Wahab Ali Gulzar Khawaja, Ph.D.

Champion Court, Raleigh, NC, 27606 · +1-336-307-6223 · wkhawaj@ncsu.edu
Google Scholar Profile

Objective

To apply my expertise in electromagnetics, wireless propagation channels, software-defined radios, radar systems, space communication protocols, and AI to advance research, develop, test, and deploy next-generation wireless communication technologies and standards.

Education

- **North Carolina State University**, Raleigh, NC, USA.
  Ph.D., Electrical Engineering (June 2019) · Advisor: Prof. Ismail Guvenc.
  Dissertation: *Ultra-wideband and mmWave Channel Propagation for Public Safety and UAV Communications.*
- **The University of Engineering & Technology (UET) Lahore**, Lahore, Pakistan.
  M.S., Electrical Engineering (Aug. 2012) · Thesis on IPsec over Performance Enhancing Proxies for Satellite Networks.
- **The University of Engineering & Technology (UET) Lahore**, Lahore, Pakistan.
  B.S. (Hons.) Electrical Engineering (Aug. 2008).

Professional Experience

- **Postdoctoral Research Associate** · *North Carolina State University, USA* Nov. 2025 – Present
  - R&D for NSF and NASA projects focusing on integrated communication and sensing (ISAC) using telecom networks.
  - Developed RF sensing frameworks using AI/ML for drone detection, tracking, and surveillance.
- **Postdoctoral Researcher** · *Aarhus University, Denmark* Apr. 2024 – Oct. 2025
  - Led R&D for Green Comm., DISCO-2, and STEP-A projects focusing on advanced satellite communications.
  - Integrated ground stations and SDRs; analyzed DVB-S2/CCSDS standards via ray-tracing channel modeling.
- **Assistant Professor** · *Mirpur University of Science & Technology (MUST), Pakistan* Jul. 2019 – Mar. 2024
  - Taught undergraduate/graduate courses, supervised student theses, and conducted wireless communications research.
- **Consultant** · *Remcom Inc., Pennsylvania, USA* Oct. 2019 – Jan. 2020
  - Validated proprietary 3D ray-tracing software results against 28 GHz empirical channel measurements.
- **Research Assistant / Intern** · *NCSU / Docomo Innovations Inc., USA* May 2016 – Jun. 2019
  - Executed mmWave and UWB channel sounding, empirical measurements, and data analysis for NASA and NSF grants.
- **Lecturer** · *Mirpur University of Science & Technology (MUST), Pakistan* Oct. 2008 – May 2014

Key Accomplishments and Awards

- **Fulbright Ph.D. Scholarship:** Fully funded by the U.S. Department of State for doctoral studies.
- **Best Paper Nominations:** Two papers selected for Best Paper Award competition at IEEE Aerospace Conf. (2019) and IEEE GSMM (2018).
- **Best Paper Presentation Award:** IACSIT Conference, Jeju, South Korea (2014).
- **Spectrum ShaRC Cognitive Radio Contest:** Secured 4th place team finish at Virginia Tech (2016).

Research Interests

Electromagnetic Wave Propagation; DSP; Channel Measurements & Modeling; SDRs; Ray Tracing; Integrated Sensing and Communications (ISAC); AI/ML for Wireless; UAV and Space Communication Protocols.

Patents

- "A Two-Stage 5G NR ISAC Framework for Coarse-to-Fine UAV Detection and Tracking", U.S. Patent App. No. 64/044,383, Apr. 2026.
- "System and Method for Adaptive Multi-Static ISAC Utilizing Distributed SDR Sensors", U.S. Patent App. No. 64/044,362, Apr. 2026.

Selected Journal Publications **(See Google Scholar for complete list)**

1. **W. Khawaja** et al., "A Survey on Detection, Tracking, and Classification of Aerial Threats using Radars and Communication Systems", *IEEE Communications Surveys & Tutorials*, Mar. 2025.
2. **W. Khawaja** et al., "RL-Based Detection, Tracking, and Classification of Malicious UAV Swarms through Airborne Cognitive Multibeam Multifunction Phased Array Radar", *Drones*, vol. 7, no. 7, 2023.
3. **W. Khawaja**, O. Ozdemir, I. Guvenc, "Channel Estimation for mmWave Ground-to-Air Communications during Blockage", *IEEE Antennas and Wireless Propagation Letters*, vol. 20, no. 8, 2021.
4. C. Gentile et al., including **W. Khawaja**, "Methodology for benchmarking radio frequency channel sounders through a system model", *IEEE Trans. on Wireless Communications*, vol. 19, no. 10, 2020.
5. **W. Khawaja** et al., "Ultra-Wideband Air-to-Ground Propagation Channel Characterization in an Open Area", *IEEE Trans. on Aerospace and Electronic Systems*, vol. 56, no. 6, 2020.
6. **W. Khawaja**, I. Guvenc, D. Matolak, et al., "A Survey of Air-to-Ground Propagation Channel Modeling for Unmanned Aerial Vehicles", *IEEE Communications Surveys & Tutorials*, vol. 21, no. 3, 2019.

Selected Conference Publications

1. **W. Khawaja**, I. Guvenc, A. C. Gurbuz, "NOMA-Based Monostatic ISAC: Performance of 5G NR Reference Signals and OTFS", *Sub. to IEEE ISAC Conf.*, 2026.
2. **W. Khawaja**, I. Guvenc, A. C. Gurbuz, "Resource-Efficient Passive UAV Surveillance Using 5G NR Signals of Opportunity", *Sub. to IEEE MILCOM*, 2026.
3. **W. Khawaja**, A. M. Alam, A. C. Gurbuz, "A Two-Stage 5G NR ISAC Framework for Coarse-to-Fine UAV Detection and Tracking", *IEEE DySPAN*, May 2026.
4. **W. Khawaja**, R. H. Jacobsen, "Hybrid Digital Twin Framework for DVB-S2/S2X with Reward-Based Adaptive MODCOD", *IEEE ICC Workshop*, May 2026.
5. **W. Khawaja**, I. Guvenc, R.H. Jacobsen, "Propagation Channel Modeling for LEO Satellite Missions Using Ray-Tracing Simulations," *IEEE WCNC*, Apr. 2026.
6. **W. Khawaja**, R.H. Jacobsen, S. Hussain, I. Guvenc, "Birth Death Prediction of MPCs in mmWave UAV Ground-to-Air Channel," *IEEE WCNC*, 2025.
7. **W. Khawaja**, O. Ozdemir, F. Erden, I. Guvenc, D.W. Matolak, "UWB Air-to-Ground Propagation Channel Measurements and Modeling," *IEEE Aerospace Conf.*, 2019.
8. **W. Khawaja**, I. Guvenc, D.W. Matolak, "UWB Channel Sounding and Modeling for UAV Air-to-Ground Channels," *IEEE GLOBECOM*, 2016.

Book Chapters

- **W. Khawaja**, I. Guvenc, D. W. Matolak, et al., "A survey of air-to-ground propagation channel modeling for unmanned aerial vehicles," in *UAV Communications for 5G and Beyond*, Wiley/IEEE Press, 2021.

References

Dr. Ismail Guvenc (Ph.D. Advisor)
North Carolina State University
Faculty Profile

Dr. David Matolak (Co-author)
University of South Carolina
Faculty Profile

Dr. Walid Saad
Virginia Tech
Faculty Profile

Last updated: August 7, 2026