

SHLOK VAIBHAV SINGH

EDUCATION

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Indian Institute of Technology Bombay

Bachelor of Technology in Electrical Engineering with M.Tech in Microelectronics

Mumbai, India

July'18 – June'23

- Cumulative Grade Point: **9.44/10.0**
- Minor Degree in Computer Science and Engineering

PROFESSIONAL EXPERIENCE

Analog Design Engineer | Texas Instruments India

July'23 –

- Designed transmitter for an ISO and EMC-compliant CAN protocol transceiver for automotive use (July'23- Dec'24)
- Guiding the silicon measurements and characterization for the above transceiver (March'25 -)
- Designed the IO transmitter interface for an Ethernet standard (Dec'24 - March'25)

PUBLICATIONS

1. Das, Pallabi, **Shlok Vaibhav Singh**, and Siddharth Tallur. "**Design and analysis of electro-optic modulators based on high contrast gratings in AlGaIn/GaN heterostructures.**" *Semiconductor Science and Technology* 35, no. 12 (2020): 125022 .

RESEARCH EXPERIENCE

Study of application of small signal NEGF to impedance characterization of nanoscale devices

May'22 – June'23

Dual Degree Thesis, Guide: *Prof. Bhaskaran Muralidharan, Department of Electrical Engineering*

IIT Bombay

- **Introduction:** *Non-equilibrium green's function (NEGF) is a powerful technique to find observables like current, charge density in nanoscale devices. AC NEGF is the NEGF technique applied to a nanostructure with small oscillating voltages.*
- Performed a thorough literature survey on physics behind **NEGF, topological interconnects** and scattering formalism
- Developed the code to replicate NEGF setup in Carbon-Nanotubes coupled with Poisson Solver used in literature

Study of Weak Value Measurements for spin traversal time measurement

July'21 – April'22

- Performed literature survey on weak-values, **Quantum Metrology** and the set-up of spin-traversal time measurement

Analysis and Modelling of Periodic Gratings

Dec'19 – Jun'20

- Simplified an existing analytical model for computing reflectivity and wave-guide modes of 1-D grating structures for exploring design space for novel III-V hetero-structure high-contrast periodic gratings based optical modulators
- Developed **MATLAB code** that achieved speed upto **25%** of an RCWA (Rigorous Coupled Wave Analysis) based application .

KEY TECHNICAL PROJECTS

System Level Design of FFE filter, SerDes and phase detector | EE800: High Speed Interconnects

Spring 2023

- Designed and characterized Serializer-Deserializer and phase detector using Verilog-A blocks in cadence
- Designed and trained FFE filter using Verilog-A for pulse-shaping at the receiver end of lossy transmission line

Neural Networks on FPGA for image classification | EE705: VLSI Design Lab

Spring 2022

- Trained CNN network for CIFAR-10 Dataset using tensorflow and developed code for synthesizable CNN layers in VHDL

Google FaceNet implementation using tensorflow 📄 | CS419: Machine Learning

Spring 2021

- Coded the triplet loss and inception layer to train the model in tensorflow. Cleaned up the dataset for training

Image Texture Transfer Using Wavelets 📄 | CS 663: Fundamentals of Digital Image Processing

- Used wavelet based filtering to transfer texture from one image to another
- Demonstrated aesthetic effects like merging satellite map on physical map, crumbling of paper etc

Wavelet Based ECG Delineator and ECG Data Compression 📄 | EE338: Digital Signal Processing

Fall 2020

- Employed quadratic spline wavelet filter banks and **Algorithme à trous** to **robustly** delineate the ECG pulse waves
- Used **Singular Value Decomposition** to compress the ECG signals by exploiting their **periodicity in time**
- Tested our procedure on **physionet** database signals with various artifacts with upto **98%** R-peak detection

SCHOLASTIC ACHIEVEMENTS

- Secured an **All India Rank of 320** in JEE Advanced among 0.15 million candidates (2018)
- Secured an **All India Rank of 680** in JEE Mains (Engineering) among over 1 million candidates (2018)
- Secured an **All India Rank of 100** in KVPY fellowship exam conducted by IISc Bengaluru (2018)

TECHNICAL SKILLS

- **Engineering:** MATLAB, C, C++, Cadence, NgSpice, Magic, VHDL, Verilog, Verilog-A, Git, AutoCAD, Eagle, Altium Designer
- **Data Science:** Python, Tensorflow, Keras, Tableau, **Coursera: Neural networks and deep learning, Machine Learning**

EXTRACURRICULAR ACTIVITIES

- Volunteered at St. Broseph's Foundation, Bengaluru to help automate and digitize RTI request and response handling
- Completed a two semester-course in Chinese Language offered by International Relations Cell (IIT Bombay)