



Talha Kaim khani

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ABOUT MYSELF

Researcher with 10+ years of overall experience spanning academia, laboratory leadership, telecommunications, and optical systems research. Currently contributing to an Ericsson collaborative project on segmented Mach-Zehnder modulators, using device-level modeling and phase-shifter segmentation to improve high-speed electro-optic modulation performance. Published research on reconfigurable optical delay lines that increased tunability by 67% while reducing controller count and power consumption. Brings strong hands-on and research experience in integrated photonics, optical communication, photodetectors, LEDs, and bandwidth optimization aligned with advanced semiconductor and photonics research.

EDUCATION & TRAINING

Erasmus+ Research Mobility (Visiting Scholar)

Scuola Superiore Sant'Anna [26/02/2026 - Current]

City: Pisa | **Country:** Italy

- Contributed to an Ericsson-funded collaborative research project on segmented Mach-Zehnder Modulators (SEMZMs) for photonics and semiconductor applications, under the supervision of Dr Luca Poti, Scuola Superiore Sant'Anna
- Conducted full electro-optic characterisation of a fabricated 4-segment thin-film lithium tantalate (TFLT) MZM, extracting key device parameters: electro-optic 3-dB bandwidth of 67 GHz, half-wave voltage $V = 5.2$ V, extinction ratio ~ 30 dB, and thermal heater efficiency of 3.0 V/ π — validated across all four segments using a Keysight 70 GHz VNA and CT 400 optical component analyser
- Designed and validated a MATLAB simulation framework for a 4-segment MZM transceiver, encompassing RRC pulse shaping, RF subcarrier upconversion, AWGN optical channel modelling, square-law photodetection, and BER computation under unipolar OOK modulation
- Extending the validated 4-segment framework to a 16-segment lumped-element MZM architecture, incorporating BPAM modulation, chromatic dispersion, and polarisation mode dispersion to establish a high-fidelity IM/DD simulation testbed for AI-based equalization research

Masters of Engineering

Mehran University of Engineering & Technology [17/03/2016 - 17/09/2020]

City: Jamshoro | **Country:** Pakistan

Field(s) of study: Communication & Networks: | **Final grade:** 4.0 CGPA | **Level in EQF:** 7 | **Thesis:** Performance Analysis Of VLC Based Optical Link Under Different Modulation Schemes

- Data Networks learned about switches, router and firewalls
- Optical Networks learned about lasers, photodiode, OTDR, Fusion Splicer
- Designed and implemented a visible light communication (VLC) optical link using LEDs, photodetectors, and LED driver circuitry.
- Improved communication performance through experimental optimization of transmitter-receiver electronic components.

Bachelors of Engineering

Mehran University of Engineering & Technology [07/01/2008 - 02/01/2012]

City: jamshoro | **Country:** Pakistan

Field(s) of study: Telecommunication: | **Final grade:** 3.63 CGPA | **Level in EQF:** 6 | **Thesis:** Coherent Optical Network

- Conducted comparative analysis of coherent and non-coherent optical communication systems.
- Evaluated BER, SNR, Q-factor, and data-rate metrics to assess system-level optical network performance.
- Signal Processing
- Wireless Networks

WORK EXPERIENCE

Mehran University of engineering & Technology - Pakistan, Jamshoro

Lab Supervisor

[17/03/2016 - Current]

- Delivered lectures and supervised laboratory sessions in Data Communication Networks and Optical Communication Systems at both theoretical and practical levels.
- Conducted hands-on lab demonstrations on data network equipment including switches, routers, and firewalls.
- Conducted hands-on lab demonstrations on optical hardware including lasers, photodiodes, optical systems, OTDRs, and fiber splicing equipment.
- Supervised undergraduate final-year research projects in optical networks, photonic systems, and communication engineering.
- Served as Timetable Coordinator for the department, managing scheduling and resource allocation across academic program.
- Contributed to quality assurance and institutional review processes as an active member of the QOBE team.
- Provided academic counselling and pastoral support to students in the capacity of Class Advisor

Pakistan Telecommunication Company Limited, PTCL - Pakistan, Hyderabad

Trainee Engineer

[02/01/2014 - 02/01/2015]

- Supported broadband service provisioning and field operations in a large-scale communications network environment.
- Monitored BB/IPTV fault rates and ensured timely rectification to improve operational performance.

SKILLS

Microsoft Office | MATLAB | OTDR, Power Meter, Fusion Splicer | VNA Measurements | Photonic simulators including Lumerical FDTD | lasers | Photodiodes | cisco asa 5505 | Cisco Nexus Switching | Cisco NK7000 | System simulation and modelling tools (MATLAB, ..)

LANGUAGE SKILLS

Mother tongue(s): Urdu

English

LISTENING: B2 **READING:** B2 **WRITING:** B2

SPOKEN PRODUCTION: B2

SPOKEN INTERACTION: B2

PUBLICATIONS

Novel Optical Delay Line Overcomes Bandwidth-Delay Limit for Enhanced Beamforming Performance

We propose a novel, reconfigurable delay line architecture that achieves a $(2N-1)$ times greater tunability range compared to previously reported architectures. This design overcomes the bandwidth-delay product constraint and surpasses the tunability range by 67% and offers a 1.5x reduction in controllers and power consumption.

Waqas, Abi, Talha Kaim Khani, Brendan Roycroft, and Brian Corbett. "Novel Optical Delay Line Overcomes Bandwidth-Delay Limit for Enhanced Beamforming Performance." In 2024 IEEE Photonics Conference (IPC), pp. 1-2. IEEE, 2024.

Reconfigurable optical delay line breaking the bandwidth-delay limit

We propose a continuously tunable true-time delay line with easy coupler control. It is based on multiple Mach-Zehnder interferometers with two couplers setting. One setting achieves a flat-top group delay spectra, breaking the bandwidth-delay limit, while the other offers a large transmission bandwidth.

Waqas, Abi, Talha Kaim Khani, and Brian Corbett. "Reconfigurable optical delay line breaking the bandwidth-delay limit." In 2024 IEEE Silicon Photonics Conference (SiPhotonics), pp. 1-2. IEEE, 2024.

Improving VLC Data Rate and Link Range Using Commercial Electronic Components

visible light communication (VLC) link was setup using electronic components commercially available which can achieve a data rate up to 2.55 Mb/s and link range of 80 cm

Kaim Khani, Talha, Zarlish Mushtaq, Abi Waqas, Bhawani Shankar Chowdhry, and Muhammad Aslam Uqaili. "Improving VLC Data Rate and Link Range Using Commercial Electronic Components." Wireless Personal Communications 121, no. 2 (2021): 1325-1337.

Performance Analysis of VLC system using Commercially Available Components

Compared transmitter and receiver electronics in terms of intensity and rise-time performance across frequencies

Khani, Talha Kaim, Hyder Bux Mangrio, and Fahim Aziz Umrani. "Performance analysis of VLC system using commercially available components." In 2019 22nd International Multitopic Conference (INMIC), pp. 1-4. IEEE, 2019

PROJECTS

Muet intranet Penetration testing Conducted a comprehensive penetration test of the MUET (Mehran University of Engineering & Technology) intranet infrastructure, identifying network vulnerabilities, assessing system resilience against simulated cyber threats, and delivering actionable remediation recommendations to strengthen the institution's defense posture.

SDN kit design using Zodaic Fx switch Designed and implemented an SDN experimental kit using the Zodiac FX OpenFlow switch, enabling hands-on experimentation with programmable network control, dynamic flow management, and real-time traffic monitoring for undergraduate networking laboratory curriculum

FSO link establishment in PTCL network Presented a technical proposal to PTCL recommending the deployment of Free Space Optics (FSO) links to enhance performance across both wired and wireless network services, and proposed FSO as a viable last-mile solution for site installations in locations where conventional cable infrastructure is not feasible

RECOMMENDATIONS

Name: Luca Potti

He is doing a project with me on segmented MZM. I found him to be good at concept on optical communication. contact me for full recommendation

Email: luca.poti@cni.it | **Phone:** +39 3487919757

Name: Prof. Dr. Faisal Karim Shaikh

Dr. Faisal Karim Shaikh, Chairman at MUET, recommends Engr. Talha based on 10+ years of observation, citing his specialized expertise in photonics, optical networking. Full recommendation letter available on request

Email: faisal.karim@faculty.muuet.edu.pk | **Phone:** +92 222772250

Name: Dr. Fahim Aziz Umrani

Dr. Fahim Aziz Umrani, who has supervised Engr. Talha across both his bachelor's and master's theses over a decade, highlights his independent research approach. Recommends him. Feel free to contact for full recommendation

Email: faheemaziz.umrani@faculty.muuet.edu.pk | **Phone:** +92 3073410407