Muhammad Fahim Ul Haque

23-D Block 2 PECHS, Karachi, Pakistan.
Tel: +92-3150224430,
Email: fahim.ulhaque@gmail.com,
mfahim@cloud.neduet.edu.pk.

Objective

I wish to seek opportunities for research and self-development. My studies have been full of thought, knowledge and have instilled in me a research oriented approach which encourages me to explore areas that are yet to be fully understood.

Education

PhD Computer Engineering: Linköping University, Sweden	2011
M.E. Telecommunications Engineering: NED University of Engineering and Technology, Pakistan	2010
B.E. Telecommunications Engineering: NED University of Engineering and Technology, Pakistan	2007

Work Experience

Assistant Professor: Department of Telecommunications Engineering, NED University of Engineering and Technology, Pakistan	June 2021 –Till date
Assistant Professor: Department of Electronics Engineering, NED University of Engineering and Technology, Pakistan	May 2017 – June 2021
Lecturer: Electronic Department, NED University of Engineering and Technology, Pakistan	May 2007 – May2017
RF Engineer, DANCOM Online	Dec 2006 – March 2007
HEC Approved PhD Supervisor	2019- 2023
NED Approved PhD Supervisor	2024- Till date
Member of Board of Faculty ECE, NEDUET	Nov2024–Till date
Member of Board of Studies Telecommunications Engineering, NEDUET	Sep 2024–Till date
Member of Industrial Advisory Board, Telecommunications Engineering, NEDUET	2022-Till date
Class Advisor (Various Batches)	Various Semesters
Factotum	Various Semesters

Completed Projects

- Design and implementation of novel **aliasing compensated polar PWM transmitter.**
- Design and implementation of novel **combined outphasing aliasing free polar PWM transmitter**.
- Design and implementation of **modified band-limited polar PWM transmitter**.
- Design and implementation of **all digital polar PWM transmitter** (Complete transmitter except Class D power amplifier is implemented in FPGA, where Class D power amplifier is implemented in 130 nm standard CMOS).
- Design of novel **combined RF and multiphase polar PWM transmitter**.
- Design of novel **combined RF and multilevel polar PWM transmitter**.
- IC tape-out of **RF-PWM based transmitter**in 130nm standard CMOS (Output power +30 dBm; Operating frequency 1 GHz).
- IC tape-out of **all digital RF-PWM based transmitter** in 65nm standard CMOS (Output power +28 dBm).
- IC tape-out of **all digital RF-PWM based transmitter** in 130nm standard CMOS (Output power +27 dBm).

- IC tape-out of **Class AB power amplifier** in 130nm standard CMOS (Output power +23 dBm; Operating frequency 1 GHz).
- IC tape-out of **Class AB power amplifier** in 130nm standard CMOS (Output power +33 dBm; Operating frequency 2.5 GHz).
- IC tape-out of **Delay lock loop based frequency multiplier** in 350nm standard CMOS. (Operating frequency 900 MHz).
- Low power Cyphering Algorithm for IoT Devices.
- Centralized adaptive antenna tilting system for real time RF optimization of GSM network.
- **802.11a physical layer synthesis on FPGA** (Altera Cyclone IV) using Simulink.
- High level simulation of **Impulse Radio UWB system.**
- High level simulation of **MTI and Pulse Doppler.**

Ongoing Project:
- Design and Implementation of All Digital Transmitter Architecture on FPGA.
- Physical Design of Power efficient AI accelerator on 5nm and 12nm FinFET CMOS.

Grants
- Physical Design of Power efficient AI accelerator, Xcelerium
- Design and Implementation of All Digital Transmitter Architecture. University PhD Fund
- Reconfigurable Ultra-Wideband System for Frequency Congested Environment, MoST
- Linearization of MIMO Transmitter for Wireless Applications, University PhD Fund
- IC Design Summer School.

Policy Advocacy:
- Member Micro-Electronics Technical Committee for Electronic Policy of Pakistan, Ministry of Science and Technology, Government of Pakistan.
- Member Academic Committee for Pakistan Semiconductor Plan, Presented to Honorable President of Pakistan.

Technical Skills
- Digital IC Design APR Flow (Work on 5 nm FinFET CMOS, 12nm FinFET CMOS, 22 nm SOI)
- RF IC Design (Work on 28nm SOI, 65nm standard CMOS, 90 nm standard CMOS, 130 nm standard CMOS and 350 nm standard CMOS).
- Static Timing Analysis on Digital IC (Prime Time).
- Digital IC Design Open Source Tool Chain (Skywater 130nm CMOS)
- High level simulation of communication system. (MATLAB, ADS Ptolemy)
- Low level simulation of complete transmitter. (Co-simulation of ADS, Cadence, Verilog& MATLAB)
- High Speed Transceiver based Design on FPGA
- Digital design synthesis on FGPA.
- RF PCB Design. (ADS)
- RF system testing and measurement.
- Image and video processing/compression. (MATLAB)

Tools and Software Skill

Digital IC Design Tool	Analog/RF IC Design Tool	Programming Lang.	Application Software
- Verilog/VHDL - Fusion Compiler - Prime Time - Prime Power - Formality - IC Validator - Red Hawk - Star RC - Model Sim/VCS - Quartus/Vivado - Library Compiler - Open Lane	- ADS - Cadence Schematic editor and AMS - Cadence Virtuso - Cadence Spectre	- MATLAB - Python - C Language - TCL Script	- LaTEX - JabREF - MS VISIO - Git - Linux - MS Excel, Word, Power Point. - Google Docs, Sheet, Sheets.

Training Conducted:

- Radio Frequency Integrated Circuit Design to SUPARCO technical manager from RF Team.
- Verilog training in IC Design Summer School 2022
- Verilog training in IC Design Summer School 2024
- Physical Design training in IC Design Summer School 2025

Professional Training

- **'Fusion Compiler: Synthesis Jumpstart'** training from Synopsys.
- **'Fusion Compiler: Design and Synthesis'** training from Synopsys.
- **'Fusion Compiler: Design Implementation'** training from Synopsys.
- '**Prime Time Jumpstart'** training from Synopsys.
- '**Fusion Platform: Reference Methodology'** training from Synosys.
- **'Formality Jump Start'** training from Synopsys.
- **'IC Compiler II Block level Implementation'** training from Synopsys.
- Certified Training on **'HUAWEI BSS'** from Huawei UET Telecom and IT Center, Lahore, Pakistan.
- Certified Training on **'HUAWEI MSC & VLR'** from Huawei UET Telecom and IT Center, Lahore, Pakistan.
- Certified Training on **'HUAWEI HLR'** from Huawei UET Telecom and IT Center, Lahore, Pakistan.
- Training on "R&S ZNB Vector Network Analyzer" conducted by Rohde & Schwarz
- Workshop on Telecommunication Technology conducted by Elettronica Veneta.

Reports and Publications

- **PhD Thesis:** Pulse-Width Modulated RF Transmitters
- **MS Thesis:** Video Motion Estimation and Compensation.
- "Aliasing-compensated polar PWM transmitter." IEEE Transactions on Circuits and Systems II: Express Briefs 64, no. 8 (2016): 912-916.
- "A modified all-digital polar PWM transmitter." IEEE Transactions on Circuits and Systems I: Regular Papers 65, no. 2 (2017): 758-768.
- "An All-digital PWM Transmitter with Enhanced Phase Resolution." IEEE Transactions on Circuits and Systems II: Express Briefs 65, no. 11 (2017): 1634-1638.
- "Power-efficient aliasing-free PWM transmitter." IET Circuits, Devices & Systems 13, no. 3 (2019): 273-278.
- "Exploring compiler optimization space for control flow obfuscation." Computers & Security 139 (2024): 103704.
- "Approximate Computing: Hardware and Software Techniques, Tools and Their Applications." Journal of Circuits, Systems and Computers 33, no. 04 (2024): 2430001.
- "A novel IFPWM-based all-digital transmitter architecture and FPGA implementation." International Journal of Circuit Theory and Applications.
- "Selecting the best compiler optimization by adopting natural language processing." IEEE Access (2024).
- "Coherent Detection of Discrete Variable Quantum Key Distribution using Homodyne Technique." Applied Physics B.
- "Modulated Theta Band Frequency with Binaural Beat Stimulation Correlates with Improved Cognitive Scores in Alzheimer's Patients", Frontiers in aging neuroscience .
- "Combined RF and multilevel PWM switch mode power amplifier." In 2013 NORCHIP, pp. 1-4. IEEE, 2013.
- "Combined RF and multiphase PWM transmitter." In 2015 European Conference on Circuit Theory and Design (ECCTD), pp. 1-4. IEEE, 2015.
- "Modified Band-limited Pulsewidth Modulated Polar Transmitter." In Int. Symp. on Microwave and Optical Technology, Dresden, Germany. 2015.

- A comparison of polar and quadrature RF-PWM." In 2018 IEEE Nordic Circuits and Systems Conference (NORCAS): NORCHIP and International Symposium of System-on-Chip (SoC), pp. 1-4. IEEE, 2018.