Arif Ullah Khan

Graduate Research Assistant
Telecommunication and Networking (TeleCoN) Research Lab
GIK Institute of Engineering Sciences and Technology Topi, 23640, Pakistan.

Address	GIK Institute of Engineering Sciences & Technology, Topi, 23640 (Pakistan)	**Website**	https://arifkhaan.github.io
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Birth	02 June 1988	**E-mail**	arifkhaan.ciit@gmail.com
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Research Interest

- Wireless communications; 5G and beyond 5G networks; Stochastic geometry.
- Millimeter wave communications; UAV and RIS assisted communication; Massive MIMO
- Machine learning and AI enabled wireless communication.

Education

Sep 2017 – Jul 2021 — **Doctor of Philosophy (PhD)** • GIK Institute of Engineering Sciences and Technology Topi, 23640, Pakistan.
Electronic Engineering
Study Emphasis: Wireless Communication and Networking
Thesis: User-centric Small Cell Aided Future Cellular Networks: Sub-6GHz and Hybrid Millimeter Wave Communications.
PhD Supervisor: Dr. Ziaul Haq Abbas

Mar 2014 – Jul 2016 — **Master of Science (MSc)** • COMSATS University Tobe campus, Abbotabad, 22060, Pakistan.
Electrical Engineering
Study Emphasis: Wireless Communication and Signal Processing
Thesis: Precise Estimation of Soft Output for Sphere decoding MIMO OFDM Receiver using Modified Likelihood Ascent Search Algorithm.
MSc Supervisor: Prof. Dr. Shahid Khattak

Aug 2007 – Dec 2011 — **Bachelor of Science (BSc)** • Balochistan University of Information Technology Engineering and Management Sciences (Pakistan)
Electronic Engineering
Study Emphasis: Electronic and Communication Engineering
Thesis: Real time Tracking, Monitoring and Controlling of Vehicles through GPS and GSM.

Professional Experience

Mar 2010 – May 2010 — **Internship** • Pakistani Telecommunication Company Limited (Pakistan)

Jun 2012 – Aug 2013 — **Trainee Engineer (Operation and Maintenance)** • Egyptian Pakistani Telecommunication Company (Pakistan)
Deal with issues related to operation and maintenance of mobile network.

Jul 2016 – Jun 2017 — **Visiting Lecturer** • COMWAVE Institute of Information Sciences and Technology, Abbotabad, (Pakistan)
Teaching and Departmental Responsibilities.

Sep 2017 – Jun 2021 **Graduate Teaching/Research Assistant** • GIK Institute of Engineering Sciences and Technology Topi (Pakistan)
Assisted in lectures and laboratory activities for both undergraduate and graduate courses.

1. Assisted as teaching assistant in
   - Linear Circuit Analysis (EE-211) course (Fall 2017)
   - Digital Control System (EE-444) course (Spring 2021)
2. Assisted as lab instructor in
   - Electronics Devices and Circuit Lab (EE-231L) (Spring 2018-2019)
   - Signal and System Lab (EE-351L) (Fall 2018-2019)
   - Communication System Lab (EE-361L) (Spring 2020)

Publications

Peer-reviewed Publications

J1. **Arif Ullah**, Ziaul Haq Abbas, Fazal Muhammad, Ghulam Abbas, Sunghwan Kim, "Uplink Performance Analysis of User-centric Small Cell Aided Dense HCNets with Uplink/Downlink Decoupling," *IEEE Access*, vol. 8, pp. 148460-148474, 2020. DOI:10.1109/ACCESS.2020.3015915

J2. **Arif Ullah**, Ziaul Haq Abbas, Ghulam Abbas, Fazal Muhammad, Lei Jiao, "Performance Analysis of User-Centric SBS Deployment with Load Balancing in Heterogeneous Cellular Networks: A Thomas Cluster Process Approach," *Computer Networks*, vol. 170, pp. 107120, 2020. DOI:10.1016/j.comnet.2020.107120

J3. Ziaul Haq Abbas, **Arif Ullah**, Ghulam Abbas, Fazal Muhammad, Frank Yong Li, "Outage Probability Analysis of User-Centric SBS based HCNets Under Hybrid Rician/Rayleigh Fading," " *In IEEE Communication Letters*., pp. 1–1, Dec, 2019. DOI:10.1109/LCOMM.2019.2959578

J4. **Arif Ullah**, Ziaul Haq Abbas, Ghulam Abbas, Fazal Muhammad, Lei Jiao, "Capacity Driven SBS Deployment in Heterogeneous Cellular Networks: Outage probability and Rate coverage Analysis," *In Transaction on Emerging Telecommunications Technologies*, 2019. DOI:10.1002/ett.3876

J5. Hammad Ahmad, Muhammad Mahmood Ali, **Arif Ullah**, Arbab Abdur Rahim, Husnul Maab, Mahmood Khan, "An Ultra-Thin Beam Splitter Design Using a-Si:H Based on Phase Gradient Metasurfaces," *Journal of Nanoelectronics and Optoelectronics*, vol. 14, pp. 1339-1343(5), September 2019. DOI:10.1166/jno.2019.2614

J6. **Arif Ullah**, Ziaul Haq Abbas, Fazal Muhammad, Irfanullah, Alam Zeb, Shahid Khattak, "Likelihood ascent search augmented sphere decoding receiver for MIMO systems using MQAM constellations," *IET Communication*, vol. 14(22), pp. 4152-4158, December 2020. DOI:10.1049/iet-com.2019.1316

Manuscripts Submitted / in Preparation

S1. **Arif Ullah**, Ziaul Haq Abbas, Ghulam Abbas, Fazal Muhammad and Jae-Mo Kang, "Hybrid millimeter wave heterogeneous networks with spatially correlated user equipments," Submitted to IEEE digital communication and networks. 2021.

P1. Muhammad Tanveer, Abd Ullah Khan, Shehzad Ashraf Chaudhry, and **Arif Ullah**, Comments on "Designing Secure User Authentication Protocol for Big Data Collection in IoT-Based Intelligent Transportation System", *Submitted to IEEE Internet of Things Journal*, 2021.

Conference Contributions

C1. **Arif Ullah**, Ziaul Haq Abbas, Ghulam Abbas, Fazal Muhammad, "Analysis of Outage Probability and Rate Coverage in Heterogeneous Cellular Networks with joint uniform and clustered users," *20nd IEEE International Multi topic Conference (INMIC)*, Islamabad, Pakistan, 29-30 Nov. 2019. DOI:10.1109/INMIC48123.2019.9022767

Theses

T1. **Arif Ullah**. (2021). User-centric Small Cell Aided Future Cellular Networks: Sub-6GHz and Hybrid Millimeter Wave Communications [Doctoral dissertation, GIK Institute of Engineering Sciences and Technology]. Institutional Repository at the University of ... https://....

T2. **Arif Ullah** (2016). Precise Estimation of Soft Output for Sphere decoding MIMO OFDM Receiver using Modifed Likelihood Ascent Search Algorithm [MSc. dissertation, COMSATS University]. Institutional Repository at the University of ... https://....

Notable Graduate Projects

2020–2021 **Hybrid Millimeter Wave Heterogeneous cellular networks:** This project investigate the performance of user-centric small cell aided HCNet in hybrid millimeter wave setup.

2018–2019 **User-centric small cells aided Heterogeneous cellular networks:** This project focuses on the stochastic geometry modeling and performance evaluation of hotspot aided user-centric small cell deployment using in HCNet.

Spring 2018 **Beam splitter design using metasurfaces:** This project focuses on design of ultra-thin beam splitter Using a-Si:H based on phase gradient metasurfaces in HFSS.

2015–2016 **Precise estimation of soft output for sphere decoder:** In this project we precisely estimated the soft output for sphere decoding (SD) receiver in multi antenna setup using low complexity modified likelihood ascent search algorithm (LAS) in MIMO OFDM system.

Fall 2014 **Design of UHF-RFID Tags with Meander-Line Antennas:** This project focuses on the design of different active and passive UHF-RFID tags and simulated small size meandered line antenna tag using HFSS for transportation application.

Courses Undertaken

Online Courses

2021 **"Introduction to Machine Learning"** offered by DUKE University online on Coursera

Graduate Courses

2014 Stochastic Processes (EEE-611) • Optimization Techniques (EEE-712) • Microwave Passive Devices and Circuits (ETN-611) • Electromagnetic Field Theory (ETN-610) • Radio Engineering (ETN-616) • Data Networks and Communication (ETN-671)

2015 Linear System Theory (ECI-665) • Wireless Communication Techniques (ETN-644)

2017 Advance Algorithm and Computational Techniques (CS-506) • Organic Semiconductor and Devices (EE-633)

2018 Computational Methods for Engineers (ES-531) • Instrumentation and Control Systems (EN-541) • Cyber Security and IOT (CS-520) • Electromagnetic Meta materials (EE-613)

Skills

Programming Python (basic) • Matlab • LaTeX• C/C++ • Assembly language • Mathematica

Software Simulink • Advance Design System (ADS) • High Frequency Structured Simulation (HFSS) • CST Microwave Studio • Pspice • Electronic Workbench • Inkscape • Linux

Languages	**Native**	Pashto
	Full professional proficiency	Uru
	Professional working proficiency	English

Membership & Awards

2017–2021 **Postgraduate Fellowship** • Graduate Assistantship (GA4), GIK Institute of Engineering Sciences and Technology (Paksitan)
I obtained a graduate fellowship during my PhD studies.

2014 — 2016 **Scholarship** • Prime Minister Fee Reimbursement Scholarship by Higher Education Commission
I obtained a full fee scholarship to cover the tuition fee expenses at the COMSATS University (Pakistan) during my master studies.

2019 — Present **Graduate Student Member** • Institute of Electrical and Electronics Engineers (IEEE)
Membership #: 95038221.

2013 — Present **Membership** • Registered Engineer with Pakistan Engineering Council (PEC)
Registration # ELECTRO/16479.

Organization and Community Services

Reviewing Activities

- IEEE Wireless Communications Letter
- RS Open Journal on Innovative Communication Technologies (RS-OJICT)

Presentation/Workshop/Seminars

P1. **Paper Presentation:** 22nd IEEE International Multi Topic Conference held at National University of Computer and Emerging Sciences Islamabad Pakistan, 2019

W1. **Attended:** First International Pak-Turk Workshop on Emerging Technologies in the Field of Sciences and Engineering held at GIK Institute Topi, Pakistan, 2018

W2. **Attended:** DEEP INTELLIGENCE Hands on Workshop organized by Aerial Robotic Lab GIK Institute Topi, Pakistan, 2021

S1. **Attended:** Seminar on "Writting a Good Research Paper" held at GIK Institute Topi, Pakistan, 2019

References

Dr. Ziaul Haq Abbas **PhD Advisor** • Associate Professor, Faculty of Electrical Engineering, GIK Institute of Engineering Sciences and Technology Topi, 23640, Pakistan. Email: ziaul.h.abbas@giki.edu.pk, Phone: +92-312-5522633

Dr. Ghulam Abbas **PhD Co-advisor** • Associate Professor, Faculty of Computer Science and Engineering, GIK Institute of Engineering Sciences and Technology Topi, 23640, Pakistan. Email: abbasg@giki.edu.pk, Phone: +92-312-5432666

Dr. Shahid Khattak **MSc Advisor** • Professor, VC, University of Engineering and Technology Mardan, 23200, Pakistan. Email: skhattak710@gmail.com, Phone: +92-333-9400571