Dhiman Sarkar

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Statement

I am a postgraduate student, studying RF & Microwave Engineering in the Department of Electrical Engineering at the Indian Institute of Technology Tirupati (IITTP). I'm very much passionate in the field of Analog Design, RF Engineering, VLSI Engineering and Precision Instrumentation. I'm aiming to use my knowledge that I have acquired from my coursework as well as self-study to research, develop, learn and create in my domain.

Education

Master of Technology

Indian Institution of Technology Tirupati — *August 2022 - Current*

RF & Microwave Engineering

- **CGPA:** 7.9 (Sem 1)

Bachelor of Technology

Jalpaiguri Government Engineering College — *October 2019 - May 2022*

Electronics and Communication Engineering

- **CGPA:** 8.01

Diploma in Engineering & Technology

Jalpaiguri Polytechnic Institute — *2016 - 2019*

Electronics and Telecommunication Engineering

- **CGPA:** 8.3

12th

Fanindra Deb Institution — *2016*

WBCHSE - Science

- **Percentage:** 70

10th

Fanindra Deb Institution — *2014*

WBBSE

- **Percentage:** 82.14

Experience

Summer Internship

IEEE AP-MTTs SBC IIT Kharagpur — *June 1, 2023 - July 15, 2023*

West Bengal, India

- Design of an Enhanced Efficiency Class of Power Amplifier.
- Technical Skills: Cadance AWR Microwave Office, MATLAB, Microwave Engineering.

Certification

ELEDIA Research Center (ELEDIA@UniTN – University of Trento) — *July 5, 2023 - July 26, 2023*

Trento, Italy (Online)

- Antenna Modeling and Simulation Made Easy - Fundamentals and Hands-On Exercises.
- Technical Skills: Ansys HFSS, Antenna Theory, Antenna Design and Simulation.

Projects

Design of an Enhanced Efficiency Class of Power Amplifier.

- Designed a Class-F Power Amplifier with Pulse Voltage and Pulse Current Waveform Shaping.
- Frequency of operation is 2.4GHz (narrow-band).
- Achieved a simulated gain of 15dB, PAE 71.5%, DCRF 72.5% using Qorvo QPD0020 GaN on SiC HEMT.
- Simulation Software: Cadence AWR Microwave Office.

Design of a broadband GaN Power Amplifier.

- Designed a 2-5GHz broadband power amplifier using Wolfspeed CGH40006P GaN HEMT.
- Achieved a gain to more than 10dB in the frequencyband.
- Design tool: Cadance AWR Microwave Office.

Implementation of Computational Methods to solve Maxwell's Equations.

- Solution of Poisson's Equation to calculate the charge distribution of along a wire which is kept at a constant potential using Method of Moment (MoM).
- Solution of Maxwell's Equation in 1D for an TEM wave with perfect electrical conductor (PEC) material at the ends using FDTD.
- The computation was implemented in a combination of C++, Python and MATLAB code.
- https://github.com/DhimanSarkar/Computational-Electromagnetics

Design of a Reduced Footprint Wilkinson Power Divider with EMVerification.

- Designed, simulated and optimized a Wilkinson Power Divider, working at 2.4GHz, in Keysight ADS. It was then transformed into a reduced-footprint design. Using generic DRC rule of ADS, EMVerification was done.

Design of a Five Pole Low Pass Filter with cut-off frequency of 2.4GHz and stop-band attenuation of -20dB at 5GHz.

- Designed, simulated and optimized a microwave LPF for the desired specification.
- Design Tool: Ansys HFSS.

Design of a Third Order 3dB Equal Ripple Low Pass Filter Using Microstrip Lines with a Cut-off Frequency of 4GHz.

- Designed, simulated and optimized a microwave LPF at $f_c = 4$GHz.
- Design Tool: Ansys HFSS.

16×16 SRAM Array

- Designed (circuit level) and simulated a 6T 16×16 SRAM array. LTSpice XVII was used.

Matrix Multiplier - An Analog Approach

- An approach to multiply two matrices where accuracy and precision can be within certain tolerance. Exploited the square-law current drawing characteristics of the class AB output stage of a BJT based OpAmps to multiply two numbers in-terms of normalized voltages. Then using proper summing amplifiers and voltage scaling amplifiers the final output is produced.
- Project Report Link.

ELF-VLF Signal Receiver

- An experimental setup for the study of atmospheric changes due to various causes like lightning, solar storm, eclipse, earthquake etc.
- https://github.com/DhimanSarkar/ELF-VLF-Signal-Receiver

Precision Null Detector

- An alternative to galvanometric implementations of analog null detector.
- High precision and resolution than galvanometric implementations.
- https://github.com/DhimanSarkar/Precision-Null-Detector

Microphone Pre-amp

- A general purpose op-amp based preamp implementation.
- https://github.com/DhimanSarkar/Desktop_Microphone_PreAmp

Audio Amplifier Board

- 24 watt output power • 4 input mixer • Bluetooth connectivity
- https://github.com/DhimanSarkar/Audio-Amplifier-System

Skills

Electrical:	Microwave Simulation Tools [Ansys HFSS, Cadance Microwave Office, Keysight ADS], Analog Design (HF), Analog Filter Design, PCB Design (MF), Arduino, Digital Logic Design, Circuit Simulation Tools (HF) [SPICE, Multisim, MATLAB/Simulink], EDA Tools [KiCAD, Altium, OrCAD, AutoCAD]
Hardware:	Oscilloscope, Function/Signal Generator, Spectrum Analyzer, Vector Network Analyzer (VNA), Multimeter, Arduino, Raspbary PiPico
Computer Science:	Embeded C, C, C++, C#, .NET Core/Framework, MATLAB, GNU Octave, Python, HTML/CSS/JS, Jekyll, Hugo, Google Script, Netlify, GitHub Pages
Academic:	LATEX, MATLAB, Mathematica, Office Suite
Misc:	Graphic Design, Teaching Material

Technical Achievements

2023 **Best Performance,** Summer Internship organized by IEEE AP-MTTs SBC IIT Kharagpur *IIT Kharagpur*
2023 **Winner,** Analog Hardware Development Competition organized by Texas Instruments *IIT Tirupati*
2020 **Winner,** Circasm - Circuit building contest in Sristi (annual tech-fest of JGEC) *JGEC*

Courses

Differential Equations.

Wolfram U *2022*

Online

- Achieved Level 1 Certificate.
- Certificate ID: e577bc75-db93-4782-895a-c68f043ddf28
- Skills: Mathematica, Calculus, Mathematics, Linear Algebra.

Solving Ordinary Differential Equations with MATLAB.

MathWorks | *Training Services* *2022*

Online

- Certificate ID: 9be93668-c83c-4ba0-88ae-2bad07c61316
- Skills: MATLAB, Calculus, Mathematics, Linear Algebra.

MATLAB Onramp.

MathWorks | *Training Services* *2022*

Online

- Certificate ID: 789d5f9e-7698-42e1-a02d-bd04cb56c131
- Skills: MATLAB, Mathematics, Linear Algebra.

MATLAB Fundamentals.

MathWorks | *Training Services* *2022*

Online

- Certificate ID: 8f96ee2e-ece0-4ddf-976e-3681e03ed250
- Skills: MATLAB, Mathematics, Linear Algebra.

Languages

English Professional proficiency
Bengali Native proficiency