

Curriculum Vitae

PERSONAL INFORMATION

Amartyaraj Kumar

DOB: 24/10/1999

Place of Birth: Bardhaman, West Bengal, India

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RESEARCH INTERESTS

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

RELEVANT COURSES

Electronic Devices, Analog and Digital Electronics, Electromagnetic Theory, Introduction to MEMS, Smart Sensing Technologies, Nanoelectronics, Spintronics (audit), MOS Device Modelling.

EDUCATION

Indian Institute of Science Education & Research, Bhopal

BS-MS. (🏆 Proficiency Medal)

Department of Electrical Engineering & Computer Science (EECS)

2019 - 2024

CPI/CGPA : 9.04/10

Burdwan Municipal High School

Higher Secondary Education, WBCHSE

English, Mathematics, Physics, Chemistry, Biology, Bengali

2016-2018

Overall Score : 90.4/100

Mahesh Sri Ramkrishna Ashram Vidyalaya - H.S.

Secondary Education

WBBSE

2010-2016

Overall Score : 93.57/100

RESEARCH EXPERIENCES

Master's Thesis

Supervisor : *Dr. Mitradip Bhattacharjee*

i-Lab

Indian Institute of Science Education & Research, Bhopal

July 2023 - May 2024

Bhopal, India

Title : *"Self-Powered $\text{Cu}_2\text{O}(\text{CuO})$ Composite Based Vis-NIR Photodetector"*

In this work, a Schottky junction-based $\text{Cu}/\text{NaCl (W)}/\text{Cu}_2\text{O}(\text{CuO})$ photodetector is explored as a probe-like device in photoelectrochemical applications while using NaCl -water electrolytic polar solution in its assist.

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Research Internship

Supervisor : *Dr. Kuntal Roy*

Quantum NanoDevice Lab (QNDL)

Indian Institute of Science Education & Research, Bhopal

May 2023 - July 2023

Bhopal, India

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

This work characterizes a commercial photodiode for its recombination ideality factor, measures the resistivity of silicon wafers via the four-probe method, and analyzes PMMA coating thickness on

wafers prepared at varying spin-coating speeds using ellipsometry.

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 have been studied through COMSOL simulations to develop comb-like energy-harvesting devices for ambient vehicle vibrations.

PUBLICATIONS "Ultrafast Self-Powered Copper Oxide Composite-Based Vis-NIR Photodetector Probe", **Amartyaraj Kumar**, Shivank Sahu, and Mitradiip Bhattacharjee, *ACS Applied Electronic Materials* **2024** 6 (9), 6457-6465, DOI : 10.1021/acsaelm.4c00940

PATENTS "A MULTI-ORGAN THERANOSTIC BODY WEARABLE DEVICE", Mitradiip Bhattacharjee, Ariba Siddiqui, Subham Das, **Amartyaraj Kumar**, IN Patent Appl. 202421006385, 2024/2.

"A SELF-POWERED UV- NIR PHOTODETECTOR PROBE", Mitradiip Bhattacharjee, **Amartyaraj Kumar** and Shivank Sahu, IN Patent Appl. 202421055636, 2024/7.

LABORATORY SKILLS

- **Instruments** : Digital Multimeter (DMM6500 6¹/₂ digit), Sourcemeter (SMU 2450), Vector Network Analyzer (VNA) basics, Function Generator, Mixed-signal Oscilloscope, Digital Oscilloscope, Ellipsometry (J.A. Wollam), Spin-coating (Holmarc HO-TH-05), SLA 3D printing basics (FormLabs 3B+).
- **IoT** : Arduino-uno, Raspberry Pi, ESP-32, ESP-8266, and their real-time monitoring applications with temperature sensor (LM35), pressure sensors and humidity sensors (DHT11, DHT22).

TECHNICAL SKILLS

- **Scientific Software** : COMSOL, QuantumATK, LTSpice, HighScore Plus, OriginPro, EDA playground (Verilog HDL), FreeCAD, SolidWorks, LabVIEW for instrument automation, Arduino IDE,
- **Programming language** : MATLAB (functions & live-script), Python (Pandas, NumPy, SciPy, Scikit-Learn, Streamlit, etc), HTML, CSS, L^AT_EX.

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 Bangla, English, Hindi.

REFEREES

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IISER Bhopal, India

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