

SUBHAM DAS

Purdue University, West Lafayette, Indiana, USA, 47907

✉ subham.ds@gmail.com

in <https://www.linkedin.com/subham>

github.com/subham23

Education

Purdue University, West Lafayette

Jan. 2024 – Ongoing

PhD Scholar, School of Mechanical Engineering

Indiana, USA

- CPI: **3.65** (on a 4-point scale)

Indian Institute of Science Education and Research (IISER) Bhopal

Aug. 2018 – Jun. 2023

BS-MS in Electrical Engineering and Computer Science, Minor in Biological Sciences

Madhya Pradesh, India

- CPI: **9.46** (on a 10-point scale) **Rank 2/50** ([Transcript](#))

Our Own English High School, Sharjah, Boy's Branch

2018

AISSE-CBSE CLASS 12

Sharjah, UAE

- Percentage: **96.2%** (Science Stream) **School Rank 2/70 (Top 1% in UAE)**

Work and Research Experience

Graduate Research Assistant at MVL Lab, Purdue University

January 2024 – Ongoing

Purdue University | Eli Lilly and Company Collaboration

Indiana, USA

- Performing Atomic Force Microscopy (AFM) characterization of nanoparticles.

Junior Research Fellow at i-Lab, IISER Bhopal

May 2023 – November 2023

Research Associate

Bhopal, India

- Fabrication and characterization of flexible sensors for multimodal sensing such as pressure, electrochemical, and ultrasonic for assistive healthcare technologies. Also, implementing deep learning algorithms for larger system intelligence.

Intern at Intisen Pvt. Ltd

August 2022 – November 2023

Product Design and Development

Bhopal, India

- Design and development of flexible sensors for assistive healthcare. Primarily my research work focussed on designing flexible sensor components in simulation and prototyping, readout circuit development, signal processing algorithms, and sensor packaging. Till date we have developed a flexible health band, e-health phone applications, packaging of a smart mask device, and others, and filed patents for the same.

Polymer-based Flexible Sensors for Tactile Sensing - Master's Thesis

August 2022 – April 2023

Supervised by Dr.Mitradip Bhattacharjee (Dept. of EECS)

IISER, Bhopal, India

- Developed a coupled pressure-temperature sensor setup that is capable for identifying the terrain it is placed on by analyzing the pressure profile and radiated heat of the surface. It is also capable of detecting nature of surface and can withstand high pressure.

Wearable Printed Sensors for Monitoring Patient Health

May 2022 – August 2022

Supervised by Dr.George Knopf (Dept. of Mechanical and Materials Engineering)

University of Western Ontario, Canada

- Developed a multi-purpose printable electronic sensor circuit for a variety of wireless devices that can monitor patient health. Fabricated the prerequisite, chipless readout system, with RFID frequency (13.56 MHz) and the components being purely RLC based. The system is such that any sensor can be replaced into the circuit and a reading obtained.

Developing a Database of Synthetic Logic Gates using NLP and ML

May 2021 – December 2021

Supervised by Dr.Areejit Samal (Dept. of Computational Biology)

IMSc, Chennai, India

- A database with compiled information regarding all synthetic logic gates discovered to date. The data was analysed using NLTK to give a suitable PUBMED search query and a sum total of 750+ logic gates were documented.

Phone Application For Health Monitoring - Bachelor's Thesis

June 2021 – April 2022

Supervised by Dr.Mitradip Bhattacharjee (Dept. of EECS)

IISER, Bhopal, India

- Developed an application that can provides data for four diagnostics (heart rate, oxygen level, blood pressure, and temperature) and predicts two diseases (arrhythmia and anemia). This is done using image processing techniques and a custom designed PCB.

Projects

Stamp embedded and mask embedded microfluidic device design | *Solidworks, 3D printing*

January 2023

Polymer-based flexible ultrasonic band for diagnostics | *COMSOL, Arduino*

August 2022

Detection of Parkinson's Disease | *ML and Deep Learning*

April 2021

Thermal and Pressure Sensor PCB Design | *Altium*

December 2021

Technical Skills

Coding Languages: Python, C, HTML/CSS, MATLAB, R

Simulation Tools: COMSOL, Simulink, Ansys-HFSS

Modeling & Electronics : Blender, Solidworks, Arduino, ADS, NI Multisim, Altium Designer, Proteus 8

Electrical : Filter Circuit Design, Analysis of MOSFET Characteristics, Designing Amplifier Circuits Using OP-AMPS

Experimental : Electrochemical (CV) and Electrical Impedance Spectroscopy (EIS), Synthesis of polymer based sensors, Electrospinning, Spin coating, SLA and FDM 3D printing

Others : Adobe Premiere Pro, Adobe After Effects, LaTeX

Languages : English (IELTS 7.5 | W=7.5, R=8, L=7.5, S=7), Hindi (fluent), Odiya (fluent), French (basic), Arabic (basic)

Awards / Co-Curricular Activities

Reviewer for IEEE Sensors Letters 2024

Reviewer for IEEE Applied Sensing Conference (APSCON) 2022 & 2023

Teaching Assistant 2023

- ECS413/613 Smart Sensing Technologies

MITACS Globalink Research Internship 2022

- Selected for MITACS summer internship 2022, a training opportunity to perform research in Canadian universities

Indian Academy of Science Summer Research Fellow 2021

- Selected for IAS SRF 2021, a programme which supplements research activities that occur during the academic year.

Vijyoshi - National Science Camp 2018

- Took part in the National Science Camp organized by KVPY-IISc and Inspire at IISER Bhopal campus.

19th SOF National Science Olympiad 2017

- Zonal Rank '2' in 19th SOF National Science Olympiad – was awarded a Silver Medal.

Secretary of Cultural Council IISER Bhopal 2020 – 2021

REFERENCES

Dr. Ryan Wagner: Research Assistant Professor, School of Mechanical Engineering, Purdue University (WL), IN, USA

Dr. Mitradip Bhattacharjee: Asst. Professor, Dept. Electrical Engineering and Computer Science, IISER Bhopal, India

Prof. Sarath Kodagoda: Professor, UTS Robotics Institute, Sydney, Australia

Dr. Karthick Thiyagarajan: Asst. Professor, UTS Robotics Institute, Sydney, Australia

Prof. George K. Knopf: Professor, Dept. Mechanical and Materials Engineering, University of Western Ontario, Canada

Dr. Areejit Samal: Professor, Dept. Computational Biology, IMSc Chennai, India

Patent(s)

1. Mitradip Bhattacharjee, **Subham Das**, "A detection system based on colorimetric analysis", (Indian Patent Appl. under processing) 2024.
2. Mitradip Bhattacharjee, Chirantan Das, **Subham Das**, Vibhas Chugh, "Substrateless device", (Indian Patent Appl. under processing) 2024.
3. Mitradip Bhattacharjee, **Subham Das**, Athul Krishnan "Multi-sensor monitoring system", (Indian Patent Appl. under processing) 2024.
4. Mitradip Bhattacharjee, **Subham Das**, Lakhvir Singh "Micro/nanostructured flexible multilayered sensors", (Indian Patent Appl. under processing) 2024.
5. Abhijit Patra, Mitradip Bhattacharjee, Tapas Kumar Dutta, **Subham Das**, "A smart electronic safety system", (Indian Patent Appl. under processing) 2024.
6. Abhijit Patra, Mitradip Bhattacharjee, Madhurima Sarkar, Athul Krishnan, **Subham Das**, "A self-sustainable photoelectric converter for electrochromic system", (Indian Patent Appl. under processing) 2024.
7. Mitradip Bhattacharjee, Ariba Siddiqui, **Subham Das**, Amartyaraj Kumar "A multi-organ theranostic body wearable device", (Indian Patent Appl. under processing) 2023.
8. Mitradip Bhattacharjee, **Subham Das**, "Image sensing assisted health monitoring system and method thereof", (Indian Patent Appl. under processing) 2023.

Journal Article(s)

1. **Subham Das**, Mitradip Bhattacharjee, "Image-based Sensing of Leukonychia for Early Diagnosis of Anemia using a Smartphone Application", IEEE Sensors Letters (doi:10.1109/LSENS.2022.3217010)
2. **Subham Das**<#>, Athul Krishnan<#>, Mitradip Bhattacharjee, "Flexible Piezoresistive Pressure and Temperature Sensor Module for Continuous Monitoring of Cardiac Health", IEEE Journal on Flexible Electronics (doi:10.1109/JFLEX.2023.3243877)(<#> Equal contribution)
3. Ariba Siddiqui, **Subham Das**, Mitradip Bhattacharjee, "Acoustic Sensing Response in Human Tissues for Theranostics and Implants", IEEE Sensors Letters (doi:10.1109/LSENS.2023.3251991)
4. **Subham Das**, Mitradip Bhattacharjee, Karthick Thiyagarajan, Sarath Kodagoda, "Conformable Packaging of a Pressure Sensor for Tactile Perception", IoP Flexible and Printed Electronics (doi:10.1088/2058-8585/aced15)
5. **Subham Das**<#>, Vibhas Chugh<#>, Chirantan Das, Mitradip Bhattacharjee, "Non-enzymatic Glucose Sensing Employing a Patterned Substrate Miniaturized Device-on-Mask", IEEE Sensors Letters (doi:10.1109/LSENS.2023.3307089)(<#> Equal contribution)
6. **Subham Das** and Mitradip Bhattacharjee, "Nonlinear Response Analysis of a Polymer-based Piezoresistive Flexible Tactile Sensor at Low-Pressure", IEEE Sensors Letters (doi:10.1109/LSENS.2023.3320986)
7. Chirantan Das, **Subham Das**, Vibhas Chugh, Mitradip Bhattacharjee, "Smart 3D Printed Design Assisted Multi-layered GO - modified Polymer Glucose Sensor", Wiley Advanced Engineering Materials (doi:10.1002/adem.202301067)
8. Tapas Kumar Dutta, **Subham Das**, Madhurima Sarkar, Mitradip Bhattacharjee, Abhijit Patra, "Multistate Electrochromic Covalent Organic Framework Film for Electronic Safety Indicator", ACS Chemistry of Materials (doi:10.1021/acs.chemmater.4c00399)
9. Ariba Siddiqui, **Subham Das**, Mitradip Bhattacharjee, "Nanofillers Embedded Flexible Piezoelectric Polymer Sensor Pad for Robotic and Human Finger Tap Analysis", Sensors and Actuators A: Physical (doi:10.1016/j.sna.2024.115503)
10. **Subham Das**, Mitradip Bhattacharjee, Karthick Thiyagarajan, Sarath Kodagoda, "Skin-inspired Multimodal Tactile Sensing with Multilayer Perceptron Network for Terrain Recognition", (Submitted - npj Robotics)
11. **Subham Das**, Arti Shrivastava, Payal Soni, Anil Kumar Gupta, Sarman Singh, Mitradip Bhattacharjee, "Image Sensing for Quantitative Analysis of Tuberculosis Biomarkers Using Rapid Diagnostic Test Kit", (Submitted - IEEE Sensors Journal)

Conference Publication(s)

1. Ariba Siddiqui, **Subham Das**, Mitradip Bhattacharjee, "Acoustic Power Distribution Analysis in Different Human Tissues for Bioimplant Application", IEEE International Students' Conference on Electrical, Electronics and Computer Sciences (SCEECS), Bhopal, India, February 2023
(doi:10.1109/SCEECS57921.2023.10062978) - Oral Presentation.
2. **Subham Das**[#], Vibhas Chugh[#], Chirantan Das, Mitradip Bhattacharjee, "Non-enzymatic Glucose Sensing Employing a Patterned Substrate Miniaturized Device-on-Mask", IEEE Sensors Conference, Vienna, Austria, October 2023 - Oral Presentation