Engr. Salik Nawaz

Photonic Specialist

Paderborn, Germany

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Digital Portfolio

Professional Summary

- Photonic Specialist with 3+ years of experience in designing, fabricating, and characterizing active and passive photonic integrated circuits (PICs) for quantum computing and communication applications.
- Proficient in Matlab, C++, and Python for simulation, data analysis, and device modeling.
- Experienced with agile methodologies and collaborative research environments.
- Passionate about developing energy-efficient, scalable photonic devices for research and industrial use.
- Currently focused on machine learning applications in photonic systems, with a strong command of Python and PyTorch.

Experience

Research Assistant - CeOPP, Germany Sep 2021 – Jul 2023

- Fabricated Vertical Cavity Surface Emitting Laser (VCSEL) for quantum computing applications, achieving a reduction in power consumption while enhancing photon emission accuracy to improve entangled photon pairs.
- Designed Bulls-eye Cavity for a single-photon emitter for quantum technology, increasing the efficiency of the device.
- Executed advanced lithography, dry/wet etching processes, sputtering, atomic layer deposition, and thin film deposition, employing analytical tools that ensured over accuracy in optical surface analysis for industrial research projects focused on quantum technology applications.
- Designed and investigated a new protocol for characterizing III-V semiconductor chips, which led to an increase in measurement accuracy by ensuring that samples met quality standards.
- Achieved uniform deposition of semiconductor layers by utilizing Molecular Beam Epitaxy (MBE) on diverse wafer substrates, ensuring precise control over layer homogeneity.
- Published research in leading international journals, advancing the field of optoelectronics, photonics, and related disciplines.
- Engaged in various seminars and research presentations to broaden knowledge and stay current with advancements in the field.

Fabrication Engineer - TurnoTech, Islamabad Pakistan Sep 2018 – Feb 2020

- Conducted semiconductor front-end processes for the fabrication of nanochips, achieving a maximum yield rate by implementing rigorous quality checks and characterizing performance using advanced analytical tools to ensure product excellence.
- Collaborated with engineering teams to refine fabrication methods used in chip production that contributed directly to enhanced efficiency.
- Spearheaded the collaboration of cross-functional teams for semiconductor chip development, creating 12 comprehensive documentation sets that included detailed specifications and test reports, enhancing team understanding and project accuracy.
- Researched and analyzed emerging technologies in semiconductor fabrication, contributing actionable insights that led to the identification of key process improvements for enhanced operational efficiency across projects.
- Coached 10 summer interns and launched a mentorship program for new joiners.

Education

Universität Paderborn Apr 2020 – Jun 2024

M.Sc Optoelectronics and Photonics

- Research and Development a Novel Method for Preparing and Characterizing Electrical Contacts to Doped (In, Ga) As Layers

International Islamic University, Islamabad Sep 2014 – Aug 2018
BS Electronics Engineering

- Matlab-Based Automated CNC Liquid Dispensing

Projects

Confocal Microscopy for Optical Analysis Oct 2020 – Feb 2021
Utilized a confocal microscopy setup for high-resolution optical surface and layer inspection of nanophotonic structures.

Characterization of Optoelectronic Devices: LED-Laser Oct 2020 – Mar 2021
Performed optical and electrical characterization of LED and laser devices to assess emission spectra, I-V curves, and performance metrics.

Optical Waveguide Apr 2021 – Aug 2022
Designed and simulated optical waveguides using COMSOL, and analyzed different modes, and propagation loss.

Integrated Optics and Photonics Oct 2022 – Mar 2023
Explored Ti:$LiNbO_3$-based integrated photonic components for beam steering, coupling, and modulation in photonic circuits.

VCSEL Optimization Jan 2025 - Current
Developing a machine learning model using PyTorch to optimize VCSEL output characteristics based on fabrication parameters, enabling predictive tuning of photonic device performance.

Publication

Design Bulls-eye Cavity for Single-Photon Emitter

- Salik Nawaz, "Design of Bulls-eye Cavity for Single-Photon Emitter", submitted to **AIP Advances**, 2024.

Certifications (Coursera)

- AI Infrastructure and Operations Fundamentals
- Introduction to AI
- Python for Data Science, AI, and Development
- Practical Deep Learning with FastAI (In Process)

Languages

English (C2), German (B2), Urdu (Native)

Skills

Layout & Simulation: Microsoft 365, Lumerical FDTD/MODE, COMSOL, OriginLab, GDS, KLayout
Scripting: Python, Matlab, C++, Git, LaTeX, PyTorch, TensorFlow, NumPy, Pandas, Matplotlib
Fabrication Techniques: Cleanroom, lithography (e-beam/photo), Etching (wet/dry), PVD, Doping, Sputtering, Atomic Layer Deposition, Solution Processing, MBE
Characterization: SEM, AFM, Profilometer, XRD, I-V curves, Optical Laser Microscopy
Soft Skills: Organizational and planning, Independent-oriented, Critical thinking, Motivated, Optimistic, Flexible, Hands-on Mentality
Driving License: German driving license Class B