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## ACADEMIC QUALIFICATION

- **Tech University of Korea** — 2021-2023
  **Post-Doctorate**
  (Department of Electronics Engineering)
- **International Islamic University, Islamabad** — 2012-2019
  **Ph.D**. (Electronics Engineering)
  Resource Allocation and Spectrum Sensing in Cognitive Radio Network with Malicious Users using Soft Computing and Statistical Techniques
- **Gandhara University Peshawar** — 2008-2010
  **MS.** Telecommunication & Networking
- **Northern University Nowshara** — 2014-2016
  **MCS.** Computer Science
- **University of Peshawar** — 2003-2005
  **M.Sc.** Electronics

## EMPLOYMENT HISTORY

**Tech University of Korea** — April 2021 till date
Research Professor

**University of Peshawar** — Peshawar-KPK
Full Time — 2016-till date
Lecturer (Teaching and Research)

**Northern University,** — Nowshera-KPK
Full Time — 2012-2016
Assistant Professor (Teaching and Research)

**PERRA** — Abbottabad-KPK
Full Time — 2008-2012
Electronics/MIS Manager

Responsibility as Electronics/MIS manager in the provincial earthquake reconstruction and rehabilitation agency (PERRA)

- Computers, switches, routers, photocopiers, telephone exchange, and fax machine maintenance/troubleshooting.
- Installing and configuring the server and clients' systems while accessing the network.
- Monitoring the network of the district reconstruction units in the hard areas.
- Making resources available on the network by managing user accounts and sharing directories.

- Systems upholding tasks such as developing and managing physical and virtual servers, software installation, administering resource usage, and applying patches.
- Supervision and evaluation of the ERM (earthquake reconstruction monitoring) database.
- Consolidating and confirmation of the FMIS (financial management information system) data with ERRA and DRUs (district reconstruction units).
- Preparation of the DRUs monthly and weekly consolidated reconstruction activity report.
- GIS training and data collection from the PERRA and DRU staff of Balakot city.
- Provision of the MIS progress report regarding data collection from DRUs and reconstruction offices.

FONO-TECH (Part-Time Job) Abbottabad-KPK
Electronics/Telecommunication Engineer 2010-2011

Responsibility as Maintenance Engineer in Fonotech-Abbottabad

- Intercom and communication system design.
- Configuration and Maintenance of the steno set, PA master systems, PA executive system, and master telephone set.
- Installation and repair of the network devices i.e., switches, and routers.
- Electronics control design, including microcontrollers, temperature sensors, and various communications technologies.
- PCB designing, simulation, and troubleshooting according to the product specifications.
- Reprogramming the steno sets made by Fonotech and telephone industries Pakistan (TIP).
- Installation and repair of the PABX exchange for various government institutions.

PIONEER GAMMA CAMERA SCANNING & RADIOLOGIST TRAINING INSTITUTE, PESHAWAR Peshawar-KPK
2006-2010
Part-Time
Senior Maintenance Engineer

Responsibility as Engineer in Pioneer Gamma Camera

- Provide coaching & assistance to the technician regarding the operations, protocols, and commands.
- Logical and functional illustration of the Gamma camera to doctors and technicians.
- Consideration of strong security policies, typical for medical applications, and legal regulations, according to the manufacturer's best practices.
- Energy correction & calibration testing of the Gamma camera
- Camera PM tubes tuning to ensure the Gamma camera images are more visible and transparent.

IDEAL TECHNOLOGY INTERNATIONAL Peshawar-KPK
Full Time 2006-2008
Sales Services and Maintenance Engineer
Responsibility as sales/maintenance Engineer in Ideal Technologies International (Pvt) Ltd

- Inspecting, testing, and maintenance of medical equipment.
- Selection and acquisition of medical equipment according to requirements.
- Keeping the backup available to the hospitals in case of equipment failure.
- Restoration and replacement of defective parts.
- Calibrate and adjust components and equipment, using hand tools, power tools, and measuring devices.
- Maintenance of the X-Ray units, CT scan, Gamma cameras, ultrasound, patient monitors, electrocardiography, defibrillators, electrosurgical units, anesthesia apparatus, pacemakers, ultrasound, and ETT machines.

TRAINING

- IC nanometer design training from the integrated circuit design center of the national institute of electronics (two weeks).
- Advanced telecommunication training (landline-based communication, RF-based communication, optical communication) from the communication engineering group, National Institute of Electronics (two weeks).

- Training as a broadcast engineer in radio Pakistan, Abbottabad (two months).
- Telecom Trainee engineer in special communication organization (SCO), Rawalpindi (one month).
- CCNA course completion from comsat cisco local academy Abbottabad.
- MSCE course completion from INARA Computer Institute Tehkal-5 Peshawar.

## TECHNICAL SKILLS AND INTEREST

- Developing and debugging skills in C, C++, MATLAB, Python and Java.
- Interest in solving research problems using optimization techniques and artificial intelligence.
- Ability to work with machine learning and artificial intelligence for solving wireless communication, signal processing, and power electronics projects.
- Ability to work on the projects internet of things (IoT), unmanned aerial vehicles (UAVs), and lethal autonomous missile systems (with minimum human control) to increase their communication throughput with a reduction in energy cost and reliable target identifications.
- Ability to work in data science and machine learning and apply them to create new data-driven insights.
- Develop new machine learning models to detect malicious activity in wireless communication (Cognitive Radio Network) applications and data (sensing and resources allocation).
- Modeling and simulation of IC Designs using Model-sim and Eldo.
- Schematic capture and design Integration using design architect-IC.
- Physical Layout Verification using IC Station and Design verification with the help of Calibre.
- Intel, microchip, and microcontroller-based circuit designing & their programming.
- Local and remote configuration of cisco routers, firewalls, and switches.
- Manage network operations to troubleshoot connectivity problems, add/terminate users, and assign rights and access control.
- Knowledge/expertise in computer languages i.e. Python, OpenCV, MATLAB, JAVA, C#, C++, and Assembly Language.

## (Journal Publications)

1. Abdul Kaleem, **Noor Gul**, Atif Elahi, et al. Multiple Generalized Sidelobe Cancellers for Minimization of Interference in Cognitive Radio System. Wireless Pers Commun 133, 641–666 (**2023**). https://doi.org/10.1007/s11277-023-10784-8.
2. Jehad Ali, Gaoyang Shan, **Noor Gul**, et al. An Intelligent Blockchain-based Secure Link Failure Recovery Framework for Software-defined Internet-of-Things. J Grid Computing 21, 57 (**2023**). https://doi.org/10.1007/s10723-023-09693-8.
3. Muhammad Rizwan, Sana Ul Haq, **Noor Gul**, Muhammad Asif, Syed Muslim Shah, Tariqullah Jan, Naveed Ahmad (**2023**) "Appearance-based dynamic hand gesture recognition using 3d separable convolutional neural network," Computers, Materials & Continua, vol. 76, no.1, pp. 1213–1247, **2023**.
4. **Noor Gul**, Su Min Kim, Jehad Ali, Junsu Kim (**2023**) UAV aided virtual cooperative spectrum sensing for cognitive radio networks. PLoS ONE 18(9): e0291077. https://doi.org/10.1371/journal.pone.0291077.
5. **Noor Gul**, Saeed Ahmed, Sajjad Khan, Junsu Kim, and Su Min Kim, Reconfigurable Sensing Time in Cooperative Cognitive Network Using Machine Learning, Comput. Mater. Contin., vol. 74, no. 3, pp. 5209-5227, **2023**, doi: 10.32604/cmc.2023.026945.
6. **Noor Gul**, Saeed Ahmed, Atif Elahi, Su Min Kim, Junsu Kim, “Optimal cooperative spectrum sensing based on butterfly optimization algorithm,” Comput. Mater. Contin., vol. 71, no. 1, pp. 369–387, **2022**, doi: 10.32604/cmc.2022.022260.
7. **Noor Gul**, Saeed Ahmed, Su Min Kim, and Junsu Kim, “Robust spectrum sensing against malicious users using particle swarm optimization,” ICT Express, no. xxxx, **2022**, doi: 10.1016/j.icte.2021.12.008.

8. Saeed Ahmed, **Noor Gul**, Jhangir Khan, Sum Min Kim, Jusu Kim, Energy-Efficient Scheduling for a Cognitive IoT-Based Early Warning System, CMC SI: Artificial Intelligence Convergence Healthcare System Leveraging Blockchain Networks, CMC, **2022**, vol.71, no.3, 2022.
9. Usman, Saeed Ahmed, **Noor Gul**, Junsu Kim, Su Min Kim, "Priority-Based Energy Sharing and Management Among Prosumers in Smart Grids," IEEE Access, vol. 10, pp. 12179–12190, **2022**, doi: 10.1109/ACCESS.2022.3141263.
10. Rashid Ahmed, **Noor Gul**, Saeed Ahmed, Muhammad Sajjad Khan, Su Min Kim, and J. Kim, "Sidelobe Reduction in NC-OFDM-Based CRNs Using Differential Evolution-Assisted Generalized Sidelobe Canceller," Volume 2022, Article ID 9449400, 11 pages, doi:10.1155/2022/9449400vol. 2022, **2022**.
11. **Noor Gul**, Su Min Kim, Saeed Ahmed, and Junsu Kim, Differential evolution based machine learning scheme for secure cooperative spectrum sensing system, Electron. 10 (2021) 1–29. https://doi.org/10.3390/electronics10141687. **2021.**
12. Atif Elahi, **Noor Gul**, and Shafqatullah Khan, Eigen Space-Based Generalized Sidelobe Canceler Applied for Sidelobe Suppression in Cognitive Radio Systems, Wirel. Pers. Commun. (**2021**). https://doi.org/10.1007/s11277-021-08861-x.
13. Muhammad Sajjad Khan, **Noor Gul**, Su Min Kim, and Junsu Kim. A Genetic Algorithm-Based Soft Decision Fusion Scheme in Cognitive IoT Networks with Malicious Users, Wireless Communications and Mobile Computing. Recent Advances in Security and Privacy Issues for Internet of Things Applications (RASPS). Vol. 2020. Article ID: 2509081. 10 Pages, **2020**.
14. **Noor Gul**, IM Quresi, Muhammad Sajjad Khan, Atif Elahi, and Sadiq Akbar. Differential Evolution-based Reliable Cooperative Spectrum Sensing in the Presence of Malicious Users, Wireless personal Communication. 114, 123-147 **(2020)**.
15. **Noor Gul**, Atif Elahi, Zafar Khalil, Muhammad Sajjad Khan, Su Min Kim and Jusu Kim, Boosted Trees Algorithm as reliable Spectrum Sensing Scheme in the Presence of Malicious Users, MDPI, Electronics **2020**, 9(6), 1038.
16. **Noor Gul,** MS Khan, Junsu Kim, and Su Min Kim, "Robust Spectrum Sensing via double sided neighbor distance based Genetic Algorithm in Cognitive Radio Network" **mobile information system**. Vol. 2020, Article ID 8876824, 10 pages, **2020**
17. Sajjad Khan, Liaqat Khan, **Noor Gul**, Muhammad Amir, Junsu Kim, and Su Min Kim, Support vector machine based classification of malicious users in cognitive radio network. Wireless Communication and mobile Computing. Vol. 2020, Article ID 8846948, 11 pages, **2020**
18. **Noor Gul**, Muhammad Sajjad Khan, Su Min Kim, Marc St-Hilaire, Ihsan Ullah, Junsu Kim, "Particle Swarm Optimization in the Presence of Malicious Users in Cognitive IoT Networks with Data", Scientific Programming, vol. **2020**, Article ID 8844083, 11 pages, **2020**. https://doi.org/10.1155/2020/8844083
19. Arshad ahmad, Muhammad sajjad khan, **Noor Gul**, "A Comparative Analysis of Different Outlier Detection Techniques against Malicious Users in Cooperative Spectrum Sensing, Wireless Communication and Mobile Computing. **2020**.
20. **Noor Gul,** IM Qureshi, Aqdas Naveed, Atif Elahi. Secure Soft combination Schemes against malicious users in cooperative spectrum sensing: Wireless Personal Communication. 108(1). 389-408**. 2019**
21. **Noor Gul, IM Qureshi**, A Elahi, and Imtiaz Rasool**. (2018).** Defense Against malicious users in cooperative spectrum sensing using Genetic Algorithm: *International Journal of Antenna and Wireless Propagation*. 2018, article ID 2346217, 1-11.

22. **Noor Gul**, IM Qureshi, Sadiq Akbar, Imtiaz Rasool and Muhammad Kamran. One-to-many relation based KL divergence in CSS against malicious users: *Wireless Communication and Mobile Computing*. 2018, article ID 3153915, 1-14. **2018**
23. Atif Elahi, IM Qureshi, Sajjad Khan, Fawad Zaman, **Noor Gul**. Improved algorithms for interference suppression in non-contiguous orthogonal frequency division multiplexing based cognitive radio systems: *Neural Computing and Applications,* (2018), 1-13. **2018**.
24. Atif Elahi, IM Qureshi, Fawad Zaman, and **Noor Gul (2018)**. Out-of-Band Radiation Reduction in Cognitive Radio OFDM Systems Hybridizing Firefly Algorithm with Generalized Sidelobe Canceller: *Wireless Personal Communications*, 100(3), 941-956. **2018**
25. Atif Elahi, IM Qureshi, **Noor Gul**, Muhammad Sajjad Khan, and Hayatullah **2018**. A Nature-Inspired Hybrid Technique for Interference Reduction in Cognitive Radio Networks. Cognitive Computation. 10(5). Pp 805-815.**2018**
26. **Noor Gul,** IM Qureshi, Aqdas Naveed, and Atif Elahi **(2018).** Cooperative spectrum sensing using optimal hard decision in the presence of abnormalities: *Journal of Science, Higher Education Department, KPK, Pakistan, 2018*.
27. **Noor Gul,** IM Qureshi, Aqdas Naveed, and Atif Elahi (2018). An optimized spectrum sensing decision using Genetic Algorithm: Journal of Science, Higher Education Department, KPK, Pakistan, **2018**.
28. Atif Elahi, Arshad Khattak, Zulqarnain Khattak, Muhammad Kamran, and **Noor Gul**. **(2018)**. Interference Cancellation Technique for OFDM Based Cognitive Radio Systems: *Journal of Science, Higher Education Department, KPK,* Pakistan, **2018**.
29. Atif Elahi, **Noor Gul**, Zulqarnain Khattak, and Muhammad Kamran. **(2018)**. Efficient High Out of Band Reduction for Cognitive Radio Systems: *Journal of Science, Higher Education Department, KPK,* Pakistan, 2018.
30. **Noor Gul,** IM Qureshi, Adnan Umar, Sajjad Khan, and Atif Elahi (2017). History based forward and feedback mechanism in cooperative spectrum sensing including malicious users in cognitive radio network:*PLOS-One*, 12(8). **2017**
31. Tahir Saleem, Muhammad Usman, Atif Elahi and **Noor Gul (2017)**. Simulation and performance evaluations of the New GPS L5 and L1 signals: *Wireless Communication and Mobile Computing*, vol. 2017, article ID 7492703, p. 1-4. **2017**
32. Atif Elahi, IM Qureshi, and **Noor Gul (2017)**. Side-lobe reduction in cognitive radio systems using hybrid technique. *World Academy of Science, Engineering and Technology*. 11(3). 213-216. **2017**
33. Atif Elahi, IM Qureshi, Fawad Zaman, and **Noor Gul** (2017). Suppression of Mutual Interference in Noncontiguous Orthogonal Frequency Division Multiplexing Based Cognitive Radio Systems. *Wireless Communications and Mobile Computing*, vol. 2017, article ID 1860134, 1-9.**2017**
34. Faseeullah, Tariq, Muhammad Arshad, Muhammad Saqib, and **Noor Gul (2012)**, Analysis of Security Techniques for Detecting Suspicious Activities and Intrusion Detection in Network traffic: *IJCSI, International Journal of Computer Science*. 9(1).259-265.**2012**
35. **Noor Gul,** Ahmad Faraz, Amin ul Haq, Junaid Khan, Amir Shahzad, Wassem Khan, ihsan ilahi, and Shahzad hameed. (2012**)**. Cloud Computing: History, Issues and Discussions: *International Journal of Multidisciplinary Sciences and Engineering*. 3(2). 31-33.**2012**
36. Khan, MA., Ahmed, A., Shah, M., Khan MS, **Noor Gul.** (**2012**). A survey on Architecture, Protocols, Challenges and Solutions on Vehicular Networking: *International Journal of Multidisciplinary Sciences and Engineering.* 3(3). 5-8.

Conference Publications:

1. **Noor Gul**, Jehad Ali, Su Min Kim, Junsu Kim, UAV-Based Optimized Virtual Cooperative Sensing Using Particle Swarm Optimization, ICTC 2023, September 1, **2023**.
2. **Noor Gul**, Su Min Kim, Junsu Kim, "Situation aware multi-agent UAV base stations for wireless network", The 33rd Joint Conference On Communications And Information, Yeosu Hidden Bay, South Korea, JCCI 2023.
3. **Noor Gul**, Su Min Kim, Junsu Kim, "Internet of Things-based Remote ECG Reconstruction System", The Korean institute of communication and information sciences (KICS), Pyeongchang-gun, Gangwon-do, Korea, **2023**.
4. S. Ahmed, **N. Gul**, Su Min Kim and Junsu Kim, "Euclidean Distance-based Machine Learning Scheme to Detect Vehicle Hacking Cyber-Attacks", KICS-Winter-2022, Alpensia Resort, Pyeongchang, Gangwon Province, Korea, February 9-11, **2022**.
5. **Noor Gul**, Saeed Ahmed, Su Min Kim and Junsu Kim, "Interference Minimization in 6G CRN using Bat Algorithm", KICS-Winter-2022, Alpensia Resort, Pyeongchang, Gangwon Province, Korea, February 9-11, **2022**.
6. **Noor Gul**, Saeed Ahmed, Su Min Kim and Junsu Kim, "Machine Learning-based Virtual Cooperative Spectrum Sensing in UAV-CR Networks", Accepted, JCCI **2022**.
7. Saeed Ahmed, **Noor Gul**, Su Min Kim and Junsu Kim, "Identification of Denial-of-Service Assault in Smart Cars Using Machine Learning", Accepted, JCCI **2022**.
8. **Noor Gul**, Saeed Ahmed, Su Min Kim, Junsu Kim, Butterfly Optimization Algorithm using Penalty-Reward Analysis for Secure Sensing in Cognitive Radio System, 2022 IEEE VTS Asia Pacific Wireless Communications Symposium (APWCS), August 24-August 26, **2022**.
9. **Noor Gul**, Saeed Ahmed, Su Min Kim, Junsu Kim, A Novel Sensing Strategy through Denoising Autoencoder and Ensembling Methods, 2021 International Conference on Information and Communication Technology Convergence (ICTC), **2022**, Jeju South Korea
10. **Noor Gul**, Saeed Ahmed, Su Min Kim, Junsu Kim, Improved Sensing Performance with Autoencoder and Ensemble Classifier, APCC **2022**.
11. Muhammad Sajjad Khan, **Noor Gul**, Su Min Kim, , Junsu Kim, Design and Comparison of Single Band Rectangular, Cylindrical, and Triangular DRA of C and X-Band Frequency, International Conference on Information and Communication Technology Convergence (ICTC), **2022**, Jeju South Korea.
12. **N. Gul**, S. Ahmed, Najeebullah, S. M. Kim and J. Kim, "Robust Spectrum Sensing Employing PSO," *2021 Twelfth International Conference on Ubiquitous and Future Networks (ICUFN)*, 2021, pp. 461-466, doi: 10.1109/ICUFN49451.**2021**.9528553.
13. S. Ahmed, Z. A. Khan, **N. Gul**, J. Kim and S. M. Kim, "Machine Learning-Based Clustering of Load Profiling to Study the Impact of Electric Vehicles on Smart Meter Applications," **2021** Twelfth International Conference on Ubiquitous and Future Networks (ICUFN), **2021**, pp. 444-447, doi: 10.1109/ICUFN49451.2021.9528396.
14. **N. Gul**, S. Ahmed, Najeebullah, J. Kim and S. M. Kim, "Secure Voting Scheme for Cooperative Sensing," 2021 International Conference on Information and Communication Technology Convergence (ICTC), **2021**, pp. 393-398, doi: 10.1109/ICTC52510.2021.9620944.
15. **N. Gul**, S. Ahmed, Najeebullah, S. M. Kim and J. Kim, "Sensing Weight Selection using the Genetic Algorithm to Enhance Cooperative Decision," 2021 International Conference on Information and Communication Technology Convergence (ICTC), **2021**, pp. 56-60, doi: 10.1109/ICTC52510.2021.9620891.

16. R.Ahmed, A.Elahi, G.Ahmad, **N.Gul** A. Ahmed. Sidelobe minimization in Orthogonal Frequency Division Multiplexing Using Efficient Generalize Sidelobe Canceler, In. 17th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 14-18 January **2020**, Bhurban, Pakistan
17. A.Elahi, **N.Gul**, A.Ahmed, R.Ahmed, M.Kamran. A Mongrel Technique for the Reducation of Sidelobes in OFDM – Based Cognitive Radio System, In. 17th International Bhurban Conference on Applied Sciences and Technology (IBCAST), 14-18 January **2020**, Bhurban, Pakistan.
18. A.Ahmed, **N.Gul**, I, Rasool, A, Elahi. Performance comparison of hard decision schemes in the presence of malicious users, In. Proceedings of the 1st International Conference on Electrical, Communication and Computer Engineering (ICECCE), 24-25 July **2019**, Swat, Pakistan
19. H. Asfandyar, **N.Gul**, I, Rasool, A, Elahi. Enhanced Cooperative Spectrum Sensing in Cognitive Radio Network Using Flower Pollination Algorithm, In. Proceedings of the 1st International Conference on Electrical, Communication and Computer Engineering (ICECCE), 24-25 July **2019**, Swat, Pakistan
20. A.kaleem, S.Haq, A,Elahi, **N.Gul**. Minimization of OOB radiation in OFDM based cognitive radio system using multiple GSC, In. Proceedings of the 1st International Conference on Electrical, Communication and Computer Engineering (ICECCE), 24-25 July **2019**, Swat, Pakistan
21. R.Ahmed, A, Elahi, **N.Gul**, N, Ali, M, Shafiullah. Minimization of Out of Band Radiation in Orthogonal Frequency Division Multiplexing using Modified Generalized Sidelobe Canceler, In. Proceedings of the 1st International Conference on Electrical, Communication and Computer Engineering (ICECCE), 24-25 July **2019**, Swat, Pakistan.
22. A. Elahi, A. Waseem, I. M. Qureshi, and **N. Gul**, "Interference Prevention in Cognitive Radio Networks," IEEE 2nd International Conference on Intelligent Systems Engineering, Kuala Lumpur, Malaysia (ICISE 2018), **2018**.
23. **N. Gul**, I. M. Qureshi, A. Naveed, A. Elahi, and T. Saleem, "A combination of double-sided neighbor distance and genetic algorithm in cooperative spectrum sensing against malicious users," in Proceedings of 2017 14th International Bhurban Conference on Applied Sciences (IBCAST) **2017**, Islamabad, Pakistan, pp. 746-753
24. A. Elahi, I. M. Qureshi, M. Atif, and **N. Gul**, "Interference reduction in Cognitive radio networks using Genetic and Firefly Algorithms," 2017 International Conference on Communication, Computing and Digital Systems (C-CODE), Islamabad, **2017**, pp. 96-100.
25. A. Elahi, I. M. Qureshi, **N. Gul**, and T. Saleem, "Application of Differential and cuckoo search algorithm in reduction of sidelobes," 2016 19th international, Multi-topic conference (INMIC), Islamabad, Pakistan, Dec. **2016**, pp. 1-4. Doi: 10.1109/INMIC.2016.7840103.