Dhiman Sarkar

+91 89276 86156 | dhiman.sarkar.careers@gmail.com | github.com/DhimanSarkar | linkedin.com/in/Dhiman-Sarkar

Work Experience

Radio Frequency Test Engineer

Gallium-nitride Ecosystem Enabling Centre and Incubator *June, 2024 - Present*

CeNSE, Indian Institute of Science, Karnataka, India

- Key Responsibilities: Load/Source-Pull Measurements using automatic and manual tuners, Pulsed/CW/Modulatd RF and DC Measurements, Passive Devices/Components Measurement and Characterization.
- Additional Contributions: Planning of customized RF&MW test benches including electrical and mechanical designs and fabrication, Development of custom python library for test gear automation, Consultation to other businesses, students, and staffs, Network and computational systems administration and deployment, EDA licenses and HPC/Cluster management.
- Technical Skills: RFµW measurement and calibration, Vector Network Analyzer, Nonlinear VNA (NVNA or LSNA), Scalar/Vector Signal Generator, Signal Analyzer, Power Meter, SCPI Automation, Design of miscellaneous passive and active components, On-wafer DUT measurement, Custom calibration standards, fixture removal, and de-embedding, Load-Pull and Pulsed IV setup by Focus Microwaves, Pulsed IV setup by Maury Microwaves, Scaler Load-Pull using manual tuners.

Education

Master of Technology

Indian Institution of Technology Tirupati *August 2022 - May 2024*

RF & Microwave Engineering

- **CGPA:** 8.77
- **Courses:** Advanced Electromagnetics, Antenna Theory and Design, Advanced Microwave Engineering, RF Transceiver Design, Computational Electromagnetics, Advanced Microwave Laboratory, RF/Mixed Signal Design, RF CAD Project, RF CAD Circuits Laboratory, Compound Semiconductors, Analog VLSI Design, Digital VLSI Design, Wireless Communication, Linear Algebra, Differential Equations, Mathematical Physics, Classical Electrodynamics.

Bachelor of Technology

Jalpaiguri Government Engineering College *October 2019 - May 2022*

Electronics and Communication Engineering

- **Courses:** Signal & Systems, Control System, Network Theory, Electronic Devices, Analog Electronic Circuits, Digital System Design, CMOS VLSI Design, Measurement and Instrumentation, Electromagnetic Field Theory, Microwave Theory, Microwave IC, Antenna Theory, Mixed Signal Design, Digital Signal Processing, Analog & Digital Communication, Power Electronics, Embedded Systems, Data Structure & Algorithm, Optimization Techniques, Neural Network and Fuzzy Logic Control, Computer Network, Computer Architecture, Microprocessor & Microcontroller.
- **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

Skills

Electrical:	Microwave Simulation Tools [Ansys HFSS, COMSOL Multiphysics, Cadance Microwave Office, Keysight ADS, CST Microwave Studio], Analog/RF Circuit Design, Analog/RF Filter Design, PCB Design, Digital Logic Design, Circuit Simulation Tools [SPICE, Multisim, MATLAB/Simulink], EDA Tools [KiCAD, Altium, OrCAD, AutoCAD], SCPI Programming.
Hardware:	Oscilloscope, Function/Signal Generator, Spectrum Analyzer, Vector Network Analyzer (VNA), Multimeter, Arduino, Raspbary PiPico, LPKF Circuit Board Plotter, SCPI Automation.
Computer Science:	Embeded C, C, C++, C#, .NET Core/Framework, MATLAB, GNU Octave, Python, HTML/CSS/JS, Batch/Bash Scripting, Networking, Hypervisor/Containerization [Proxmox, Docker].
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*

Projects

Temporal Control of Electromagnetic Pulses

Masters' Thesis *July 2023 - May 2024*

IIT Tirupati

- *Abstract:* This thesis examines the propagation of electromagnetic (EM) pulse in a spatially homogeneous or inhomogeneous medium whose properties vary with time abruptly or continuously. The analysis is carried out in the commercially available numerical solver, COMSOL Multiphysics®. Emphasis has been given on the practical realization of the transition time for the step change in material properties. A technique to split an EM pulse has been presented in this thesis. It has been shown that the pulses after splitting can be directed towards a specific direction. Furthermore, the pulses can be recombined together to form a single pulse. This thesis also presents a technique to combine multiple EM pulses. By using proper excitation at the source, the combined pulse can be of linearly polarized or circularly/elliptically polarized.
- *Keywords:* Spacetime Metamaterial, Temporal Metamaterial, Classical Electrodynamics.
- *DOI:* 10.5281/zenodo.12752168

Design of an Enhanced Efficiency Class-F 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

Exploration

Workshop

National Atmospheric Research Laboratory *March 10, 2024 - March 22, 2024*

Andhra Pradesh, India

- Radio Probing of the Atomosphere.
- Technical Skills: Radar, Weather Radar, Doppler Radar Techniques, VHF Antenna.

Summer Internship

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

West Bengal, India

- Design of an Enhanced Efficiency Class-F 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.

Courses

Large Signal Analysis: Configuration, Calibration, Measurement, Data Analysis, and Design

IEEE Microwave Theory & Technology Society *2025*

Online

- Certificate ID: 16102c37-896f-4250-861f-c16b5d798e80

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