**RESEARCH**

# Research Interests

* Exploring mechanisms and protocols for end-to-end communication in the Internet of Things (IoT).
* Understanding the role of IoT technology in delivering real-time streaming data related to the natural environment.
* Investigating innovative IoT concepts like programmable networks, including Software Defined Networking and Network Function Virtualization.
* Examining channel estimation mechanisms for massive MIMO systems in 5G technology.
* Studying mechanisms and protocols for end-to-end communication in Mobile Ad Hoc Networks (MANETs) and Wireless Sensor Networks (WSN).
* Delving into the realm of digital inclusion and the enhancement of digital skills, understanding their impact on future technologies and society.
* QoS, Network Security, Information Security, Privacy, Artificial Intelligence and Deep Learning.
* Mobile Ad Hoc Networks and Delay Tolerant Networks (DTN) and its QoS, Routing, security and privacy issues.
* Intelligent Transport System (ITS) and its QoS, privacy, routing and security issues
* Renewable Energy and Energy Efficient Algorithm and Materials Fabrications.

# International Academic Peer Reviewed Publications

My scholarly contributions to research exceed **40**, including 37 articles published in premier, peer-reviewed journals, 05 papers presented at conferences, and 3 additional journal articles currently under the review process. Google Scholar Citations: 445, i10-index: 12, h-index: 10; https://scholar.google.com/citations?user=\_Um3BSoAAAAJ&hl=en

**Journal Papers Recognized by HEC in Category W (Web of Science Indexed)**

1. Muhammad Rizwan, Sana Ul Haq, Noor Gul, **Muhammad Asif**, Syed Muslim Shah, Tariqullah Jan, Naveed Ahmad. Appearance Based Dynamic Hand Gesture Recognition Using 3D Separable Convolutional Neural Network. Computers, Materials & Continua, 76(1), 1213-1247, 2023.
2. Muhammad Amin. Khalil Ullah, **Muhammad Asif,** Habib Shah, Arshad Mehmood, Muhammad Attique Khan. Real-World Driver Stress Recognition and Diagnosis Based on Multimodal Deep Learning and Fuzzy EDAS Approaches. Diagnostics, 13(11):1897, 2023.
3. Ehsan Raza, Zubair Ahmad, Fakhra Aziz, **Muhammad Asif** et al. Design and optimization of four-terminal mechanically stacked and optically coupled silicon/perovskite tandem solar cells with over 28% efficiency. Heliyon, vol.9 (2), 2023.
4. Muhammad Amin, Khalil Ullah , **Muhammad Asif** et al. ECG- Based Driver’s Stress Detection Using Deep Transfer Learning and Fuzzy Logic Approaches. IEEE Access, vol. 10, pp. 29788-29809, 2022.
5. Muhammad Sadiq, Abdul Majid, **Muhammad Asif** et al. Effects of Nodes Mobility on the energy consumption of Routing Protocols (AODV, DSDV) in- Ad-Hoc Networks. Pakistan Journal of Scientific and Industrial Research, 65A (1), pp: 74-79, 2022.
6. Ehsan Raza, Zubair Ahmad, **Muhammad Asif** et al. Numerical modeling and performance optimization of carbon-based hole transport layer free perovskite solar cells. Optical Materials, vol. 125,112075, 2022.
7. Muhammad Arshad, **Muhammad Asif** ,Sana Ul Haq et al. Spectroscopic and photoluminescence properties of praseodymium doped potassium aluminum phosphate (P2O5-K2O- Al2O3) glasses for optoelectronics applications. Journal of Non-Crystalline Solids, vol. 586, 121570, 2022.
8. Muhammad Sadiq, Amir Naveed, **Muhammad Asif** et al. Geopolymerization: A Promising Technique for Membrane Synthesis. Materials Research Express, vol. 8(11), 112002, 2021.
9. Muhammad Sadiq, Muhammad Arif, **Muhammad Asif,** Amir Naveed et al. Synthesis of MnO2 Carbon nanotubes catalyst with enhanced Oxygen Reduction Reaction for Polymer Electrolyte Membrane Fuel Cell. Journal of the Pakistan Institute of Chemical Engineers, Vol. 49(2), 2021.
10. Ehsan Raza, **Muhammad Asif,** Ayyaz Ahmed et al. Numerical simulation analysis towards the effect of charge transport layers electrical properties on cesium based ternary cation perovskite solar cells performance, Solar Energy, Vol.225,pp: 842-850,2021.
11. Muhammad Sadiq, Muhammad Humayun, **Muhammad Asif** et al. Effect of Organic Additives and Current Efficiency on Electrodeposition of Nickel from Sulfate Bath. Journal of the Pakistan Institute of Chemical Engineers, Vol. 49(2), 2021.
12. Shoaib Khan, **Muhammad Asif,** Amir Naveed et al. Designing and Simulation of Permanent Magnet Synchronous Generator for Wind Energy Hybrid System. Journal of Engineering and Applied Sciences, Vol. 40(1), pp. 52-59, 2021.
13. Muhammad Humayun, Muhammad Zeeshan, **Muhammad Asif** et al. Physical and mechanical characterization of sand replaced stone dust concrete. Materials Research Express, vol. 8(8) 085507, 2021.
14. Haroon-Ur Rashid, Muhammad Ali, **Muhammad Asif,** Sahar Shah et al. Synthesis, Characterization, and Applications of Silver Nano Fibers in Humidity, Ammonia, and Temperature Sensing. Micromachines, vol. 12(6), 682, 2021.
15. Muhammad Uzair Khan, Amir Naveed, **Muhammad Asif** et al. Experimental validation of bulk- graphene as a thermoelectric generator. Materials Research Express, vol. 8(5) 056302, 2021.
16. Khalil ur Rehman, **Muhammad Asif**, Muhammad Tahir et al. Improvement of capacitive humidity sensors using tris (8-hydroxyquinoline) gallium (Gaq3) nanofibers as a dielectric layer. Journal of Materials Science: Materials in Electronics, vol. 31(23), pp: 21702-21710, 2020.
17. Gauhar Ali, Naveed Ahmad, Yue Cao, **Muhammad Asif** et al. Blockchain based Permission Delegation and Access Control in Internet of Things (BACI). Elsevier Journal on Computer and Security, vol. 86, pp: 318-334, 2019.
18. Qazi Ejaz Ali, Naveed Ahmad, **Muhammad Asif**, Muhammad Khalid et al. SPATA: Strong Pseudonym based Authentication in Intelligent Transport System. IEEE Access, vol. 6(1), pp: 79114- 79128, 2018.
19. Fazli Amin Khalil, Shahzad Anwar, **Muhammad Asif**, Sana Ul Haq et al. Energy management strategy for integrating photovoltaic energy in AC microgrid. Journal of Renewable and Sustainable Energy, vol. 10 (6), 065102, 2018.
20. Shahid Latif, Saeed Mahfooz, Bilal Jan, Naveed Ahmad, Yue Cao, **Muhammad Asif.** A comparative study of scenario-driven multi-hop broadcast protocols for VANETs. Vehicular Communications, vol. 12, pp: 88–109, 2018.
21. Sadiq Akbar, Fawad Zaman, **Muhammad Asif**, Ata Ur Rehman, Muhammad Asif Zahoor Raja. Novel application of FO DPSO for 2-D parameter estimation of electromagnetic plane waves. Neural Computing and Applications 31, pp: 3681–3690, 2019.
22. Fazli A. Khalil, **Muhammad Asif,** Shahzad Anwar, Sana ul Haq, and Farman Illahi. Solar Tracking Techniques and Implementation in Photovoltaic Power Plants: a Review. Proceedings of the Pakistan Academy of Sciences 54 (3), pp: 231– 241, 2017.
23. Taimur Khan, Naveed Ahmad, Yue Cao, Syed Asim Jalal, **Muhammad Asif**, Sana Ul Haq, Haitham Cruickshank. Certificate Revocation in Vehicular Ad hoc Networks Techniques and Protocols: A SURVEY. Springer SCIENCE CHINA Information Sciences, vol. 60,100301, 2017.
24. Naveed Ahmad, Haitham Cruickshank, Yue Cao, Fakhri Alam Khan, **Muhammad Asif,** Awais Ahmad, Gwanggil Jeon. Privacy by Architecture Pseudonym Framework for Delay Tolerant Network. Future Generation Computer Systems, vol. 93, pp: 979-992, 2017.
25. Hassan, A. Ali, F. Khan, S. Khan, S. Rahim, S. U. Haq, T. Jan, **M. Asif.** Using Series Capacitors for the Improvement and Evaluation of Transmission Line Utilization. Sindh University Research Journal (Science Series) 48(2): 257-260, 2016.
26. Haseeb Ashraf Malik, Fakhra Aziz, **Muhammad Asif,** Ehsan Raza et al. Enhancement of optical features and sensitivity of MEH-PPV/VOPcPhO photo detector using CdSe quantum dots. Journal of Luminescence, vol. 180, pp: 209-213, 2016.
27. Ehsan Raza, **Muhammad Asif,** Fakhra Aziz et al. Influence of thermal annealing on a capacitive humidity sensor based on newly synthesized macroporous PBObzT2. Sensors and Actuators B: Chemical, vol. 235, pp: 146-153, 2016.
28. Muhammad Amin, Ajmal Khan, **Muhammad Asif**, Sana Ul Haq, Imtiaz Rasool. A Survey of Routing Protocols for Delay Tolerant Networks in VANETs. Science International Lahore, vol. 28(2), pp: 1137-1143, 2016.
29. **Muhammad Asif**, Sana Ul Haq, Muhammad Arshad et al. Analysis of Solar Maximum Power Point Tracking Algorithms and Hardware Architectures”, Sindh University Research Journal (Science Series) 48 (1), pp: 61–66, 2016.
30. **Muhammad Asif**, Muhammad Ali, Naveed Ahmad et al. Design and Development of a Data Logger Based on IEEE 802.15.4/ZigBee and GSM. Proceedings of the Pakistan Academy of Sciences, vol. 53 (1), pp: 37–48, 2016.
31. Amad Hamza, Tariqullah Jan, Asiya Jehangir, **Muhammad Asif** et al. A Novel Approach for Blind Estimation of Reverberation Time using Gamma Distribution Model. Journal of Electrical Engineering and Technology, vol. 11(2), pp: 529-536, 2016.
32. **Muhammad Asif**, Sohail Ahmad, Sana Ul Haq et al. Improved OLSR Protocol for VANETs and Comparison with State of Art DSR and AODV Protocols. Sindh University Research Journal (Science Series), vol. 47 (4), pp: 835–838, 2015.
33. **Muhammad Asif**, Sana Ul Haq, Naveed Ahmad et al. QoS Assurance in Higher Mobility Mobile Ad Hoc Networks using Multipath Admission Control Protocol. Proceedings of the Pakistan Academy of Sciences, vol. 52 (3), pp: 201–214, 2015.
34. Sana Ul Haq, **Muhammad Asif**, Tariq Ullah Jan et al. Audio-Visual Emotion Classification using Filter and Wrapper Feature Selection Approaches. Sindh University Research Journal (Science Series), Vol.47 (1), pp: 67-72, 2015.
35. S. HAQ, A. ALI, **M. ASIF**, T. JAN, Y. KHAN, Naveed AHMAD. Speaker-Independent Speech Emotion Recognition using Gaussian and SVM Classifiers. Sindh University Research Journal (Science Series), Vol.47 (1), pp: 103-106, 2015.
36. Sanaul Haq, Tariqullah Jan, **Muhammad Asif**, Amjad Ali, and Naveed Ahmad. Speaker dependent Human Emotion Recognition in Unimodal and Bimodal Scenarios. Pakistan Academy of Sciences, 52 (1), pp: 15–25, 2015.
37. Sana ul Haq, Tariq Ullah Jan, Asiya Jehangir, **Muhammad Asif** et al. Bimodal Human Emotion Classification in the Speaker-dependent Scenario. Pakistan Academy of Sciences, vol. 52 (1), pp: 27–38, 2015.

**Peer-Reviewed Published Conference Papers**

1. **Muhammad Asif**, Zhili Sun, Haitham Cruickshank and Naveed Ahmad. Flow Aware Admission Control–Multipath protocol with multiple Constraints (FAAC-MM) for assurance of multiple QoS metrics in MANETs. 18th IEEE Symposium on Communications and Vehicular Technology, Benelux Ghent, 22-23 November 2011, Belgium.
2. **Muhammad Asif**, Zhili Sun, Haitham Cruickshank and Naveed Ahmad. QoS Assurance in MANETs using Flow Aware Admission Control– Multipath (FAAC-Multipath) Protocol. 30th IEEE International Performance Computing and Communications Conference IPCCC 2011, 17-19 November 2011, Orlando, Florida, SA.
3. **Muhammad Asif,** Zhili Sun, Haitham Cruickshank and Naveed Ahmad. QoS Provisioning in contention aware MANETs using Flow Aware Admission Control (FAAC) protocol. IADIS International Conference Telecommunications, Networks and Systems 2011 Rome, 20-22 July 2011, Italy.
4. Naveed Ahmad, Haitham Cruickshank, Zhili Sun, **Muhammad Asif.** Pseudonymised Communication in Delay Tolerant Networks. Ninth Annual Conference on Privacy, Security and Trust, 19-21 July, 2011, Montreal, Québec, Canada.
5. **Muhammad Asif**, Zhili Sun and Haitham Cruickshank. Admission Control Protocol in Mobile Ad Hoc Networks Provisioning QoS. 7th ACM International Conference on Frontiers of Information Technology, December 2009, Pakistan.

**Successful Research Degree Supervision**

# PhD Supervision:

1. **Dr. Sadiq Akbar**, Parameter Estimation of Electromagnetic Plane Waves Using Novel Adaptive Metaheuristic Techniques
2. **Dr. Muhammad Amin,** ECG-Based Driver’s Stress Detection Using Deep Transfer Learning and Fuzzy logic approaches Learning and Fuzzy Logic Approaches
3. **Dr. Muhammad Arshad**, Synthesis and Characterization of Selected Rare-Earth (Doped Glasses for Optoelectronics Applications)
4. **Dr. Ehsan Raza**, Designing of low cost, stable and highly efficient perovskite based single junction and tandem solar cells using numerical modelling

# MPhil Supervision:

1. **Abdul Basit,** Suppression of Sidelobes with Improved Subcarrier Weighting in Orthogonal Frequency Division Multiplexing Based Cognitive Radio System
2. **Sohail Ahmad**, Improved OLSR Protocol for VANETs and Comparison with State of Art DSR and AODV protocols
3. **Fazli Amin Khalil,** Grid Connected Photovoltaic Power Synchronizing and Management System
4. **Shah Fahad**, An Efficient and Adaptive Energy Cooperation in Internet of Things Using Energy Harvesting
5. **Muhammad Arshad**, Cost and Efficiency Assessment of Solar Maximum Power Point Tracking Algorithms and Hardware Architectures
6. **Sonia Altaf**, A Comparative Study of the Routing Protocols in Wireless Sensor Networks with the Proposed Model of Energy Conservation
7. **Rehana Zeb**, Optimized Energy Aware Routing Protocol Based On Cooperation for Wireless Sensor Networks
8. **Haseeb Ashraf,** Fabrication and Characterization of Photo Detector based on Ternary Blend of MEH-PPV, VOPcPhO and CdSe Nanoparticles
9. **Ehsan Raza**, Investigating Humidity Sensing Properties of benzo[b]thiophene end-capped dioctyloxy-benzene Polymer (PBObzT2) Based Thin Film Sensor
10. **Khalil Ur Rehman**, Investigation and Characterization of Tris (8-Hydroxyquinoline) Gallium (Gaq3) Based Capacitive Humidity Sensor
11. **Nayyera Saba**, Humidity Sensing Properties of Graphene Oxide Nanofibres
12. **Furqan Ullah,** Synthesis and Characterization of Bulk Graphene-Based Thermoelectric Generator