

Sumbel Ijaz (ELECT/30547)

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No. of publications: 35+



Profile Summary

Dr. Sumbel Ijaz is serving as a Lecturer in the Department of Electrical Engineering at Government College University Lahore since 2012, with over 13 years of academic, teaching, and student supervision experience. She completed her PhD in Electrical Engineering from Information Technology University, and both her MS and BS in Electrical Engineering from University of Engineering and Technology Lahore.

Her research interests include photonics, metasurfaces, solar cell design, thermophotovoltaic systems, and agrivoltaics. She has taught a wide range of undergraduate courses including Signals & Systems, Digital Signal Processing, Antenna & Wave Propagation, and Linear Algebra. Dr. Sumbel has supervised diverse undergraduate Final Year Projects (FYPs) and is actively engaged in promoting practical, industry-oriented engineering education through STEM outreach, interdisciplinary learning, and emerging technology integration. Her academic and research experience makes her well-suited for evaluating undergraduate engineering projects and technical presentations.

Experience

Lecturer	Government College University (GCU), Lahore – Pakistan Serving as a faculty member at (Electrical) Engineering Department Since May 2012; Primary responsibilities included UG teaching and Supervising UG Final-Year Projects ;
Lab Engineer/ Lecturer	University of Management & Technology (UMT), Lahore – Pakistan Served as a faculty member at Electrical Engineering Department during (February 2011 – May 2012)
Controls Engineer	Energy Systems (Pvt.) Ltd., Lahore – Pakistan (Aug. 2010 – Feb. 2011)

Education

Qualification	Tenure/ Year of Passing	Institution	CGPA/ %age
Ph. D. Electrical Engineering	2025	Information Technology University, Lahore – Pakistan	3.89/ 4.0
M. Sc. Electrical Engineering	2017	University of Engineering & Technology, Lahore – Pakistan	3.76/ 4.0
B. Sc. Electrical Engineering	2006 – 2010	University of Engineering & Technology, Lahore – Pakistan	3.64/ 4.0
Higher Secondary School Certificate	2004 – 2006	Board of Intermediate & Secondary Education, Lahore – Pakistan	85%
Secondary School Certificate	2002 – 2004	Board of Intermediate & Secondary Education, Lahore – Pakistan	77.2%

Research Work/ Interests

Ph. D. Thesis **Design and Development of Efficient Nanostructured Metamaterials for**

Next Generation Thermophotovoltaics

M. Sc. Thesis

Indoor Photovoltaic System Design & Modeling

Modeled and simulated the working of an IPVS using OptiSystem®

B. Sc.

IP Multimedia Subsystems Implementation

Research Grants

1. Co-PI for the awarded HEC Pakistan National Research Program for Universities (NRPU) Grant for 2026, worth 8.195 **Million**.

Project Title: “Framework for Development of Innovative Virtual Labs in Outcome-Based Education using Digital Twin for Industry-Ready Engineering Graduates.”

Research Publications

2. A. Rehman, **S. Ijaz**, K. Niazi, T. Tauqeer, F. Amir, F. Farukh, M. Zubair, M. Q. Mehmood “Sustainable Agrivoltaics Across Diverse Climates: A Generalizable Framework for Energy-Agriculture Coproduction”, *Journal of Solar Energy Engineering*, 2026
3. A. Rehman, **S. Ijaz**, K. Niazi, T. Tauqeer, M. Usman, M. Zubair, M. Q. Mehmood “Towards sustainable Agri-Photovoltaics through system design and viability in Semi-Arid conditions” *Solar Energy*, vol. 299, pp. 113682, 2025
4. **S. Ijaz**, D. Kang, A.S. Rana, J. Kim, M.T. Saeed Chani, M. Zubair, Q. H Abbassi, M.Q. Mehmood, J. Rho “Metasurface Absorber–Emitter Pair-Integrated High-Efficiency Thermophotovoltaic System”. *ACS Photonics*, 2025
5. **S. Ijaz**, E. Raza, Z. Ahmed, M. Zubair, M.Q. Mehmood, H. Mehmood, Y. Massoud and M. M. Rehman, “Numerical simulation to optimize the efficiency of HTM-free perovskite solar cells by ETM engineering.” *Solar Energy*, vol. 250, pp. 108-118, 2023
6. **S. Ijaz**, M.Q. Mehmood, H. Cabrera, M. Zubair, Y. Massoud, “Ultra-broadband UV–VIS–NIR absorbers via nanostructured refractory nitrides.” *MRS Energy & Sustainability*, Pages 1-17, 2024
7. **S. Ijaz**, A. S. Rana, Z. Ahmed, B. Rehman, M. Zubair and M.Q. Mehmood, “Exploiting zirconium nitride for an efficient heat-resistant absorber and emitter pair for solar thermophotovoltaic systems.” *Optics Express*, vol. 29, pp. 31537-31548, 2021.
8. **S. Ijaz**, A. S. Rana, Z. Ahmed, M. Zubair, Y. Massoud, and M.Q. Mehmood, “The Dawn of Metadevices: From Contemporary Designs to Exotic Applications.” *Advanced Devices & Instrumentation*, vol. 2022, 2022.
9. **S. Ijaz**, M. Q. Mehmood, Z. Ahmed, K. A Aljaloud, A. H Alqahtani, Y. Al-Adidi, R. Hussain, “Efficient Solar energy harvesting via thermally stable tungsten-based nanostructured solar thermophotovoltaic systems.” *Materials Today Communications*, Pages 109967, 2024
10. **S. Ijaz**, S. Noureen, B. Rehman, M. Zubair, Y. Massoud, M. Q. Mehmood, “Multi-Material Described Metasurface Solar Absorber Design with Absorption Prediction Using Machine Learning Models.” *Materials Today Communications*, Pages 106377, 2023
11. **S. Ijaz**, S. Noureen, B. Rehman, M. Zubair, M. Q. Mehmood, Y. Massoud, "A Machine Learning-based Approach to Model Highly-thermally Robust Metasurface Absorber," *Proceedings of the 2022 Conference on Lasers and Electro-Optics Pacific Rim*, (31 Aug, 2022)
12. **S. Ijaz**, A.S. Rana, M. Zubair, and M. Q. Mehmood, "Investigating sunlight trapping efficiency of an ultrathin, ultrabroadband, thermostable, zirconium nitride (ZrN)-based metasurface for solar thermophotovoltaic systems," *Proceedings Volume 12150, Photonics for Solar Energy Systems IX; 1215007 SPIE Photonics Europe*, (24 May 2022), <https://doi.org/10.1117/12.2615502>.

13. **S. Ijaz**, A. Zulfikar, B. Rehman, Q.H. Abbasi, M Zubair, M. Q. Mehmood, "Machine learning for metasurfaces broadband absorber design", *Proceedings Volume 13011, Data Science for Photonics and Biophotonics; SPIE Photonics Europe, 2024*, <https://doi.org/10.1117/12.3022094>
14. **S. Ijaz**, S. Noureen, B. Rehman, M. Zubair, M. Q. Mehmood, Y. Massoud, "Application of machine-learning techniques for characteristic analysis of refractory materials," *Proceedings Volume 12313, Photonics for Energy II; 1231307 SPIE/COS Photonics Asia (16 Dec, 2022)* <https://doi.org/10.1117/12.2643946>.
15. **S. Ijaz**, A.S. Rana, M. Zubair, and M. Q. Mehmood, "Evaluating the most efficient 2D ZrN nanostructures for broadband metasurface absorbers," *Proceedings Volume 12004, Integrated Optics: Devices, Materials, and Technologies XXVI; 120040T SPIE OPTO, (5 March 2022)*, <https://doi.org/10.1117/12.2607885>.
16. **S. Ijaz**, A.S. Rana, M. Zubair, and M. Q. Mehmood, "Ultra-black Pythagorean-tree metasurface antenna array based absorber and emitter for applications in solar thermophotovoltaics," *1st International Conference on Microwave, Antennas & Circuits (ICMAC)*, pp. 1-4, 2021.
17. S. Noureen, I.H. Syed, **S. Ijaz**, A. A. Abdellatif, H. Cabrera, M. Zubair, Y. Massoud^d, M. Q. Mehmood "Physics-driven tandem inverse design neural network for efficient optimization of UV–Vis meta-devices." *Applied surface science advances*, 18 (2023) 100503

Roles & Responsibilities

- **FYDP supervision EE department**
- **Member SAR committee EE department**
- **Member CQI committee EEE department**
- **Advisor Scientific Ravi**