ABDUL BASIT PhD, (Electronic Engineer)

Department of Electrical and Computer Engineering (DECE), Faculty of Engineering &Technology (FET), International Islamic University, Islamabad (IIUI), Pakistan, Mobile: +92-333-5366766 Office: +92-51-9019414 Email: abdulbasit@iiu.edu.pk

Work Experience

(A) <u>University of Electronic Science & Technology China Oct 17 – OCT19</u>

I worked as a Post-Doctoral research fellow in School of information and communication engineering (SICE), UESTC, and CHINA. My research area included cognitive radar, MIMO radar, Phased Array radar, Frequency Diverse Array Radar Signal processing and Joint Radar-Communication designs.

(B) International Islamic University Islamabad (IIUI) July 07 – to Date

Currently I am working as an Associate Professor in DEE, FET, International Islamic University Islamabad (IIUI) Pakistan. I have worked at IIUI in various capacities, details are given below

1. Associate Professor (2023- to date)

I am working as an Associate Professor in in the Department of Electronic Engineering, International Islamic University Islamabad, Pakistan.

2. Assistant Professor (Feb 2016- Dec 2022)

I worked as an Assistant Professor in the Department of Electronic Engineering, International Islamic University Islamabad, Pakistan. I teach undergraduate courses, supervise MS students and Co-supervise PhD students. Moreover, I am an HEC approved PhD supervisor.

3. Lecturer (Sep 2011-to Feb 2016)

I worked as a lecturer in the Department of Electronic Engineering, International Islamic University Islamabad, Pakistan. I have taught the following courses at the Undergraduate level:

- 1. Electronic Circuit Design-I
- 2. Electronic Circuit Design -II
- 3. Signals & Systems
- 4. Complex Analysis
- 5. Basic Electronic Engineering
- 6. Digital Logic Design
- 7. Differential Equations
- 8. Digital Signal Processing
- 9. Applied Mathematics
- 10. Calculus and Analytical Geometry

- 11. Instrumentation and Measurements
- 12. Complex Variable and Transforms

4. Lab Engineer (July 2007 to August 2011)

My job was to instruct labs and manage laboratory equipment and staff. I conducted the following labs:

- 1. Electronic Circuit Design-I Lab
- 2. Electronic Circuit Design-II Lab
- 3. Circuit Analysis-I Lab
- 4. Digital Logic Design Lab
- 5. Signal and Systems Lab
- 6. Digital Signal Processing Lab
- 7. Basic Electronic Engineering Lab
- 8. Electrical Machines Lab
- 9. Antenna and Wave Propagation Lab

5. Teaching Assistant (addition to job as Lab Engineer): August 2007 to February 2008

Assisted Prof Hyder Ali Khan in IIUI for the subject of Basic Electronic Engineering.

6. Member

- i. -Annual Engineering Open House organizing committee at the Department of Electronic Engineering, Faculty of Engineering & Technology.
- ii. -Student counselling committee of DEE
- iii. -University Examination committee DEE
- iv. -University International conferences protocol committee DEE

7. Graduate Research Committee

Incharge graduate research Committee (GRC) at Department of electrical and computer engineering, IIU, Islamabad.

8. Student Activity

In-charge student activities (i.e., regarding sports) at the Faculty of Engineering & Technology.

9. Final Year Project Supervisor

I supervise up to three final year projects and one MS thesis per year.

10. Event Supervisor

Annual Sports Gala Cricket team selection supervisor (Faculty of Engineering & Technology Engineering) since 2009.

(C) <u>Muhammad Ali Jinnah University</u>, Islamabad (2005-2006)

Student Assistantship

Worked as a student assistant for the courses of Digital logic design, Physics-II and Antenna Theory & Design.

(D) <u>Internship</u> (June-2007 – July 2007)

Pakistan Telecommunication Company Limited (PTCL) Pakistan (Wireless Communication Department-08 Weeks)

MS/PhD students Supervision/Co-Supervision

i) MS students Supervision/ Co-Supervision

1. Syed Masood Kakakhel, Application of OFDM in Cognitive Radio (completed under Supervision 2017)

2. Asad Mehmood Investigation of Co-Prime Array Beamforming Patterns (under Supervision)

3. Muhammad Usman Compressed Sensing Based Algorithm for Exact Estimation of Far Field Sources. (Under Co-Supervision)

4. Roveed Ahmed Hardware Enforced Restricted One-way Data Transfer Solution for Different Security Classified Networks (Under Co-Supervision)

ii) PhD Students Supervision/ Co-Supervision

1. **Fahad Munir** "Data Rate Enhancement and Interference Mitigation in design of Cognitive Radcom". (Under Supervision)

2. **Ahmed Saleem**: Efficient Beamspace Design and Waveform Optimization for RadCom (Under Co-supervision)

3. Muhmmad Umair Hafeez: Improved parameter estimation and transmit receive beamforming for cognitive FDA radar (Under Supervision)

EDUCATION

2010-2016	PhD in Electronic Engineering Radar Signal Processing International Islamic University, Islamabad, Pakistan. (CGPA 3.91/4.00)
2007-2009	Masters in Electronic Engineering Majors in Signal and Image Processing International Islamic University, Islamabad, Pakistan. (CGPA 3.95/4.00)
2003-2007	B.S Electronic Engineering Muhammad Ali Jinnah University, Islamabad, Pakistan. (CGPA 3.73/4.00) (Silver medal)

COMPUTER SKILLS

- ✓ Matlab
- ✓ Pspice (Electronic circuit Design)
- ✓ Electronic Work Bench (EWB)
- ✓ MS Office

AFFILIATIONS

• Registered Engineer, Pakistan Engineering Council (PEC)

JOURNAL & CONFERENCE PUBLICATIONS

- 1. Basit, W.-Q. Wang, S. Y. Nusenu, and S. Wali, "FDA Based QSM for mmWave Wireless Communications: Frequency Diverse Transmitter and Reduced Complexity Receiver," IEEE Transactions on Wireless Communications, 2021.
- 2. Basit, W.-Q. Wang, S. Wali, and S. Y. Nusenu, "Transmit beamspace design for FDA–MIMO radar with alternating direction method of multipliers," Signal Processing, vol. 180, p. 107832, 2021.
- **3.** A. Basit, W.-Q. Wang, and S. Y. Nusenu, "Adaptive transmit array sidelobe control using FDA-MIMO for tracking in joint radar-communications," Digital Signal Processing, vol. 97, p. 102619, Feb. 2020.
- 4. A. Basit, W.-Q. Wang, S. Y. Nusenu, and Z. Zheng, "Cognitive FDA-MIMO With

Channel Uncertainty Information for Target Tracking," IEEE Transactions on Cognitive Communications and Networking, vol. 5, no. 4, pp. 963–975, 2019.

- 5. A. Basit, W.-Q. Wang, S. Y. Nusenu, and S. Zhang, "Range-Angle-Dependent Beampattern Synthesis With Null Depth Control for Joint Radar Communication," IEEE Antennas and Wireless Propagation Letters, vol. 18, no. 9, pp. 1741–1745, 2019.
- 6. A. Basit, W.-Q. Wang, and S. Y. Nusenu, "Adaptive transmit beamspace design for cognitive FDA radar tracking," IET Radar, Sonar & Navigation, 2019.
- 7. A. Basit, W. Khan, S. Khan, and I. M. Qureshi, "Development of frequency diverse array radar technology: a review," IET Radar, Sonar & Navigation, vol. 12, no. 2, pp. 165–175, 2017.
- 8. A. Basit, I. M. Qureshi, W. Khan, S. u. Rehman, and M. M. Khan, "Beam Pattern Synthesis for an FDA Radar with Hamming Window-Based Nonuniform Frequency Offset," IEEE Antennas and Wireless Propagation Letters, vol. 16, pp. 2283–2286, 2017.
- **9.** A. Basit, I. M. Qureshi, W. Khan, and A. N. Malik, "Range-Angle-Dependent Beamforming for Cognitive Antenna Array Radar with Frequency Diversity," Cognitive Computation, vol. 8, no. 2, pp. 204–216, 2016.
- **10.** A. Basit, I. M. Qureshi, W. Khan, and A. N. Malik, "Cognitive frequency diverse array radar with symmetric non-uniform frequency offset," Science China Information Sciences, vol. 59, no. 10, p. 102314, 2016.
- **11.** A. Basit, I. M. Qureshi, B. Shaoib, W. Khan, and A. N. Malik, "Performance Analysis of a Cognitive Phased Array Radar with Online Tracking Capability," Wireless Personal Communications, pp. 1–18, 2016.
- **12.** A. Basit, I. M. Qureshi, W. Khan, I. Ulhaq, and S. U. Khan, "Hybridization of cognitive radar and phased array radar having low probability of intercept transmit beamforming," International Journal of Antennas and Propagation, vol. 2014, 2014.
- **13.** Basit A, Qureshi I M, Ulhaq I, A.N Malik, Khan W, "Evolutionary Computing Based Antenna Array Beamforming with Low Probability of Intercept Property," World Applied Sciences Journal, vol. 23, no. 11, pp. 1570–1575, 2013.
- 14. A. Basit, "Hybrid Cognitive Phased and Frequency Diverse Array Radar." PhD Thesis, INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD, PAKISTAN, 2016.
- **15.** A. Basit; S. Y. Nusenu; S. U. Khan, "Adaptive Main Lobe/Sidelobes Controls Selection in FDA based Joint Radar-Communication Design," in IEEE ICECE conference, 2019, pp. 1–1.

- 16. A. Basit, S. Y. Nusenu, S. U. Khan, W. Khan, M. A. Khan, and M. U. Farooq, "Adaptive Detection and Correction of Faulty Elements in Frequency Diverse Array," in 2019 16th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2019, pp. 1010–1016.
- **17.** A. Basit, I. M. Qureshi, W. Khan, and S. U. Khan, "Cognitive frequency offset calculation for frequency diverse array radar," Applied Sciences and Technology (IBCAST), 2015 12th International Bhurban Conference on. pp. 641–645, 2015.
- **18.** A. Basit, I. M. Qureshi, W. Khan, A. N. Malik, and B. Shoaib, "Beam pattern synthesis for a cognitive frequency diverse array radar to localize multiple targets with same direction but different ranges," in 2016 13th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2016, pp. 682–688.
- **19.** A. Basit, I. M. Qureshi, A. N. Malik, W. Khan, and B. Shoaib, "Beam sharpening of a range-angle-dependent pattern using non-uniform symmetric but integer frequency offset," in 2016 International Conference on Intelligent Systems Engineering (ICISE), 2016, pp. 232–235.
- **20.** Muhammad Fahad Munir, Abdul Basit, Wasim Khan, Ahmad Saleem, AbdulRahman Al-salehi, "A Comprehensive Study of Past, Present, and Future of Spectrum Sharing and Information Embedding Techniques in Joint Wireless Communication and Radar Systems", *Wireless Communications and Mobile Computing*, vol. 2022, Article ID 9642849, 25 pages, 2022. https://doi.org/10.1155/2022/9642849
- **21.** Khurram Hameed, Shanshan Tu, Nauman Ahmed, Wasim Khan, Ammar Armghan, Fayadh Alenezi, Norah Alnaim, Muhammad Salman Qamar, Abdul Basit, Farman Ali, "DOA Estimation in Low SNR Environment through Coprime Antenna Arrays: An Innovative Approach by Applying Flower Pollination Algorithm" Applied Sciences, Jan 1,2021.
- 22. Abdulmuneem Alselwi, Adnan Umar Khan, Ijaz Mansoor Qureshi, Wasim Khan, Abdul Basit," Multi-user transmission for the joint radar communication systems based on amplitude phase shift keying modulation and waveform diversity"International Journal of Microwave and Wireless Technologies, 2021.
- 23. Abdulmuneem Alselwi, Adnan Umar Khan, Ijaz Mansoor Qureshi, Wasim Khan, Abdul Basit," Throughput Enhancement for the Joint Radar-Communication Systems Based on Cognitive Closed-Loop Design", IEEE Access, 20, 2021.
- 24. YAN Yisheng, WANG Wen-Qin, Abdul BASIT, CAI Jingye," Airborne FDA-MIMO Radar Modeling and Detection Performance Analysis", Radioengineering, 2021.
- **25.** B. Huang, Y. Yan, A. Basit, W. -Q. Wang and J. Cheng, "Radar Cross Section Characterization of Frequency Diverse Array Radar," in *IEEE Transactions on Aerospace and Electronic Systems*, 2022, doi: 10.1109/TAES.2022.3185023.

- 26. H. Bang, J. Jian, A. Basit, R. Gui and W. -Q. Wang, "Adaptive Distributed Target Detection for FDA-MIMO Radar in Gaussian Clutter without Training Data," in *IEEE Transactions on Aerospace and Electronic Systems*, doi: 10.1109/TAES.2022.3145781.
- **27.** B. Huang, W. -Q. Wang, A. Basit and R. Gui, "Bayesian Detection in Gaussian Clutter for FDA-MIMO Radar," in *IEEE Transactions on Vehicular Technology*, vol. 71, no. 3, pp. 2655-2667, March 2022, doi: 10.1109/TVT.2021.3139894.
- **28.** Bang Huang, Abdul Basit, Wen-Qin Wang, Shunsheng Zhang," Adaptive Detection With Bayesian Framework for FDA-MIMO radar", IEEE Geoscience and Remote Sensing Letters, 2021.
- **29.** Bang Huang, Abdul Basit, Ronghua Gui, Wen-Qin Wang," Adaptive Moving Target Detection Without Training Data for FDA-MIMO Radar", EEE Transactions on Vehicular Technology, 2021.
- **30.** S. Y. Nusenu, S. Huaizong, Y. Pan and A. Basit, Directional Modulation With Precise Legitimate Location Using Time-Modulation Retrodirective Frequency Diversity Array for Secure IoT Communications IEEE Systems Journal, 2020.
- **31.** S. Y. Nusenu, S. Huaizong, Y. Pan and A. Basit,Space-Frequency Increment Index Modulation Approach for Fifth Generation and Beyond Wireless Communication Systems IEEE Transactions on Vehicular Technology, 2020.
- **32.** Shaddrack Yaw Nusenu and Abdul Basit Frequency-modulated diverse array transmit beamforming with bat metaheuristic optimization, IET Radar Sonar Navig., 2020.
- **33.** Shaddrack Yaw Nusenu, Abdul Basit, and Emmanuel Asare, FDA Transmit Beamforming Synthesis Using Chebyshev Window Function Technique to Counteract Deceptive Electronic Countermeasures Signals Progress In Electromagnetics Research Letters, Vol. 90, 53-60, 2020.
- **34.** S. Y. Nusenu and A. Basit, "Frequency diverse array antennas: from their origin to their application in wireless communication systems," Journal of Computer Networks and Communications, vol. 2018, 2018.
- **35.** S. Y. Nusenu and A. Basit, "Cognitive Transmit Subarray FDA Design for Integrated Radar-Communication Using Flexible Sidelobe Control," in 2018 IEEE 7th International Conference on Adaptive Science & Technology (ICAST), 2018, pp.–6.
- **36.** S. Y. Nusenu, W.-Q. Wang, and A. Basit, "Time-modulated FD-MIMO array for integrated radar and communication systems," IEEE Antennas and Wireless Propagation Letters, vol. 17, no. 6, pp. 1015–1019, 2018.
- **37.** S. Y. Nusenu and A. Basit, "Energy-Efficient Coding Matrix FMD-RDA Secure Transmission Scheme Based on Quadrature Spatial Modulation for mmWave

Systems," Progress In Electromagnetics Research, vol. 80, pp. 133–143, 2019.

- **38.** S. Y. Nusenu, S. Huaizong, W.-Q. Wang, and A. Basit, "Directional Radar-Embedded Communications Based on Hybrid MIMO and Frequency Diverse Arrays," in 2019 IEEE Radar Conference (RadarConf), 2019, pp. 1–5.
- **39.** S. Y. Nusenu, S. Huaizong, P. Ye, W. Xuehan, and A. Basit, "Dual-function radarcommunication system design via sidelobe manipulation based on fda butler matrix," IEEE Antennas and Wireless Propagation Letters, vol. 18, no. 3, pp. 452–456, 2019.
- **40.** S. Wali, C. Li, A. Basit, A. Shakoor, R. A. Memon, S. Rahim, and S. Samina, "Fast and Adaptive Boosting Techniques for Variational Based Image Restoration," IEEE Access, vol. 7, pp. 181491–181504, 2019.
- **41.** Samad Wali, Abdul Shakoor, Abdul Basit, LipengXie, Chencheng Huang, Chunming Li An Efficient Method for Euler's Elastica Based Image Deconvolution. IEEE Access 7: 61226-61239, 2019.
- **42.** A. R. Al-Salehi, I. M. Qureshi, A. N. Malik, W. Khan, and A. Basit, "Dual-function radar–communications: information transmission during FDA radar listening mode," International Journal of Microwave and Wireless Technologies, pp. 1–12.
- **43.** W. Khan, I. M. Qureshi, A. Basit, and M. Zubair, "A Double Pulse MIMO Frequency Diverse Array Radar for Improved Range-Angle Localization of Target," Wireless Personal Communications, vol. 82, no. 4, pp. 2199–2213, 2015.
- **44.** W. Khan, I. M. Qureshi, A. Basit, and M. Zubair, "Hybrid phased MIMO radar with unequal subarrays," IEEE Antennas and Wireless Propagation Letters, vol. 14, pp. 1702–1705, 2015.
- **45.** W. Khan, I. M. Qureshi, A. Basit, and W. Khan, "Range Bins Based Mimo Frequency Diverse Array Radar With Logarithmic Frequency Offset," Antennas and Wireless Propagation Letters, IEEE, vol. PP, no. 99. p. 1, 2015.
- **46.** W. Khan, I. M. Qureshi, A. Basit, M. Zubair, and S. U. Khan, "MIMO-frequency diverse array radar with unequal subarrays for improved range-angle dependent beamforming," Wireless Personal Communications, vol. 97, no. 2, pp. 1967–1984, 2017.
- **47.** W. Khan, I. M. Qureshi, A. Basit, and M. Zubair, "Transmit/Receive Beamforming and Interferences Cancellation Using Phased Mimo Radar with Full Waveform Diversity," World Applied Sciences Journal, vol. 27, no. 3, pp. 392–399, 2013.
- **48.** W. Khan, I. M. Qureshi, A. Basit, A. N. Malik, and A. Umar, "Performance Analysis of MIMO-Frequency Diverse Array Radar with Variable Logarithmic Offsets," Progress In Electromagnetics Research C, vol. 62, pp. 23–34, 2016.
- 49. W. Khan, I. M. Qureshi, A. Basit, and B. Shoaib, "Transmit/received beamforming

for MIMO log-frequency diverse array radar," in 2016 13th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2016, pp. 689–693.

- **50.** S. Saeed, I. M. Qureshi, A. Basit, A. Salman, and W. Khan, "Cognitive null steering in frequency diverse array radars," International Journal of Microwave and Wireless Technologies, pp. 1–9, 2015.
- **51.** M. Jadoon, Q. Zhang, I. U. Haq, A. Jadoon, A. Basit, and S. Butt, "Classification of mammograms for breast cancer detection based on curvelet transform and multi-layer perceptron," Biomedical Research, vol. 28, no. 10, pp. 1–10, 2017.
- **52.** S. U. Khan, I. M. Qureshi, A. Naveed, B. Shoaib, and A. Basit, "Detection of defective sensors in phased array using compressed sensing and hybrid genetic algorithm," Journal of Sensors, vol. 2016, 2016.
- **53.** S. U. Khan, I. M. Qureshi, F. Zaman, B. Shoaib, A. Naveed, and A. Basit, "Correction of faulty sensors in phased array radars using symmetrical sensor failure technique and cultural algorithm with differential evolution," The Scientific World Journal, vol. 2014, 2014.
- **54.** S. U. Khan, I. M. Qureshi, F. Zaman, A. Basit, and W. Khan, "Application of firefly algorithm to fault finding in linear arrays antenna," World Applied Sciences Journal, vol. 26, no. 2, pp. 232–238, 2013.
- **55.** S. U. Khan, I. M. Qureshi, B. Shoaib, and A. Basit, "Correction of faulty pattern Using Cuckoo Search algorithm and Symmetrical element failure technique along with distance adjustment between the antenna array," in 2015 12th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2015, pp. 633–636.
- **56.** B. Shoaib, I. M. Qureshi, S. A. Butt, S. U. Khan, and W. Khan, "Adaptive step size kernel least mean square algorithm for Lorenz time series prediction," in 2015 12th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2015, pp. 218–221.
- B. Shoaib, I. M. Qureshi, W. Khan, S. U. Khan, and A. Basit, "Numerical solution of nonlinear Boundary value problems in kernel space," in 2016 13th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 2016, pp. 269– 273.

RESEARCH DIRECTION and RESEARCH GROUP IN UNIVERSITY

Incharge Radar and communication systems (RaCS) research group at International Islamic University, Islamabad.