Dr. Babar ALI
Postdoctoral Researcher| Electrical Engineering

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📍 Garha More, 61150, Vehari, Punjab, Pakistan

💼 MOTIVATION AND RESEARCH DOMAIN

Research Analyst with expertise in Optoelectronics, bio-photonics, and nano-device modeling and fabrication. Skilled in spectroscopy, data analysis, and experimental design, with hands-on experience in morphological, electrical, and optical characterization. Proficient in using advanced tools to optimize processes and deliver high-impact research results across interdisciplinary projects.

Plasmonics (Nanostructures), Meta-Surfaces, Nano Photonics, Optoelectronics, THz Devices, Optical Fiber Sensors, SEIRA spectroscopy, Hydrogel fiber and Solutions, Material Characterization, Signal Processing, Optical Communication, and Networks. Machine and Deep Learning

🎓 EDUCATION

Nov 2020–Jan 2024	**PhD Information Technology and Electrical Engineering**
	University of Naples Federico II, Naples, Italy
Supervisor	Prof. Antonelo Cutolo
Research Group	Biophotonics,Optoelctronics
Thesis Title	Self-Assembled Nanostructured Substrates for ATR-SEIRA Applications
	The Ph.D. goal is the development of an innovative platform based on nanoantenna (efficient and cost-effective) for oncological applications. Development of a suitable substrate for a surface-enhanced infrared absorption spectroscopy (SEIRA) platform. Identify and develop novel, cost-effective, and highly efficient plasmonic nanostructures exhibiting good SEIRA properties (namely, the gain factor).
PhD Defense Date	10-May-2024
List of Exams	Machine Learning, Signal Processing, Robotics, Optoelectronics, Electronic Magnetic Theory
Sep 2018-2020	**Master of Engineering in Electronics and Communications Engineering**
	Beijing University of Posts and Telecommunications, Beijing, China
Supervisor	Prof. Xin Xiangjun
Research Lab	State Key Laboratory of Information Photonics and Optical Communications
	School of Electronic Engineering, BUPT, Beijing, China
Thesis	Demonstration of An Efficient Cost-Effective Laser Frequency Comb Generator with Digital Signal Processing Algorithm Based High-Speed 256-QAM WDM Coherent Optical Communication System
List of Exams	Fiber Communication System and Network, Basic Theory of Telecommunication Network, Probability Theory and Stochastic Process, Technology Innovation Management
Sep 2012-2016	**B.Sc. Electrical (Telecommunications) Engineering**
	Government College University, Faisalabad, Pakistan
Thesis	Computer Numeric Control (CNC) based PCB Milling and Drilling Machine
List of Exams	Optical Fibre Communication, Electromagnetic Field Theory, Antenna, and Wave Propagation Theory, Linear Control System, Digital Signal Processing, Microprocessor Based Systems, Applied Physics, Applied Calculus, Linear Algebra, Numerical Analysis, Differential Equations, Digital Logic Design, Probability and Statistics For Engineers, Communication Systems, Satellite Communication, Wireless, and Mobile Communication, Digital Electronics, Object Oriented Programming (Only Core Subjects)
Sep 2008-2011	**Diploma of Associate Engineering (DAE) Electrical Technology**
	Punjab Board of Technical Education, Lahore, Pakistan
Main Courses	Digital and Industrial Electronics, Telecommunications, Power Electronics, Applied Physics, Applied Mathematics

🎓 PUBLICATIONS

1. <u>Ali, Babar</u>, et al. "Self-assembled nanostructured substrates for ATR-SEIRA spectroscopy , SIE LVI Annual Meeetings Napoli, (2025)
2. <u>Ali, Babar</u>, et al. "LEACH robust routing approach applying machine learning." IJCSNS 19.6 (2019): 18-26.
3. <u>B. Ali</u>, G. Murtaza, T. Mahmood, H. M. Bilal, R. Zahoor and S. Memon, "Energy routing algorithm based on OSPF protocol and virtual circuit switching mode in energy local area network," International Journal of Computational Complexity and Intelligent Algorithms, pp. 292–310, 2020
4. **Ali, B.**, Mahmood, T., Mirza, M. A., Memon, S., Rashid, M., and Ajebesone, E. F. (2019). Study and analysis of delay-sensitive and energy-efficient routing approach. system, 26, 27.**(Scopus Index)**
5. Mohammadani, Khalid H., Rizwan A. Butt, Kamran A. Memon, Azhar A. Pirzado, Muhammad Faheem, Adeel Abro, <u>Babar Ali</u>, and Noor-ul Ain. "A QoS provisioning architecture of fiber wireless network based on XG-PON and IEEE 802.11 ac." Journal of Optical Communications (2021). **(Scopus Index)**
6. <u>B. Ali</u>, Murtaza, G., Bilal, H. M., Mahmood, T., Rashid, M., & Ullah, Z. (2025). Optical Frequency Comb-Based 256-QAM WDM Coherent System with Digital Signal Processing Algorithm. Chips, 4(2), 16.

🎓 CONFERENCE PROCEEDINGS

1. Song, K., Gao, J., Wang, Z., **Ali, B.**, Bilal, H. M.,and Xie, G. (2019). A method of improving signal integrity of solder joints. In Proc. Int. Conf. Rel. Electr. Products Electr. Contacts (pp. 244-247).**(Scopus Index)**
2. Khan, A., Jinling, Z., Ahmad, I., Wenhao, H., Ali, M., <u>**Ali, B.**</u> (2020). Chinese License Plate Segmentation and Recognition Based on Color Detection.**(Scopus Index)**

💼 PROFESSIONAL EXPERIENCE

July 2025- Current **Research Engineer**
Regional Information Communication Technology Center-CeRICT scrl, Benevento, Italy
Development and validation of biomedical (Optoelectronic) devices.
Modelling (Lumerical, COMSOL, Tidy-3D, MATLAB), Fabrication (Self-assembly, EBL, PL), and characterization (AFM, ATR-FTIR, OSA)

Jun 2024- June 2025 **Research Scholar**
Biophotonics Unisannio Research Group, University of Sannio, Benevento, Italy
Development and validation of biomedical devices for the detection, characterization, and removal of circulating Tumor cells from the peripheral blood of patients for the treatment and diagnosis of cancer
Modelling, Fabrication, and characterization
Planned and performed experimental testing using advanced optical devices

Nov 2020-May 2024 **PhD Research Scholar in Lab-on-fiber technology for biosensing**
University of Naples Federico II, Department of information Technology and Electrical Engineering, Naples, Italy
Modelling with COMSOL Multiphysics Software, Fabrication (Self-Assembly), and Morphological characterization of Metasurfaces (with AFM), and ATR-FTIR characterization

Sep 2018-Aug 2020 **Master Research CSC Scholar**
State Key Laboratory of Information Photonics and Optical Communications, BUPT , China
Identification of a novel design of the cost Cost-effective Optical Frequency Comb for Wavelength Division Multiplexing (WDM) optical communication system
Modelling of Cost-effective Optical Frequency Comb using OptiSystem
Use the Cost-effective Optical Frequency Comb in 256-QAM Based WDM Optical Communication System

Aug 2016-Aug 2017 **Team Lead - BSS and TXN Engineer**
InterAction International (Pvt.) Ltd., Lahore (Pakistan))
Operation and Maintenance of all 2G/3G Technology BSS equipment within a region. Report all field-related aspects concerning routine visits and remarks on the GSM network-associated subsystem environment.

Sep 2015-June 2016 **Teacher Assistant**
Government College University, Faisalabad (Pakistan)
Provides support to the teacher to ensure a safe and stimulating educational environment. Checking Assignments and conducting exams of the student Assists the teacher in planning and preparation for daily activities; aids the instructional efforts of the teacher.

Oct 2014-Nov 2014 **Internship**
Pakistan Telecommunication Ltd., Faisalabad (Pakistan)
Internship in Switching Department

July 2011-Aug 2012 **Solar Energy Technician**
Sleek Solar, Faisalabad (Pakistan)
Work closely with Sales and Engineering to offer the best solution for each project. Complete Helioscope design requests from Sales and Engineering. Complete interconnection drawings, single-line diagrams, bid sets, construction sets, and as-built drawings for all solar projects
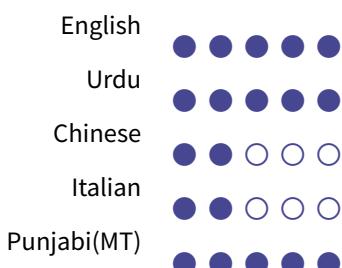
🏛 AFFILIATION/MEMBERSHIP

Registered Engineer **Pakistan Engineering Council**
PEC No. : Elect/63515

🧳 SKILLS

Techniques	**Experimental Skills** •Fabrication: Self-Assembly or Available suitable technique (lithography etc.) •Experimental characterization of the Photonics Structure •Experience with Photonics Sensors •Experience with surface-enhanced infrared absorption spectroscopy (SEIRA) •Experience and Development of suitable substrate for surface-enhanced Raman scattering (SERS) Electron-beam lithography, Photolithography, FTIR-ATR, AFM, SEM **Programming and Simulation Tools** MATLAB, Python, COMSOL Multiphysics, Lumerical, Tidy3D, CST, Optisystem, Zemax OpticStudio,VPI Photonics, Proteus, Multisim, Cisco Packet Tracer, HFSS Antenna Design **Design and Simulation** Nanostructures Designing and Optimisation, Spectral Tuning, FWHM, Gain Factor, Near Field, and Far Field Analysis **Graphics** OriginPro

🅰 LANGUAGES

English ●●●●●
Urdu ●●●●●
Chinese ●●○○○
Italian ●●○○○
Punjabi(MT) ●●●●●

➕ OTHER DETAILS

> Nationality: Pakistani
> DOB: March 8, 1993

🏆 HONOR AND AWARDS

Research Accelerator Program 2025	Photonic Integrated Circuits: design, technology and characterization" CEZAMAT, Warsaw, Poland
Research Grant 2024	University of Sannio, Benevento, Italy
Scholarship 2019	University of Naples, Federico II, Italy for PhD
Best Student	Chinese Scholarship Council Best Master Student Award
Scholarship 2017	Chinese Government Scholarship for Master