Hrit Mukherjee

Résumé

*(A final year undergraduate and **circuit designing enthusiast** particularly interested in the **Hardware** implementation of our **Electronics industry**.)*

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Areas of Interest

Analog Circuit Design, EDA, Microelectronics, Digital Signal Processing, STA and VLSI Design, Microprocessors and Microcontrollers, Embedded Systems and IoT.

Work Experience

Summer Intern, Variable Energy Cyclotron Centre (VECC), Kolkata, India. May'19-July'19.	**Low Power High Resolution High Speed DAC design:** Worked as a summer intern under the ASIC team and successfully completed the design of a Low Power High Resolution High Speed Analog/Mixed Signal 9 bit DAC using 180 nm TSMC CMOS technology. The proposed DAC was designed following current steering architecture and consists of two separate DACs, a 6 bit fine and a 3 bit coarse, whose individual responses have been added up using a non-inverting opamp. **Software:** LT Spice and Cadence *Project_Report* (https://hrit-mukherjee.github.io/Project%20Report.pdf)
Undergraduate Researcher, IEEE Center for Excellence, Heritage Institute of Technology, Kolkata, India. October'19-March'20.	**Design and Analysis of Underlapped Dual Gate (U-DG) GaN HEMT devices in the light of Analog/RF and Power performances using 1µm fabrication technology:** **i)** Presented an analytical comparison of Analog characteristics of Schottky-HEMT and MOS-HEMT and thereby showing the improved efficiency in the latter one in case of High Frequency and High Power applications. **ii)** Conducted research on U-DG InAlGaN-GaN MOS-HEMTs and presented the enhancement in Analog/RF and power performances in the quaternary material device with respect to the conventional ternary AlGaN-GaN HEMTs. **Software:** TCAD Silvaco, Origin Maker 8. *Paper* (https://ieeexplore.ieee.org/document/9106420)
Undergraduate Researcher, Innovation, TEQIP PHASE-III. Feb'20 -Mar'20.	**Hurry-Cane: "See through my eyes!":** Designed an IoT based electronic stick which is aimed to provide artificial vision to the visually impaired people by facilitating in their safe and independent terrestrial locomotion by virtue of its applications. **Hardware:** Arduino UNO, Raspberry Pi3, sensors and actuators. **Software:** Android Studio. **IoT server:** Thinkspeak. *Project_Report*(https://drive.google.com/drive/folders/1sJDo82K-dhCX14Ydx0HB-ywRG_ljyrv6?usp=sharing)

Academic Background

2017 - present	**Jadavpur University**, Kolkata, India. Third Year, Bachelor of **Electronics and Telecommunication Engineering** (2017-2021). **CGPA:- 9.6** **Dept. Rank:- 4**
2017	**Higher Secondary Examination**, West Bengal Council of Higher Secondary Examination. **Nava Nalanda High School**, Kolkata, India. **Percentage: 96.40%** **State Rank: 8**
2015	**Madhyamik Examination**, West Bengal Board of Secondary Examination. **Nava Nalanda High School**, Kolkata, India. **Percentage: 94.00%** **Percentage (Science Group): 99.67%**

Skillset

1. Programming: C, C++, Python, Matlab.
2. Operating Systems: Windows, Linux.
3. Simulators: LT Spice, Circuit Maker, Xilinx, Vivado, Simulink, SEDA tools, TCAD Silvaco, Cadence Virtuoso.
4. Embedded System Platforms: Arduino UNO, RaspberryPi 3, FPGA.
5. Typesetting tools and version control: Latex, Git & Github.

Internships and Schools Attended

Research Intern, IIT Madras, India. April'20 – July'20.	Worked under the **Microelectronics and MEMS Laboratory Group**, **IIT Madras.** Project: designing an **analytical model** for **Surface Potential** and **Threshold Voltage** for small geometry MOSFETs, HEMTs and FinFETs. Mentor: Professor Dr. Amitava Dasgupta.
Summer Intern, Variable Energy Cyclotron Centre (VECC), Kolkata, India. May'18-July'18.	Worked under the **ASIC section, Computer and Informatics Group, VECC, Kolkata.** Project: designing a **Low Power High Resolution High Speed Digital to Analog Converter.** Mentor: Dr. Tanushyam Bhattacharjee.
Finalist, Arm of Achelous, Kshitij, IIT Kharagpur. December'17-January'18.	Member of **Team Highfliers, ETCE, Jadavpur University** Project: built a basic **hydraulic arm bot**. The locomotive part was electrically powered. The controller is wired and is basically a dpdt (double pole double throw) control.
Trainee, Remote Control Plane Workshop, IIT Kanpur. November'17.	Member of **Team Highfliers, ETCE, Jadavpur University** Project: designing a **high winger aircraft** following the given specifications. **Flight test was conducted successfully** at airstrip, IIT Kanpur. Mentor: Professor Dr. Shantanu Bhattacharya.

Projects

1. Hardware Implementation of Direction of Angle of Arrival (DoA) estimation and Node Localization algorithm for Smart Antenna in Wireless Sensor Networks
- *Final year project under the guidance of Prof. Dr. Mrinal Kanti Naskar, Dept. of ETCE, Jadavpur University* **(August'20-Present)**

2. Analytical Modeling of Surface Potential and Threshold Voltage for small geometry MOSFETs, HEMTs and FinFETs with non-uniformly doped channels
- *Research project under the guidance of Prof. Dr. Amitava Dasgupta, Dept. of EE, IIT Madras* **(April'20-July'20)**

3. Designing a low power high speed high resolution Bipolar DAC with output range normalized from -1 to +1
- *Research project under the guidance of Prof. Dr. Mrinal Kanti Naskar, Dept. of ETCE, Jadavpur University* **(October'19)**

4. Training a Medical Image Classifier to attain a High Level of Accuracy for proper diagnosis of Brain Cancer
-*Research project under the guidance of Dr. Amitava Mukherjee, Senior Researcher, Dept. of ETCE, Jadavpur University* **(January'19-April'19)**

Some of relevant course-works done

1. **Razavi Electronics 1** – by Behzad Razavi.
2. **Engineering Electronics II and Analog IC Design (Spring, 2019)** - by R. Jacob Baker, PhD, PE, University of Nevada, Las Vegas.
3. **Analog Circuits** and **IC Design –** by Dr. Nagendra Krishnapura, ECE, IIT Madras.
4. **Microprocessors and Microcontrollers, Embedded Systems,** Professor Bharat Acharya, University of Mumbai.
5. **Digital logic circuits** and **systems, Digital Signal Processing**, Professor Dr. Mrinal Kanti Naskar, Dept. of ETCE, JU.
6. **Hardware Modeling Using Verilog**, Professor Indranil Sengupta, Dept. of ECE, IIT Kharagpur.
7. **Introduction to IoT,** Professor Sudip Misra, Dept. of CSE, IIT Kharagpur.

Awards and Achievements

1. Secured 8th position in **Higher Secondary Examination**, 2017.
2. Ranked 202 in **WBJEE** (West Bengal Joint Entrance Examination), 2017.
3. Winner (multiple times), **DhrisTI** online contest (on analog and microcontrollers), organized by Texas Instruments.
4. 2nd Runner-up, **Electroniche**(a competitive event involving circuit solving and designing and simulating circuits based on given specifications), organized by Srijan'19 (tech-fest of Jadavpur University).
5. 2nd position, **Anveshan 2019-20: Student Research Convention (National Level)**, **Social Science** Category, for **Hurry-Cane** project.
6. 2nd position, **Papier**(a competitive event involving practical embedded systems model building and demonstration), organized by Convolution'2k20 (tech-fest of Jadavpur University Electrical Engineering Department), for **Hurry-Cane** Project.

Responsibilities Holding / Held

1. IEEE EDS *Student Member, Kolkata Section*
- Member of the Management team of Jadavpur University Student Branch of IEEE, Kolkata Section.
- Worked under an active project, "*tete-a-tete* with IEEE".

2. Jadavpur University Code Club and **Jadavpur University Science Club –** Co-ordinator.

3. Fantasy for Innovation (Srijan-Technological fest of Jadavpur University) – Executive Committee Member.

Referees

- **Dr. Mrinal Kanti Naskar –** Professor
  Department of E.T.C.E., Jadavpur University
  Email: mrinaletce@gmail.com
- **Dr. Tanushyam Bhattacharjee –** Scientific Officer
  Head, ASIC Design Section, VECC, Kolkata
  Email: btanu@vecc.gov.in