.
- V. Reddy, G. L. Stüber, S. Al-Dharrab, A. Muqaibel, and W. Mesbah, “An energy-efficient IEEE 802.11ad mesh network for seismic acquisition,” in *IEEE 91st Vehicular Technology Conference (VTC2020-Spring)*, Antwerp, Belgium, May 2020, pp. 1-5.
- V. Reddy, G. L. Stüber, S. Al-Dharrab, A. Muqaibel, and W. Mesbah, “Wireless backhaul strategies for real-time high-density seismic acquisition,” in *IEEE Wireless Communications and Networking Conference (WCNC)*, Seoul, South Korea, May 2020, pp. 1-7.
- Y. Alraei, A. E’mar, S. Alawsh, A. Muqaibel, S. Al-Dharrab, W. Mesbah, and N. Iqbal, “TV white band utilization in Saudi Arabia for cognitive radio applications in seismic surveys,” in *10th IEEE GCC Conference & Exhibition*, Kuwait, 19-23 Apr. 2019.
- A. Othman, W. Mesbah, N. Iqbal, S. Al-Dharrab, A. Muqaibel, and G. L. Stüber, “Sum-rate maximization for wireless seismic acquisition systems,” in *88th SEG Annual Meeting*, Anaheim, CA, USA, Oct. 2018, pp. 181-185.
- N. Iqbal, S. Al-Dharrab, A. Muqaibel, W. Mesbah, and G. L. Stüber, “Analysis of wireless seismic data acquisition networks using Markov chain models,” in *IEEE 29th Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC)*, Bologna, Italy, Sep. 2018, pp. 1-5.
- V. A. Reddy, G. L. Stüber, and S. Al-Dharrab, “High-speed seismic data acquisition over mm-wave channels,” in *IEEE 88th Vehicular Technology Conference (VTC-Fall)*, Chicago, IL, USA, Aug. 2018, pp. 1-5.
- V. A. Reddy, G. L. Stüber, and S. Al-Dharrab, “Energy efficient network architecture for seismic data acquisition via wireless geophones,” in *IEEE International Conference on Communications*, Kansas City, MO, USA, May 2018, pp. 1-5.
- A. Lawal, S. Al-Dharrab, M. Deriche, M. Shafiq, and G. AlRegib, “Fault detection using seismic attributes and visual saliency,” in *SEG Technical Program Expanded Abstracts*, 86th SEG Annual Meeting, Dallas, Texas, Oct. 2016, pp. 1939-1943.
- A. Abdalla, A. Muqaibel, S. Al-Dharrab, “Aspect dependent multipath ghost suppression in TWRI under compressive sensing framework,” in *IEEE International Conference on Communications, Signal Processing, and their Applications*, Sharjah, UAE, Feb. 2015, pp. 1-6.
- S. Al-Dharrab and M. Uysal, “Outage capacity regions of multicarrier DF relaying in underwater acoustic channels,” in *IEEE 26th Biennial Symposium on Communications*, Kingston, Canada, May 2012, pp. 30-33.

- S. Al-Dharrab and M. Uysal, “Information theoretic performance of cooperative underwater acoustic communications,” in *IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*, Toronto, Canada, Sep. 2011, pp. 1562-1566.
- S. S. Ikki, S. Al-Dharrab, and M. Uysal, “Exact closed-form error probability expression for cooperative diversity networks with channel estimation errors in time selective Rayleigh fading channels,” in *IEEE ICC’10*, Cape Town, South Africa, May 2010, pp. 1-5.
- S. Al-Dharrab and M. Uysal, “Cooperative diversity over fading channels with impulsive noise,” in *IEEE WCNC’09*, Budapest, Hungary, Apr. 2009, pp.1-6.

PATENTS

- V. A. Reddy, G. L. Stüber, and S. Al-Dharrab, “Systems and Methods for Collision Prevention and Power Conservation in Wireless Networks” U.S. Patent Application No. 16/411,890,

FUNDED PROJECTS

Current Projects

- | | |
|------|---|
| 2023 | Co-Investigator (CO-I) , “Hybrid RF/FSO Multi-UAVs Communication Network for Next-Generation Flexible and Heterogeneous Infrastructures,” research project funded by the Center for Communication Systems and Sensing, KFUPM |
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Completed Projects

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| 2021-2022 | Principal Investigator (PI), “ML-Based Detection, DoA Estimation and Localization of Multi-Rotor and Fixed-Wing UAVs over Restricted Areas in Cluttered Environment,” research project funded by the Center for Communication Systems and Sensing, KFUPM |
| 2019-2022 | Co-Investigator (CO-I), “Design and Implementation of a Wireless Geophone Network for Seismic Data Collection,” research project funded by the Center for Energy and Geo Processing (CeGP), EE Department, KFUPM |
| 2017-2020 | Principal Investigator (PI), “Smart Seismic Data Acquisition,” research project funded by CeGP, EE Department, KFUPM |
| 2015-2018 | Co-Investigator (CO-I), “Interactive Computer-Aided Seismic Interpretation,” research project funded by CeGP, EE Department, KFUPM |
| 2015-2018 | Co-Investigator (CO-I), “Multipath Exploitation in Through the Wall Radar Imaging with UWB Sparse Signals,” NSTIP project |
| 2012 | Participated in conducting research work on outage capacity for underwater networks supported by Scientific and Technological Research Council of Turkey (TUBITAK) under grant 110E092 |
| 2011 | Participated in research work on underwater wireless communication supported by National Priorities Research Program (NPRP) grant from the Qatar National Research Fund |

2009 | Participated in research work on wireless communication in the presence of impulsive noise supported by Natural Sciences and Engineering Research Council of Canada (NSERC) Collaborative Research and Development Grant CRDPJ348999-06

SUPERVISED STUDENTS

- Yousef Awad, M.Sc. Degree, Thesis: *Reconfigurable Intelligent Surfaces-Assisted Systems for Malicious UAV Detection*, graduated December 2023.
- Mansour Aljarboue, M.Sc. Degree, Thesis: *Localization Techniques in Wireless Geophone Networks for High-Density Seismic Acquisition*, graduated April 2021.
- Mohammed Amer, M.Sc. Degree, Thesis: *Performance Analysis of Wireless Geophone Networks using Free-Space Optical Communication Systems*, graduated April 2020.
- Abdulmajid Lawal, M.Sc. Degree, Thesis: *Seismic Faults Detection using Saliency Maps*, graduated May 2016. (co-supervised with Dr. M. Deriche)

PROFESSIONAL EXPERIENCE

2018–present	Assistant Dean , Deanship of Research, King Fahd University of Petroleum and Minerals
2019–present	Member , Center for Energy and Geo Processing (CeGP) Executive Committee, Electrical Engineering Department, King Fahd University of Petroleum and Minerals
2013–present	Member , Communication Systems (CM) Group, Electrical Engineering Department, King Fahd University of Petroleum and Minerals
2015–2016	Visiting Professor , the School of Electrical and Computer Engineering at the Georgia Institute of Technology, Atlanta, USA
2014–2019	Assistant Director , Center for Energy and Geo Processing (CeGP), Electrical Engineering Department, King Fahd University of Petroleum and Minerals
2013–2017	Member , Program Assessment Committee (PAC), Electrical Engineering Department, King Fahd University of Petroleum and Minerals
2013–present	Assistant Professor , Electrical Engineering Department, King Fahd University of Petroleum and Minerals
2011–2013	Research Member , Communication Theory and Technologies (CT&T) Research Group, Ozyegin University
2007–2011	Research Member , Wireless Communication Systems (WiComS) Research Group, Department of Electrical and Computer Engineering, University of Waterloo
2005–2013	Graduate Assistant , Electrical Engineering Department, King Fahd University of Petroleum and Minerals

EDITORIAL EXPERIENCE

2008–present	Technical Reviewer , Institute of Electrical and Electronics Engineers IEEE Transactions on Wireless Communications, 2010, 2012, 2013, 2017, 2018
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IEEE Transactions on Communications, 2013
 IEEE Communications Letters, 2014, 2015, 2018, 2019, 2020, 2021
 IEEE Transactions on Vehicular Technology, 2012
 IEEE Transactions on Green Communications and Networking, 2019, 2020
 IEEE Systems Journal, 2018, 2019
 IEEE Transactions on Aerospace and Electronic Systems, 2023
 IEEE Access, 2019
 IEEE International Conference on Multimedia and Expo, 2016, 2017
 IEEE International Conference on Communications, 2011, 2012, 2013
 IEEE Wireless Communications and Networking Conference, 2018
 IEEE Vehicular Technology Conference, 2012, 2013
 Saudi International Electronics, Communications and Photonics Conference, 2013
 IEEE Global Communications Conference, 2011
 Radio and Wireless Symposium, 2008
 2020 **Technical Reviewer**, Elsevier, Physical Communication Journal
 2019 **Technical Reviewer**, Institution of Engineering and Technology
 IET Communications, 2019, 2020
 2016 **Technical Reviewer**, Signal, Image, Video Processing Journal
 2014 **Technical Reviewer**, Elsevier, Ad Hoc Networks Journal
 2011 **Technical Reviewer**, European Transactions on Telecommunications

ACADEMIC EXPERIENCE

2013–present **Course Instructor**, Electrical Engineering Department, King Fahd University of Petroleum and Minerals
EE 570: Stochastic Processes
Fall 2021, Fall 2022
EE 572: Principles of Digital Communications
 [Master of Wireless Communication Networks, MX Program]
Fall 2020, Spring 2022
EE 571: Digital Communications I
Fall 2017, Spring 2021
EE 576: Error Control Coding
Spring 2015, Spring 2017
EE 430: Information Theory and Coding
Spring 2014
EE 417: Communications Engineering II
Fall 2014, Fall 2018, Fall 2019
EE 370: Communications Engineering I
Spring 2014, Fall 2016
EE 315: Probabilistic Methods in Electrical Engineering
Spring 2017, Fall 2017
EE 200: Digital Logic Circuit Design
Fall 2013
 2005–2007 **Lab Instructor**, Electrical Engineering Department, King Fahd University of Petroleum and Minerals
EE 200: Digital Logic Circuit Design

Fall 2005, Fall 2006, Winter 2007
EE 201: Electrical Circuits I
Winter 2006

MEMBERSHIPS

2020-present	IEEE Senior Member
2015–2023	Associate SEG Membership
2010–present	Member of IEEE Communications Society
2019–present	IEEE Professional Member
2007–2013	IEEE Graduate Student Member
2004–2007	IEEE Student Member

TECHNICAL SKILLS

MATLAB, Mathematica, Maple, GNU Octave, C language, Latex, Beamer, TikZ, Overleaf, Microsoft Office (Microsoft Word, Excel, PowerPoint), MathType, Reference Management Software (RefWorks, Bibtex, and Mendely)

HONORS AND AWARDS

- Long Service Award (10, 15 years), KFUPM Annual Banquet Ceremony, 2015, 2020
- Ph.D. Scholarship Award, KFUPM, 2009–2013
- University of Waterloo Graduate Scholarship, Winter 2008, 2009, 2010 (CAD 1,000-2,000)
- M.Sc. Scholarship Award, KFUPM, 2007-2009
- First Honor Award, Annual Ceremony for Honor Graduates, KFUPM, 2005
- Advanced Electronics Company (AEC) Award for Outstanding Academic Performance, 2005