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**	engrz.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 – Present — **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 – Jan 2012 — **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

Jul 2010 – Sep 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.

Aug 2015 – Oct 2016 — **Visiting lecturer** • COMWAVE Institute of Information Sciences and Technology, Abbotabad, (Pakistan)
Teaching and Departmental Responsibilities.

Sep 2017 – Jan 2021 **Graduate Teaching Assistant** • GIK Institute of Engineering Sciences and Technology (Pakistan)
Assisting 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)
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.

S2. Fazal Muhammad, Samar Khan, M.S. Haroon, **Arif Ullah** and Nasim Ullah, Interference Mitigation in Intentional Jammers Aided Non-uniform Heterogeneous Cellular Networks, Submitted to ELsvier Computer Communications, 2020.

S3. 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

2019–2020	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.
Spring 2015	Performance analysis of detection techniques for MIMO receiver: In this project we evaluated the performance of different receiver algorithms including ZF, MMSE, SIC, sphere decoder and likelihood ascent search algorithms for MIMO detection in Matlab.
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.

Graduate Courses Undertaken

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

Typesetting and Documentation	Microsoft Office • Power point • Excel • Access	
Languages	**Native**	Pashto
	Full professional proficiency	Uru
	Professional working proficiency	English

Membership & Awards

2017–2021

Postgraduate Fellowship • Graduate Assistantship, GIK Institute of Engineering Sciences and Technology (Paksitan)
I obtained a scholarship from the GIK Institute of Engineering Sciences and Technology (Paksitan) for the Promotion of Education and Studies to help cover the expenses as a PhD. student in GIK Institute of Engineering Sciences and Technology (Paksitan).

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

Membership • Institute of Electrical and Electronics Engineers (IEEE)
I am a graduate student member IEEE with membership #: 95038221.

2013 — Present

Membership • Pakistan Engineering Council
I am a member of Pakistan Engineering council as registered engineer under Registration # ELECTRO/16479.

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.
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