

SOORAJ NHALLOOR

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RESEARCH EXPERIENCE

Investigation of Optical and Electrical Properties of Graphene Field Effect Transistor for The Application of Radiation Detection. 2022 - 2023

Master's Thesis

In this study, I have conducted comprehensive simulations to evaluate Graphene Field Effect transistors (GFETs) as radiation detectors. Using COMSOL Multiphysics and Lumerical suit the performance of GFET in detecting radiation-induced electron-hole pairs are simulated and assessed for their potential for enhanced radiation detection capabilities.

Supervisor: Dr. Sheo Kumar Mishra, Indira Gandhi National Tribal University (IGNTU), India

Circuit Design and Analysis of Precision Rectifier: Characteristics and Applications 2021

Bachelor's final year project

In this project I have constructed multiple precision rectifiers using Op-amp circuits and their characteristics are studied using an oscilloscope.

Supervisor: Mr. Muhammed Rafi, Majlis Arts and Science College, India

WORK EXPERIENCE

Subject Matter Expert Feb 2024

Schoolhouse.world(Khan Academy)

Providing expert guidance to students seeking help with physics concepts on Schoolhouse.world online platform.

TECHNICAL SKILLS

- Expertise in programming using **C, C++, Dart and Python.**
- Experience in graph plotting and data analysis using **Origin Pro.**
- Hands-on expertise with **Arduino Series, Raspberry Pi/Pico, ESP series, and PIC/AVR Micro controllers.**
- Extensively used **COMSOL Multiphysics, Lumerical and Quantum Espresso** for characterization and ab initio DFT simulations.
- Proficient in **Linux Command line .**
- Soft skills including **MS Office, Git, KiCad, SolidWorks and Flutter.**
- Basic experience in using **UV-Vis spectroscopy** for material characterization.
- Basic experience in using **Spin coating and Ultrasonication** for sample preparation.
- Experience in **3D printing** using PLA and ABS.
- Proficient in scientific writing using **L^AT_EX.**

EDUCATION

Master of Science in Physics

Indira Gandhi National Tribal University (IGNTU), Madhya Pradesh, India

CGPA: 8.35/10.00

2021-2023

Bachelor of Science in Physics

Majlis Arts and Science College, University of Calicut, Kerala, India

CGPA: 4.14/6.00

2018-2021

Higher Secondary Education¹

Board of Secondary Education, Kerala, India

87.25%

2016-2018

RELEVANT COURSEWORK

- Material Science - Physics of materials and Physics of nanosystems
- Quantum Mechanics & Condensed matter physics
- Advanced Simulations

CERTIFIED COURSES

Certificate Course in Unicode

· *Majlis arts and Science College, Kerala*

Dec 2021

Certificate Course in PCB Architecture and Design

· *CISCO and NASSCOM foundation*

Sep 2020

Certificate Course in Computer Operation

· *G-Tec Computer Education, Kerala*

Jul 2012

· Windows, Word, Excel & PowerPoint

EDUCATIONAL OUTREACH

Photoelectric Effect

· *A talk based on Calicut university curriculum under Majlis e-Content Development Centre.*

Sep 2020

WORKSHOPS AND SEMINARS ATTENDED

Workshop on VLSI Design Using Verilog HDL

organized by Maven Silicon in collaboration with ASAP Kerala.

Feb 2024

Workshop on Research Facility Training Program

organized by Department of Mathematics, IGNTU, India.

Feb 2023

Workshop on Concepts and Applications of Computational Intelligence Techniques(CACIT - 2023)

organized by Department of Mathematics, IGNTU, India.

Feb 2023

Workshop on Multidisciplinary Approach to Understand the Mysteries of our Universe

organized by the Department of Physics and Astronomy, NIT Rourkela, India.

Jul 2023

Workshop on Introduction to Astronomy (Intro2Astro 2022)

organized by Intro2Astro.

Jun 2022

¹Stream: Physics, Chemistry, Mathematics, Biology

OTHER ACTIVITIES AND SKILLS

- Provided tutoring support to students in Physics on the **Khan Academy Schoolhouse.world²** platform.
- Worked as a member of Additional Skill Acquisition Program (**ASAP³**)
- Mentored final year students in **STEM research projects**. Assisted students in troubleshooting technical challenges and conducting experiments. Reviewed project documentation, including reports and presentations, to ensure quality and adherence to academic standards.
- Conducted **independent research** in the development of sensors and IoT in agriculture automation, Design and Development of prototype based on the settings.
- Developed **android applications and physics based simulations**.
- Proficiency in building, testing, and debugging circuits.
- Strong writing and communication skills in English.

PERSONAL PROJECTS

Automation in Aquaponics:- Implemented automation techniques in aquaponics, optimizing control of water pH, filtration, sunlight estimation, and water filtering, enhancing efficiency and productivity.

Diffusion Cloud chamber:- Constructed a diffusion cloud chamber using Peltier modules, CPU ATX power supply, and water cooling system to observe particle tracks.

Kelpie IoT :- An IoT project utilizing Flutter, Firebase, and ESP8266, enabling remote control of farm motors, valves, and more via a smartphone from anywhere globally, enhancing farm automation.

3D printed Robotic Arm:- Engineered a 3D printed robotic arm vehicle for waste picking from water bodies, using Arduino and DTMF technology.

Mushroom Cultivation System:- Developed an advanced mushroom cultivation system integrating various biosensors to monitor crucial environmental parameters such as humidity, temperature, and CO₂ levels, optimizing growth conditions for enhanced yield and quality assurance.

Automatic Railway Gate:- Designed and developed a functional prototype of an automatic railway gate system utilizing RFID technology, ensuring seamless operation and enhanced safety by automatically detecting and responding to approaching trains, contributing to the prevention of accidents at railway crossings.

REFERENCES

Dr. Aalok Pandya
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Dr. Sheo Kumar Mishra
Associate Professor
Department of Physics
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²An online platform providing educational resources and virtual classrooms.

³A Government of Kerala entity, enhances student employability and facilitates placements.