Curriculum Vitae

DOB : 24/10/1999

Personal Information

Amartyaraj Kumar
BS-MS
Department of Electrical Engineering & Computer Science
Indian Institute of Science Education & Research (IISER)
Bhopal, Madhya Pradesh, India
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Education

Indian Institute of Science Education & Research, Bhopal *2019 - 2024*
BS-MS. CPI/CGPA : 9.04/10
Department of Electrical Engineering & Computer Science (EECS)

Burdwan Municipal High School *2016-2018*
Higher Secondary Education, WBCHSE Overall Score : 90.4/100
English, Mathematics, Physics, Chemistry, Biology, Bengali

Mahesh Sri Ramkrishna Ashram Vidyalaya - H.S. *2010-2016*
Secondary Education Overall Score : 93.57/100
WBBSE

Research Interests

Photodetectors, Semiconductor-metal-electrolyte junction physics, Photoelectric physics, Solar Cells, Self-powered photoelectrochemical photosensors, Optoelectronics, Renewable energy, Energy harvesting modules (electromagnetic and piezoelectric), MEMS & NEMS technology, Smart Sensors (using capacitor, mechanical devices, Piezoelectric composition, MOSFET etc).

Research Experiences

Master's Thesis

July 2023 - May 2024
Supervisor : *Dr. Mitradip Bhattacharjee* Bhopal, India
`i-Lab`
Indian Institute of Science Education & Research, Bhopal

Title : *"Self-Powered Cu_2O(CuO) Composite Based Vis-NIR Photodetector"*

In this work, a Schottky junction-based Cu/NaCl (W)/Cu_2O(CuO) photodetector is explored as a probe-like device in photoelectrochemical applications while using NaCl-water electrolytic polar solution in its assist.

Research Internship

May 2023 - July 2023
Supervisor : *Dr. Kuntal Roy* Bhopal, India
`Quantum NanoDevice Lab (QNDL)`
Indian Institute of Science Education & Research, Bhopal

Topic : *Characterization of photodiodes and ellipsometric analysis of spin-coated polymer on silicon wafers*

In this work, a commercial photodiode was characterized under light to study its ideality factor of recombination. In the second part, the resistivity of small silicon wafers (cleaned following the

laboratory standard cleaning method) is measured using the four-probe method. Those small wafers are then coated with PMMA at different rotation speeds of a spin coater and then studied under an ellipsometer for the thickness of that layer.

Bachelor's Thesis

January 2023 - May 2023

Supervisor : *Dr. Santanu Talukder*

Bhopal, India

`Sixth Sense Lab`

Indian Institute of Science Education & Research, Bhopal

Title : *"MEMS-Based Piezoelectric Ambient Vibration Energy Harvester"*

In this work, applications of MEMS technology has been studied through COMSOL simulations to develop energy-harvesting devices with high efficiency, low cost, and small form factors.

Undergrad Projects

- MEMS-based micromirror system for deployment in optical beam steering systems used in Quantum Information Processing using COMSOL, 2022, link.
- ATM Machine Modelling Using VeriLog HDL, 2022, link.
- Stuttering Event Detection from Podcasts with People Who Stutter using Machine Learning, 2022, link.
- Human Activity Recognition Using Smartphone Sensor Data, 2022, link.

Patents

Mitradip Bhattacharjee, Ariba Siddiqui, Subham Das, **Amartyaraj Kumar**, *"A MULTI-ORGAN THERANOSTIC BODY WEARABLE DEVICE"*, (Indian Patent Appl. under processing) 2023.

Mitradip Bhattacharjee, **Amartyaraj Kumar** and Shivank Sahu, *"A SELF-POWERED UV- NIR PHOTODETECTOR PROBE"*, (Indian Patent Appl. under processing) 2024.

Laboratory Skills

- Basic R-L-C combination, Breadboard, DC supply box, Multimeter, Vacuum desiccation.
- Digital Multimeter (DMM6500 6½ digit), Sourcemeter (SMU 2450), Vector Network Analyzer (VNA) basics.
- Function Generator, Mixed-signal Oscilloscope, Digital Oscilloscope and their signal analysis (different OP-Amp, ultrasonic sensor studies).
- In-hand experience of using ICs like XOR (74LS86), AND (74LS08), OR (74LS32), NMOS (IRFZ44N), PMOS (IRFZ9540) and different amplifiers.
- Basic Arduino-uno, Raspberry Pi, ESP-32, ESP-8266, and Seeeduino and their applications with temperature sensor (LM35), pressure sensors and humidity sensors (DHT11, DHT22).
- Ellipsometry (J.A. Wollam), Spin-coating (Holmarc HO-TH-05), SLA 3D printing basics (Form-Labs 3B+).

Technical Skills

- **Scientific Software :** OriginPro, COMSOL, LTSpice, EDA playground (Verilog HDL), FreeCAD, SolidWorks, LabVIEW for instrument (like Digital multimeter, Programmable power supply, Oscilloscope, etc) automation, Arduino IDE
- **Programming language :** C (basic), Python (Pandas, NumPy, Scikit-Learn, matplotlib, seaborn, etc), MATLAB (functions & live-script), LaTeX.
- **Operating system :** Windows, Ubuntu (Linux).
- **Office Software :** Microsoft Office, Open Office.

Relevant Courses

Basic Electronics, Electronic Devices, Analog and Digital electronics, Signals & Systems, Communication Systems, Electromagnetic Theory, Introduction to MEMS, Smart Sensing Technologies, Nanoelectronics, MOS Device Modelling.

Academic Achievements

- Qualified GATE (Graduate Aptitude Test in Engineering), 2023.
- Qualified JEE (Join Entrance Examination), 2019, top 2.5 % percentile.
- Qualified WBJEE (West Bengal Join Entrance Examination), 2019, Rank - 699.
- Qualified IAT (IISER Aptitude Test), 2019.
- Prayas Science Talent Examination (Medha Anwesha), West Bengal, 2015, Standard - IX, State Rank - 1.
- Akhil Bhartiya Sanskriti Gyan Pariksha, West Bengal, 2011, 2013, District Rank - 3 (on both occasions).

Language Proficiency

English, Bangla, Hindi.

Extracurricular Activities

- Sports (Participated in Football Tournaments in all School level standards and college standards, captaining the team one time)
- Playing Tabla Badya (Completed Distinction upto 3^{rd} Year in Bangiya Sangeet Parishad)

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Referees

Dr. Mitradip Bhattacharjee, ✉ mitradip@iiserb.ac.in
Asst. Professor, Department of EECS, IISER Bhopal, India