**Anwar Khan**

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**EDUCATION**

* **PhD Electronics (with distinction)**, Quaid-i-Azam University, Islamabad, Pakistan, 2018.

Thesis title: Interference Avoidance Routing for Underwater Wireless Sensor Networks.

* **MPhil Electronics (Grade A)**, Quaid-i-Azam University, Islamabad, Pakistan, 2007-2009.
* **MSc Electronics (Grade A)**, University of Peshawar, Peshawar, Pakistan, 2004-2006.
* **BSc (Grade B+),** University of Peshawar, Peshawar, Pakistan, 2003.

**EMPLOYMENT**

* Lecturer at the Department of Electronics, University of Peshawar, KPK, Pakistan, December 2009 till date.

**JOURNAL PUBLICATIONS (Total Impact Factor = 59.039)**

* **Anwar Khan**, Mostafa M. Fouda, Dinh-Thuan Do, Abdulaziz Almaleh, Abdullah M. Alqahtani, and Atiq Ur Rahman, “Underwater target detection using deep learning: Methodologies, challenges, applications, and future evolution,” *IEEE Access*, Vol. 12, pp. 12618-12635, Jan 12, 2024. (**IF: 3.476)**.

# Anwar Khan, Mostafa M. Fouda, Dinh-Thuan Do, A. Almaleh, and Atiq Ur Rahman, “Short-term traffic prediction using deep learning long short-term memory: Taxonomy, applications, challenges, and future trends,” *IEEE Access*, Vol. 11, No. 535244, pp. 94371-94391, August 29, 2023. (IF: 3.476).

* **Anwar Khan**, Muhammad Imran, Abdulllah Alharbi, Ehab Mahmoud Mohamed, and Mostafa M. Fouda, “Energy harvesting in underwater wireless sensor networks: Design, taxonomy, applications, challenges and future directions,” *IEEE Access*, Vol. 10, No. 535244, pp. 134606-134622, December 19, 2022. (**IF: 3.367)**.
* Munsif Ali, **Anwar Khan**, Massimo Bertozzi, Ubaidullah, Saleh M. Altowaijri, Ihsan Ali, and Salman Iqbal, “Energy and path-aware-reliable routing in underwater acoustic wireless sensor networks,” *Wireless Communications and Mobile Computing*, Vol. 2022, No. 535244, pp. 1-17, September 06, 2022. (**IF: 2.146)**.
* **Anwar Khan**, Muhammad Imran, Muhammad Shoaib, Atiq-Ur-Rahman, and Najm Us Sama, “Link and stability-aware adaptive cooperative routing with restricted packets transmission and void-avoidance for underwater acoustic wireless sensor networks,” *Computer Communications*, Vol. 181, No. 1, pp. 428-437, October 24, 2021. (**IF: 3.167)**.
* Waqas Gular, Abdullah Waqas, Hammad Dilpazir, **Anwar Khan**, Ashfaq Alam, and Hasan Mahmood, “Power control for cognitive radio networks: A game theoretic approach,” *Wireless Personal Communications*, 123, pp.745-759, October 21, 2021. (**IF: 1.671)**.
* Ihsan Ali, Abdelmuttlib Ibrahim Abdalla Ahmed, Ahmad Almorgen, Muhammad Ahsan Raza, Syed Attique Shah, **Anwar Khan**, and Abdullah Gani, “Systematic literature review on Iot-based botnet attack, ” *IEEE Access*, Vol. 8, No. 1, pp. 212220-212232, November 24, 2020. (**IF: 3.367)**.
* J. Qadar, B. S-D.-Abajo, **Anwar Khan**, B. G. Zapirain, I. D. L. T.-Tierz, and H. Mahmood, “Towards mobile edge computing: Taxonomy, challenges, applications and future realms,” *IEEE Access*, Vol. 8, pp. 189129-189162, September 25, 2020. (**IF: 3.745)**.
* **Anwar Khan**, Atiq Ur Rahman, Mahdi Zareei, Najm Us Sama, Cesar Vargas-Rosales, Junaid Qadar, and Ehab Mahmoud Mohamed, “Modem design for underwater acoustic networks: Taxonomy, capabilities, challenges, applications and future trends,” *Journal of Intelligent and Fuzzy Systems*, Vol. 10, No. 1, pp. 1-18, August 11, 2020. (**IF: 1.840)**.
* **Anwar Khan**, Khursheed Aurangzeb, Emad-ul-Haq Qazi, and Atiq Ur Rahman, “Energy-aware scalable reliable and void-hole mitigation routing for sparsely deployed underwater acoustic networks,” *Applied Sciences*, Vol. 10, No. 1, pp. 1-18, December 25, 2019. (**IF: 2.217)**.
* Junaid Qadar, **Anwar Khan**, Mahdi Zareei, and Cesar Vargas-Rosales, “Energy balanced localization-free cooperative noise-aware routing protocols for underwater wireless sensor networks,” *Energies*, Vol. 12, No. 22, pp. 1-24, November 8, 2019. (**IF: 2.707)**.
* Ubaid Ullah, **Anwar Khan**, Mahdi Zareei, Ihsan Ali, Hasan Ali Khattak, and Ikram Ud Din, “Energy-effective cooperative and reliable delivery routing protocols for underwater wireless sensor networks,” *Energies*, Vol. 12, No. 13, pp. 1-22, July 9, 2019. (**IF: 2.707)**.
* Munsif Ali, **Anwar Khan**, Hasan Mahmood, and Naeem Bhatti, “Cooperative, reliable, and stability-aware routing for underwater wireless sensor networks,” *International Journal of Distributed Sensor Networks*,” Vol. 15, No. 6, pp. 1-11, June 11, 2019. (**IF: 1.787)**.
* Manazar Ahsan, Ihsan Ali, Muhammad Imran, Idna Idris, Suleman Khan, and **Anwar Khan**, “A fog-centric secure cloud storage scheme,” *IEEE Transactions on Sustainable Computing,* Vol. 10, No. 2, pp. 250-262, May 06, 2019. (**IF: 1.787)**.
* **Anwar Khan**, Saleh. M. Altowaijri, Ihsan Ali, and Atiq Ur Rahman, “Reliability-aware cooperative routing with adaptive amplification for underwater acoustic wireless sensor networks,” *Symmetry*, Vol. 11, No.3, pp. 1-14, March 22, 2019. (**IF: 1.256)**.
* Munsif Ali, **Anwar Khan**, Khursheed Aurangzeb, Ihsan Ali, Hasan Mahmood, Syed Irtaza Haider, and Naeem Bhatti, “CoSiM-RPO: Cooperative routing with sink mobility for reliable and persistent operation in underwater acoustic wireless sensor networks,” *Sensors*, Vol. 19, No. 5, pp. 1-21, March 04, 2019. (**IF: 2.475)**.
* Ubaidullah, **Anwar Khan,** Saleh M. Altowaijri, Ihsan Ali, Atiq Ur Rahman, Vijay Kumar, Munsif Ali, and Hasan Mahmood, “Cooperative and delay minimization routing schemes for dense underwater wireless sensor networks,” *Symmetry,* Vol. 11, No. 2, pp. 1-20, February 11, 2019. (**IF: 1.256)**.
* Rahim Khan, Ihsan Ali, Saleh M. Altowaijri, Muhammad Zakarya, Atiq-Ur-Rahman, Ismail Ahmedy, **Anwar Khan**, and Abdullah Gani, “LCSS-based algorithm for computing multivariate data set similarity: A case study of real time WSN data,” *Sensors,* Vol. 19, No. 1, pp. 1-15, January 2018. (**IF: 2.475)**.
* Sahar shah, **Anwar Khan**, Ihsan Ali, Kwang-Man Ko, and Hasan Mahmood, “Localization free energy efficient and cooperative routing protocols for underwater wireless sensor networks,” *Symmetry,* Vol. 10, No. 10, pp. 1-20, October 15, 2018. (**IF: 1.256)**.
* **Anwar Khan**, Ihsan Ali, Atiq-Ur-Rahman, Muhammad Imran, Fazal-e-Amin, and Hasan Mahmood, “Co-EEORS: Cooperative energy efficient optimal relay selection protocol for underwater wireless sensor networks,” *IEEE Access,* Vol. 6, pp. 28777-28789, May 16, 2018. (**IF: 3.244)**.
* **Anwar Khan**, Ihsan Ali, Abdullah Ghani, Nawsher Khan, Mohammed Alsaqer, Atiq Ur Rahman, and Hasan Mahmood, “Routing protocols for underwater wireless sensor networks: Taxonomy, research challenges, routing strategies and future directions,” *Sensors*, Vol. 18, No. 1619, pp. 1-30, May 18, 2018. (**IF: 2.677)**.
* **Anwar Khan**, Mohammad Hossein Anisi, Ihsan Ali, Nadeem Javaid, Mohammed Qaiser Azeem, and Hasan Mahmood, “An energy efficient interference and route aware protocol for underwater wireless sensor networks,” *Ad Hoc & Sensor Wireless Networks*, Vol. 41, No. 1-2, pp. 31-53, May 20, 2018. (**IF: 1.034)**.
* Dalhatu Muhammad, Mohammed Hossein Anisi, Mehdi Zareei, Versales Rosales, and **Anwar Khan**, “Game theory-based cooperation for underwater acoustic sensor networks: Taxonomy, review, research challenges and directions,” *Sensors*, Vol. 18, No. 2, pp. 1-29, February 1, 2018. (**IF: 2.677)**.
* **Anwar Khan**, Ismail Ahmedy, Mohammad Hossein Anisi, Nadeem Javaid, Ihsan Ali, Nawsher Khan, Mohammed Alsaqer, and Hasan Mahmood, “A localization-free interference and energy holes minimization routing for underwater wireless sensor networks,” *Sensors*, Vol. 18, No. 165, pp. 1-17, January 9, 2018. (**IF: 2.677)**.
* **Anwar Khan**, Nadeem Javaid, Ihsan Ali, Mohammad Hossein Anisi, Atiq-Ur-Rahman, Naeem Bhatti, Muhammad Zia, and Hasan Mahmood, “An energy efficient interference-aware routing protocol for underwater WSNs,” *KSII Transactions on Internet and Information System*s, Vol. 11, No. 10, pp. 4844-4864, October 30, 2017. (**IF: 0.452)**.

**CONFERENCE PROCEEDINGS**

* Junaid Qadar, **Anwar Khan**, and Hasan Mahmood, “DNAR: Depth and noise aware routing for underwater wireless sensor networks,” *in. Proc. of 12th International Conference on Complex, Intelligent and Software Intensive Systems, (Published as Part of the Springer Advances in Intelligent Systems and Computing book series (AISC, volume 772),* Matsue, Japan, July 2018.
* **Anwar Khan,** Ihsan Ali, and Hasan Mahmood, “A localization free variable transmit power routing protocol for underwater wireless sensor networks,” *in. Proc. of 20thInternational Conference on Network-based Information Systems*, *(Published as Part of the Springer book series (LNDECT, volume 7))* Canada, August 2017.
* Mudassir Ejaz, **Anwar Khan**, Muhammad, Umar Qasim, Zahoor Ali Khan, and Nadeem Javaid, “Position aware mobility pattern of AUVs for avoiding void zone in underwater WSNs,” *in. Proc. of IEEE 9th International Conference on Intelligent Networking and Collaborative Systems*, Ostrava, Czech Republic, September 2016.
* **Anwar Khan**, Mudassir Ejaz, Nadeem Javaid, Muhammad Qaisar Azeem, Umar Qasim, and Zahoor Ali Khan, “EEORS: Energy efficient optimal relay selection protocol for underwater WSNs,” in. Proc. of *IEEE 19th International Conference on Network-Based Information Systems*, Ostrava, Czech Republic, September 2016.
* **Anwar Khan**, Nadeem Javaid, Hasan Mahmood, Sangeen, Zahoor Ali Khan, and Umar Qasim, “EEIRA: An energy efficient interference and route aware routing protocol for underwater wireless sensor networks,” *in. Proc. of IEEE 10th International Conference on Complex, Intelligent and Software Intensive Systems, Fukouka, Japan,* July 2016.
* **Anwar Khan**, Hasan Mahmood, Zahoor Ali Khan, Umar Qasim, and Nadeem Javaid, “A transmit power efficient non-cooperative game design for wireless sensor networks based on the utility and cost functions,” *in. Proc. of IEEE 30th International Conference on Advanced Information Networking and Applications,* Crans-Montana, Switzerland, March 2016.

**SCHOLARSHIPS/GRANTS**

* Merit scholarship during MPhil at the Department of Electronics, Quaid-i-Azam University, Islamabad, Pakistan.
* University of Peshawar Faculty scholarship for completion of PhD from the Department of Electronics, Quaid-i-Azam University, Islamabad, Pakistan.
* HEC travel grant for *IEEE 30th International Conference on Advanced Information Networking and Applications,* Crans-Montana, Switzerland, March 2016, for presentation of the paper: A transmit power efficient non-cooperative game design for wireless sensor networks based on the utility and cost functions.
* HEC travel grant for *IEEE 19th International Conference on Network-Based Information Systems,* Ostrava, Czech Republic, September 2016, for presentation of the paper: EEORS: Energy efficient optimal relay selection protocol for underwater WSNs.
* HEC travel grant for *20thInternational Conference on Network-based Information Systems,* Canada, August 2017, for presentation of the paper: A localization free variable transmit power routing protocol for underwater wireless sensor networks.

**MEMBERSHIPS**

* Member IEEE.
* Member of Pakistan Academy of Sciences.

**TAUGHT COURSES**

* Since December 2009 till now, I have taught the following courses at the Department of Electronics, University of Peshawar, Pakistan.
* **Graduate & Postgraduate Level:** Adhoc & Sensor Wireless Networks, Wireless Sensor Networks Hardware, Advanced Computer Communication & Networks, Information Theory, Game Theory, Probability Theory & Stochastic Processes, Smart Cities & Intelligent Transportation, Prediction & Regression Analysis, Machine/Deep Learning, Statistical Signal Processing.
* **Undergraduate Level:** Electric Circuits, Digital Logic Design, Analog Electronics, Semiconductor Devices, Electromagnetic Field Theory, Applied Mathematics, C/C++, Computer Networking, Probability Theory, Signals & Systems, Digital Signals Processing, Microwave Communications, Introduction to Computers.

**SUPERVISION**

* **MS Thesis:** Adaptive relayed communications with load-based time-switching wireless energy harvesting for mobile edge computing by Khushbakht Rahat, Department of Electronics, University of Peshawar, January 2023.
* **MS Thesis:** Smart data collection using sink mobility in underwater wireless sensor networks, by Ahmad Zia, Department of Electronics, University of Peshawar, Pakistan, November, 2022.
* **MS Thesis:** Delay, neighbors and destination-aware routing for underwater wireless sensor networks, by Mohid Taimour, Department of Electronics, University of Peshawar, Pakistan, September, 2022.
* **MS Thesis:** Transmission range-based void-hole avoidance in underwater wireless sensor networks, by Ijaz Ahamd Khan, Department of Electronics, University of Peshawar, Pakistan, November 20, 2021.
* Supervised over 40 undergraduate students’ final year projects and co-supervised 05 graduate students.