

## PROF. DR. IRFAN AHMED

Professor

Telecommunication Engineering Department  
NED University of Engineering & Technology,  
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## EDUCATION

- **PhD** (Electrical Engineering) **2011**  
Michigan Technological University, Houghton MI, USA.
- **M. E.** (Electrical Engineering) **2005**  
NED University of Engg. & Tech. Karachi Pakistan
- **B. E.** (Electrical Engineering) **1994**  
NED University of Engg. & Tech. Karachi Pakistan

## EXPERIENCE

### Academic:

- NED University of Engg. & Tech. Karachi Pakistan  
**Professor** **2025-to date**
- NED University of Engg. & Tech. Karachi Pakistan  
**Associate Professor** **2012-2025**
- NED University of Engg. & Tech. Karachi Pakistan  
**Assistant Professor** **2005-2012**
- NED University of Engg. & Tech. Karachi Pakistan  
**Lecturer** **2001-2005**

### Industrial / Administrative:

- NED University of Engg. & Tech. Karachi Pakistan  
**Chairman Department of Physics** **2020 to date**
- NED University of Engg. & Tech. Karachi Pakistan  
**Controller of Examination** **2015- 2017**
- Black & Veatch International (US based), Karachi  
**Electrical Engineer** **1996-2001**  
Startup & Commissioning of Power Plant E & I Equipment
- Zelin (Pvt) Ltd.  
**Electrical Engineer** **1994-1996**  
Estimation, Costing, and Bidding of Turnkey Projects

## GRANTS

- Sindh Higher Education Commission-SRSP 2023-24
  - CO-PI, “Mob-Air: Indigenously developed mobile air quality monitoring system for public health and safety” Amount: 3.4M ,Proposal No.24/18

- Higher Education Commission-NRPU
  - CO-PI, “NB-IoT ProSe: Proximity Services enabled NB-IoT for Reliable and Critical Communication in Low-Powered Applications” Amount: 6.9M, Project No.17060,2021
  - CO-PI, “Flexible Testbed for device-to-device (D2D) communication in 5G cellular Network” Amount: 6.5M Project Number: 6054, 2018-19
- MOST Endowment Fund
  - PI, Routing Reliability Improvement in IoT-based-MANET, 3.0 Million, 2020
- Funded by National Technology Fund Program-IGNITE
  - 'Development of IoT Weather Station with NED Local MQTT broker and Dashboard'- 2024
  - Smart Metering Using Power Line Communication 2020
  - Automatic Controlling and Monitoring of Underwater Environment System **2019**
- Funded by National Grassroots ICT Research Initiative of National ICT R&D Fund
  - Design & Fabrication of Wireless System Based Smart Wheelchair **2016**
  - Design & Fabrication of Wearable Antenna for BAN **2015**
  - Design & Fabrication of a Patch Antenna on Non-Conventional substrate **2013**

#### POSTGRAD STUDENT SUPERVISION

| Degree / Role          | Successfully Supervised | Successfully Co-supervised | Currently Supervising | Currently Co-Supervising |
|------------------------|-------------------------|----------------------------|-----------------------|--------------------------|
| <b>PhD</b>             | 04                      | 01                         | 02                    | 01                       |
| <b>Master's Thesis</b> | 10                      | 02                         | 01                    | -                        |

#### AWARDS

- Dean's Award of Outstanding Scholarship, Michigan Tech USA **2011**
- Doctoral Finishing Fellowship, Michigan Tech USA **2011**
- Faculty Development Fellowship for PhD, NED University Karachi **2007**

#### COMMUNITY WORK

- Member “ Board of Trustees” Pakistan Science Foundation since Nov 2025
- Member “ IGNITE Review Panel for Communication/Telecom Technologies” **2023**
- Member “National Curriculum Review Committee” of Higher Education Commission Pakistan for the subject of Telecom Engineering, **2014-15**
- Member “National Curriculum Review Committee” of Higher Education Commission Pakistan for the subject of Telecom Systems, **2013-14**
- Member Technical Committee of Pakistan Standard Quality Control Authority for “Telecommunications and Information Exchange between Systems (I.C.T-TC-1)” **2013**
- Reviewer for research articles in the following journals
  - IEEE (Antennas and Wireless Propagation Letters, Access)
  - Ad Hoc & Sensor Wireless Networks
  - Progress in Electromagnetic Research (PIER, PIER B,C,M, PIER Letters)

## RESEARCH INTERESTS

- Antenna Design, Electromagnetic Compatibility, Wireless Channel Modeling, Wireless Local Positioning System, WSNs, Green Energy / Alternate Energy.

## LANGUAGES

- Urdu, English, Sindhi, Punjabi

## MEMBERSHIPS

- Life Member, Pakistan Engineering Council; Elect/11981
- Fellow Pakistan Academy of Engineering
- Member American Physical Society; 62090581
- Member, The Institution of Engineers, Pakistan; M-21447

## LIST OF PUBLICATIONS

- <https://orcid.org/0000-0003-3629-5034>
- <https://scholar.google.com/citations?user=-dqVPzwAAAAJ&hl=en>

### Journal Publications:

| S. No. | Description   |
|--------|---|
| 1      | Tahnayat Aslam, <b>Irfan Ahmed</b> , Sundus Ali. et al. "Analytical Modeling and Performance Analysis of Uplink Coverage and Capacity of Multi-tier, Multi-band HetNets Incorporating Terahertz Communication". Arab J Sci Eng (2026). <a href="https://doi.org/10.1007/s13369-026-11234-w">https://doi.org/10.1007/s13369-026-11234-w</a>                        |
| 2      | Hira Mariam, <b>Irfan Ahmed</b> , and Muhammad Imran Aslam "Performance analysis of a dense millimeter wave IoT network" <i>Wireless Networks</i> 2026, Springer US Electronic ISSN: 1572-8196, <a href="https://doi.org/10.1007/s11276-026-04121-7">https://doi.org/10.1007/s11276-026-04121-7</a>   |
| 3      | Abdullah, Muhammad, Ghada Noor, Sundus Ali, <b>Irfan Ahmed</b> , and Muhammad Imran Aslam. 2025. "Development of Cellular IoT-Based, Portable Outdoor Air Quality Monitoring System for Pollution Mapping" <i>Engineering Proceedings</i> 118, no. 1: 30. <a href="https://doi.org/10.3390/ECSA-12-26529">https://doi.org/10.3390/ECSA-12-26529</a>               |
| 4      | Tanzila, Sundus Ali, Muhammad Imran Aslam, <b>Irfan Ahmed</b> , and Ayesha Ahmed. 2025. "Prototyping LoRaWAN-Based Mobile Air Quality Monitoring System for Public Health and Safety" <i>Engineering Proceedings</i> 118, no. 1: 20. <a href="https://doi.org/10.3390/ECSA-12-26510">https://doi.org/10.3390/ECSA-12-26510</a>                                    |
| 5      | Ayesha Urooj, Sundus Ali, <b>Irfan Ahmed</b> et al. Proximity service for vehicular passengers: modeling and analyzing D2D implementation for VoIP application using vehicular mobility models. Ann. Telecommunications. (2025). <a href="https://doi.org/10.1007/s12243-025-01101-4">https://doi.org/10.1007/s12243-025-01101-4</a>                              |
| 6      | Tahnayat Aslam, <b>Irfan Ahmed</b> , Sundus Ali, "Analysis of User Association in Multi-Tier, Multi-Band Heterogeneous Cellular Networks". <i>Telecommunication Systems</i> , Springer, Issue 88, 8 (2025), Print ISSN: 1018-4864, Electronic ISSN: 1572-9451 <a href="https://doi.org/10.1007/s11235-024-01248-w">https://doi.org/10.1007/s11235-024-01248-w</a> |
| 7      | Ali, A. K. M. S., Ahmed, I., Ali, S., & Khalid, M. (2024), "Gain Enhancement of Patch Antenna using Novel Glass Fiber Reinforced Polymer (GFRP) based Metasurface", <i>Advanced Electromagnetics</i> , 13(3), 10–18. <a href="https://doi.org/10.7716/aem.v13i3.2273">https://doi.org/10.7716/aem.v13i3.2273</a>  |
| 8      | Jafri, S. T. A., Amin, S. R., Amanat, F., Aslam, T., Ali, S., <b>Irfan Ahmed</b> & Aslam, M. I. (2024). "Development of Narrow Band Internet of Things Testbed for Proximity Services." <i>International Journal of Innovations in Science &amp; Technology</i> , 6(7), 146–157   |
| 9      | Mariam, H., Fiza, G., Ali, S., <b>Irfan Ahmed</b> , Aslam, M. I., & Shakir, M. Z. (2024). "Exploiting Internet of Things to address climate change: Case study and analysis on the perception of stakeholders in Pakistan." <i>Journal of Climate and Community Development</i> , 3(2), 264-285.  |

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| 10 | Jafri, Syed Talib Abbas, <b>Irfan Ahmed</b> , Sundus Ali, Jamaiah Yahaya, Faizan Qamar, and Zuriani Hayati Abdullah. 2023. "Split Hop Penalty for Transmission Quality Metrics in a Better Approach to Mobile Ad Hoc Networking (BATMAN) for IoT-Based MANET" <i>Symmetry</i> 15, no. 5: 969. <a href="https://doi.org/10.3390/sym15050969">https://doi.org/10.3390/sym15050969</a>  |
| 11 | Mariam, Hira, and <b>Irfan Ahmed</b> . 2023. "Performance of Dense Millimeter Wave Network with Uniform Cylindrical Array" <i>Engineering Proceedings</i> 32, no. 1: 8. <a href="https://doi.org/10.3390/engproc2023032008">https://doi.org/10.3390/engproc2023032008</a>  |
| 12 | Jafri, Syed Talib Abbas, <b>Irfan Ahmed</b> , Sundus Ali, and Faizan Qamar. 2023. "Analysis of AgRED Performance in LR-WPAN Dense Ad-Hoc Networks" <i>Engineering Proceedings</i> 32, no. 1: 5. <a href="https://doi.org/10.3390/engproc2023032005">https://doi.org/10.3390/engproc2023032005</a>  |
| 13 | Sundus Ali, Muhammad Imran Aslam, <b>Irfan Ahmed</b> , "Impact of fractional power control on downlink uplink decoupled-based HetNets in varying path loss exponent environment" <i>Transactions on Emerging Telecommunications Technologies</i> 2022; e4491. doi:10.1002/ett.4491   |
| 14 | Jafri, Syed Talib Abbas, <b>Irfan Ahmed</b> , and Sundus Ali. 2022. "Queue-Buffer Optimization Based on Aggressive Random Early Detection in Massive NB-IoT MANET for 5G Applications" <i>Electronics</i> 11, no. 18: 2955. <a href="https://doi.org/10.3390/electronics11182955">https://doi.org/10.3390/electronics11182955</a>  |
| 15 | Sundus Ali, Muhammad Imran Aslam, <b>Irfan Ahmed</b> and Attaullah Khawaja. "Uplink Performance of Narrowband Internet-of-Things Devices in Downlink-Uplink Decoupled-Based Heterogeneous Networks". <i>Iranian journal of science and technology-transactions of electrical engineering</i> (2022). <a href="https://doi.org/10.1007/s40998-022-00570-w">https://doi.org/10.1007/s40998-022-00570-w</a>                                       |
| 16 | Mariam, Hira, <b>Irfan Ahmed</b> , Sundus Ali, Muhammad Imran Aslam, and Ikram Ur Rehman. 2022. "Performance of Millimeter Wave Dense Cellular Network Using Stretched Exponential Path Loss Model" <i>Electronics</i> 11, no. 24: 4226. <a href="https://doi.org/10.3390/electronics11244226">https://doi.org/10.3390/electronics11244226</a>   |
| 17 | Mariam, Hira, <b>Irfan Ahmed</b> , and Muhammad Imran Aslam. 2022. "Impact of Multiple Beams and Mobility-Based Beam Alignment Error on Millimeter Wave Communication" <i>Engineering Proceedings</i> 20, no. 1: 42. <a href="https://doi.org/10.3390/engproc2022020042">https://doi.org/10.3390/engproc2022020042</a>   |
| 18 | Mumtaz, T., Muhammad, S., Aslam, M.I. and <b>Irfan Ahmed</b> , "Inter-slice resource management for 5G radio access network using markov decision process". <i>Telecommunication Systems</i> , Springer (2022). <a href="https://doi.org/10.1007/s11235-021-00877-9">https://doi.org/10.1007/s11235-021-00877-9</a>  |
| 19 | Hira Mariam, <b>Irfan Ahmed</b> , Muhammad Imran Aslam, "Coverage probability of uplink millimeter wave cellular network with non-homogeneous interferers' point process" <i>Physical Communication</i> , Volume 45, 16 January 2021, 101274, ISSN 1874-4907, <a href="https://doi.org/10.1016/j.phycom.2021.101274">https://doi.org/10.1016/j.phycom.2021.101274</a>  |
| 20 | A. K. M. Shafaat Ali and <b>Irfan Ahmed</b> , "Electrical characterization of glass fiber reinforced polymer (GFRP) composites for future metasurface antenna applications", <i>Materials Research Express</i> , ISSN 2053-1591 Volume 8, Number 6, 02 June 2021, <a href="https://doi.org/10.1088/2053-1591/ac02fe">https://doi.org/10.1088/2053-1591/ac02fe</a>  |
| 21 | Sundus Ali, Muhammad Imran Aslam, <b>Irfan Ahmed</b> et al., "Analysis of the decoupled uplink downlink technique for varying path loss exponent in multi-tier HetNet." <i>Telecommunication Systems</i> , Springer, Issue 4/2020 Print ISSN: 1018-4864, Electronic ISSN: 1572-9451 <a href="https://doi.org/10.1007/s11235-020-00661-1">https://doi.org/10.1007/s11235-020-00661-1</a>  |
| 22 | Sundus Ali, Muhammad Imran Aslam, <b>Irfan Ahmed</b> , "Analysis of Downlink Uplink Decoupled Dense Heterogeneous Cellular Network based on User Association using Multi-Slope Path Loss Model," <i>Advances in Electrical and Computer Engineering</i> , vol.19, no.2, pp.45-52, 2019, doi:10.4316/AECE.2019.02006  |
| 23 | Sundus Ali, Muhammad Imran Aslam, <b>Irfan Ahmed</b> , "Uplink coverage probability and spectral efficiency for downlink uplink decoupled dense heterogeneous cellular network using multi-slope path loss model". <i>Telecommunication Systems</i> , Springer, Issue 4/2019, Print ISSN: 1018-4864, Electronic ISSN: 1572-9451, <a href="https://doi.org/10.1007/s11235-019-00587-3">https://doi.org/10.1007/s11235-019-00587-3</a>           |
| 24 | Muhammad Usman, <b>Irfan Ahmed</b> , Muhammad I. Aslam, Shujaat Khan, and S. M. Usman Ali, "SIT: A Lightweight Encryption Algorithm for Secure Internet of Things" <i>International Journal of Advanced Computer Science and Applications (IJACSA)</i> , Vol. 8, no. 1, pp-402-411, 2017. <a href="https://dx.doi.org/10.14569/IJACSA.2017.080151">https://dx.doi.org/10.14569/IJACSA.2017.080151</a>  |
| 25 | Muhammad Sohail Ibrahim, <b>Irfan Ahmed</b> , Muhammad I. Aslam, Muhammad Ghazaal, Muhammad Usman, Kamran Raza and Shujaat Khan, "A Low Cost FPGA based Cryptosystem Design for High Throughput Area Ratio" <i>International Journal of Advanced Computer Science and Applications (IJACSA)</i> , Vol. 8, no. 2, pp-385-393, 2017, <a href="https://dx.doi.org/10.14569/IJACSA.2017.080249">https://dx.doi.org/10.14569/IJACSA.2017.080249</a> |
| 26 | Tahniyat Aslam, <b>Irfan Ahmed</b> , Muhammad I. Aslam, Syed M. Usman Ali, Tahir Malik, "Direction of Arrival Estimation in the presence of Scatterer in noisy environment", <i>Advanced Electromagnetics</i> , Vol. 6, no. 3, pp.33-40, 2017. <a href="https://doi.org/10.7716/aem.v6i3.525">https://doi.org/10.7716/aem.v6i3.525</a>   |

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| 27 | Akhtar Saeed, <b>Irfan Ahmed</b> , Muhammad Imran Aslam, and Tahir Malik, "Improving Energy Efficiency of Wireless Sensor Network through Optimum Selection of Cluster Heads", BUJICT Journal, Volume 10, Issue 1, June 2017, pp. 29-37.   |
| 28 | Immad Girach, Muhammad I. Aslam, <b>Irfan Ahmed</b> , Syed M. Usman Ali and Muhammad Khalid, "Photonic Band Gap Materials- Theory, Techniques and Application," Bahria University Journal of Information & Communication Technologies, Vol. 8, No. 1, pp. 126-129, 2015.             |
| 29 | Sana Aijaz, <b>Irfan Ahmed</b> , Muhammad I. Aslam, and Syed M. Usman Ali, "Spectrum Sensing in Cognitive Radios - Techniques, Issues and Challenges," International Journal of Information and Communication Technology Trends, Vol. 2, No. 1, pp. 1-4, 2015.                       |
| 30 | <b>Irfan Ahmed</b> and Warren F. Perger "Effect of Ground on Antenna Mutual Impedance for DOA Estimation Using Dipole Arrays" <i>Progress in Electromagnetics Research (PIER C)</i> , Vol. 46, page 179-185, 2014  |
| 31 | Akhter Saeed, <b>Irfan Ahmed</b> , "Wireless Sensor Networks – A Comprehensive Study," <i>International Journal of Information and Communication Technology Trends</i> , Vol. 1, 2014.   |
| 32 | <b>Irfan Ahmed</b> and Warren F. Perger "Direction Finding in the Presence of Near Zone Resonant Size Scatterers", <i>Progress in Electromagnetics Research (PIER B)</i> , Vol. 56, page 219-234, 2013   |
| 33 | <b>Irfan Ahmed</b> , Warren F. Perger, and Seyed A. Zekavat, "Effects of Ground Constituent Parameters on Array Mutual Coupling for DOA Estimation," <i>International Journal of Antennas and Propagation</i> , vol. 2011, Article ID 425913, 5 pages, 2011. doi:10.1155/2011/425913 |

### Conference Publications:

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|----|---|
| 1  | Syed Talib Abbas Jafri, <b>Irfan Ahmed</b> et. al. "Development of narrow band internet of things testbed for proximity services" International Conference on Computing Research (ICCoR 2024)   |
| 2  | S. Ali, M. I. Aslam, <b>Irfan Ahmed</b> , S. T. A. Jafri and T. Aslam, "Development of a novel OMNET++ framework for analysis of an NB-IoT uplink network," <i>2024 International Conference on Emerging Trends in Smart Technologies (ICETST)</i> , Karachi, Pakistan, 2024, pp. 1-4, doi: 10.1109/ICETST62952.2024.10737960.                                    |
| 3  | T. Aslam, <b>Irfan Ahmed</b> , S. Ali and M. I. Aslam, "TeraHertz Communication and Associated Challenges in 6G Cellular Networks," <i>2021 4th International Conference on Computing &amp; Information Sciences (ICIS)</i> , 2021, pp. 1-6, doi: 10.1109/ICIS54243.2021.9676382.   |
| 4  | A. Danish, S. Ali, M. I. Aslam and <b>Irfan Ahmed</b> , "Future prospects and challenges associated with intelligent reflecting surfaces enabled wireless communication," <i>2021 IEEE 18th International Conference on Smart Communities: Improving Quality of Life Using ICT, IoT and AI (HONET)</i> , 2021, pp. 121-125, doi: 10.1109/HONET53078.2021.9615389. |
| 5  | Sundus Ali, Muhammad Imran Aslam, <b>Irfan Ahmed</b> et al., "Performance Analysis of Single-Hop Device to Device Communication," 2021 International Bhurban Conference on Applied Sciences and Technologies (IBCAST), 2021, pp. 974-978, doi: 10.1109/IBCAST51254.2021.9393266.  |
| 6  | T. Abbas, F. Qamar, M. N. Hindia, R. Hassan, <b>Irfan Ahmed</b> and M. I. Aslam, "Performance Analysis of Ad Hoc on-Demand Distance Vector Routing Protocol for MANET," <i>2020 IEEE Student Conference on Research and Development (SCORED)</i> , Batu Pahat, Johor, Malaysia, 2020, pp. 194-199, doi: 10.1109/SCORED50371.2020.9250989.                         |
| 7  | Hasan Rafae, Syed Waqar Jamil, Muhammad I. Aslam and <b>Irfan Ahmed</b> , "Internet of Nano Things: Next Step for Future of Nanotechnology," Proceedings of the 4th International Electrical Engineering Conference, Karachi, 25-26 January, 2019.; Karachi; IEP  |
| 8  | Hasan Rafae, Muhammad I. Aslam, <b>Irfan Ahmed</b> , Furqan Alam, Syed Waqar Jamil, "Awareness of Green Computing among Students of NED University of Engineering and Technology," First International Conference on Carbon Neutral Built Environment (CNBT-I), Karachi, Pakistan, 20-21 December 2018.; Karachi; NED University                                  |
| 9  | Hasan Rafae, Muhammad I. Aslam, <b>Irfan Ahmed</b> , "Green Computing: Techniques and Challenges," First International Conference on Carbon Neutral Built Environment (CNBT-I), Karachi, Pakistan, 20-21 December 2018.   |
| 10 | Tariq Mumtaz, Shahabuddin Muhammad, Nazeeruddin Mohammad, Muhammad Imran Aslam and <b>Irfan Ahmed</b> , "Modeling and Evaluation of Mobility Management in mmWave Cellular Networks", 21st IEEE International Multi Topic Conference, Karachi, Pakistan, 1-2 November 2018. Karachi; Hamdard University.  |

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| 11 | Hira Mariam, Muhammad I. Aslam, <b>Irfan Ahmed</b> , “ <i>Device-to-Device Communication in Cellular Networks: A Survey</i> ,” International Conference on Emerging Trends in Telecommunication and Electronic Engineering, 27 - 28 February 2018, Karachi.  |
| 12 | Talib Abbas, Faizan Qamar, <b>Irfan Ahmed</b> , Kaharudin Dimiyati, Mohammed B. Majed “Propagation Channel Characterization for 28 and 73GHz Millimeter-Wave 5G Frequency Band” IEEE Scord Putrajaya, Malaysia December 2017   |
| 13 | Faizan Qamar, Talib Abbas, MHD Nour Hindia, Kaharudin Bin Dimiyati, Kamarul Ariffin Bin Noordin, <b>Irfan Ahmed</b> , “Characterization of MIMO Propagation Channel at 15 GHz for the 5G Spectrum,” 2017 IEEE 13th Malaysia International Conference on Communications (MICC), 28-30 Nov. 2017, The Puteri Pacific, Johor Bahru, Malaysia. |
| 14 | Zaheer Abbas Balouch, Muhammad I. Aslam, <b>Irfan Ahmed</b> , “Energy Efficient Image Encryption Algorithm” <i>International conference on Innovations in Electrical Engineering and Computational Technologies</i> , Karachi, Pakistan, April 2017.   |
| 15 | Sundus Ali, Muhammad I. Aslam, <b>Irfan Ahmed</b> , “MIMO channel modeling and capacity analysis using 3-D Spatial Statistical Channel Model for Millimeter Wave Outdoor Communication,” <i>14th International Bhurban Conf. on Applied Sciences and Technology</i> , Islamabad, Pakistan, January 2017                                    |
| 16 | Rana Khan, Tehzeb Jamal, Muhammad I. Aslam, <b>Irfan Ahmed</b> , “Comparative Analysis of Different Patch Antennas”, <i>Proceedings of the 1st International Electrical Engineering Congress</i> , Karachi, 13-14 May, 2016.   |
| 17 | Usama Fareed Ahmad, Muhammad ShahRukh Khan, Muneeb ur Rahman, S.M. Daniyal Hasan Shah, <b>Irfan Ahmad</b> , and Muhammad I. Aslam, “Wireless System Based Smart Wheelchair”, <i>Proceedings of the 1st International Electrical Engineering Congress</i> , Karachi, 13-14 May, 2016.   |
| 18 | Sundus Ali, Muhammed I. Aslam, <b>Irfan Ahmed</b> , “Analysis of Proportional Fairness Utility Function and Interference Mitigation in Heterogeneous Cellular Networks”, <i>31st IEEE Multi-topic International Symposium</i> , Karachi, 16th-17th March 2016.   |
| 19 | Radha Mohanlal, Muhammad I. Aslam, <b>Irfan Ahmed</b> , “Radio resource allocation techniques for downlink transmission in LTE-Advanced”, <i>4th International Conference on Electrical, Computer, Mechanical and Mechatronics Engineering (ICE2016)</i> , Dubai, Emirates, 4-5 February 2016,   |
| 20 | Shafaq Mustafa, Muhammad I. Aslam, <b>Irfan Ahmed</b> , “Analysis of Electromagnetic Wave Propagation through Photonic Crystal Fibers,” <i>International Conference on Advanced Materials and Process Engineering</i> , Karachi, 14-15 December, 2015.   |
| 21 | Syed Asad Ali Shah, Muhammad I. Aslam, <b>Irfan Ahmed</b> , and Syed M. Usman Ali1, “Near-Perfect Metamaterial Absorber for the Visible Spectrum,” <i>International Conference on Advanced Materials and Process Engineering</i> , Karachi, 14-15 December, 2015.  |

### Book Chapters:

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|---|--|
| 1 | Seema Ansari, Tahniyat Aslam, Adeel Ansari, Pablo Otero, <b>Irfan Ahmed</b> , and Fatima Maqbool, "Internet of Things: Technologies and Applications," in <i>Introduction to Internet of Things in Management Science and Operations Research: Implemented Studies</i> , A. Editor, Fausto Pedro García Márquez, Benjamin Lev. Springer Nature, 2021 pp. 1-30. |
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