K. M. Sifat

B.Sc. in Biomedical Engineering

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Professional Summary:

Biomedical Engineer with extensive experience in healthcare-oriented research, AI-driven system development, and sustainable product and workflow design. Demonstrated expertise in applying Artificial Intelligence, Machine Learning, and Natural Language Processing to healthcare applications, supported by hands-on experience in 3D modeling, PCB design, and web-based application development. Successfully completed 20+ technical projects and contributed to 10+ innovation, startup, and business model development competitions, earning multiple awards for technical excellence and analytical problem-solving. Proven strengths in research execution, project management, technical leadership, mentoring, and cross-functional collaboration. Highly motivated to pursue advanced academic research and contribute to research institutions, startups, and corporate environments by delivering scalable, data-driven, and innovation-focused solutions.

Education:

Bachelor of Science in Biomedical Engineering

Khulna University of Engineering & Technology, Khulna, Bangladesh. 2025

> Result: CGPA 3.38 out of 4.00

> Thesis Title: Breast Tumor Imaging Using Different Microstrip Patch Antenna Configurations & Detecting Tumor Growth from the Reconstructed Images using Deep learning Based Estimation Algorithm

> Major Subjects: Biomedical Image & Signal Processing, Biostatistics, Biomedical Instrumentation, Biosensor, Bio-photonics, Bioelectricity, Biomechanics, Hospital Management, Economy, Engineering Mathematics.

Higher School Certificate (HSC) 2019

Birshreshtha Noor Mohammad Public College, Dhaka Board

> Group: Science
> Result: GPA 5.00 out of 5.00
> I was an active member in Science and Math club of my college. I represented my institution in 2 Physics Olympiad, 1 Chemistry Olympiad, 3 inter-college science Olympiads.

Higher School Certificate (HSC) 2017

Birshreshtha Noor Mohammad Public College, Dhaka Board

> Group: Science
> Result: GPA 5.00 out of 5.00
> Academic Excellence: Awarded general scholarship with an aggregate of 94% in SSC exam.
> Extracurricular Engagement: Dedicated member of School Science Club.

SKILLS:

Professional Skill: Project Management, Cross-Functional Collaboration, Strategic Leadership, Technical Communication, Event Management & Logistics.

Technical Skill: Programming Language: C++, Python, MATLAB, FastAPI, Flask; Simulation: COMSOL, Simulink, Material Studio, CST Microwave Suit, Proteus, Multisim; Signal Processing: Medical Image Analysis,

EEG/ECG Signal Analysis, Machine Learning, Natural Language Processing; Database: MongoDB, SQL; Statistical Analysis: Stata. 3D Design: Blender, SolidWorks; Editing Tool: Adobe Premier Pro, Canva, Capcut.

MS Office Skill: MS Word, MS PowerPoint, MS Excel, MS Access, Google Sheet, Google Spread Sheet, Appscript

Business Skill: Financial Analysis, Market Prediction, Market sentiment analysis, Negotiation

Language Skill: Full Professional Proficiency in English and Bengali

Work Experience:

Dinning Management & Monitor (non-paid),
September'2025 - October' 2025

DR. M A Rashid Hall, KUET.

Directed dining operations for 500+ residents, overseeing supply chain logistics, staff supervision, and hygiene compliance. Served as the financial liaison to the Hall Provost. Successfully executed a 3.8 Lakh BDT procurement project for operational assets at just 3 Lakh BDT through strategic vendor negotiation, while managing daily food sourcing of ~20,000 BDT and coordinating monthly feasts.

Teaching & Mentoring (paid),
August' 2019 – Present

Organizational & Individual

Mentored 20+ students in Physics, Chemistry, and Math, focusing on conceptual clarity, applied problem-solving, and strategic career guidance. Collaborated with 6 coaching institutions, delivering teaching while actively contributing to business development and student acquisition strategies.

Research Interest:

- Medical Image Processing
- Biomedical Signal Processing
- AI in Healthcare
- Biosensor
- BioMEMS
- Bioinformatics
- Bio-Photonics
- Biomedical Device & Instrumentation
- Microwave application in Biomedical
- Biostatistics
- Brain Computer Interface
- Bio-nanomaterials

Publication:

Conference Paper

1   **Title: Dia-Tracker: A Multimodal Diabetes Assistance Device**
IEEE QPAIN 2025, Bangladesh.

Published in: IEEE Explore (29 September 2025)

DOI: 10.1109/QPAIN66474.2025.11172255

Projects:

Machine Learning

1   **Title: Pediatric Left Ventricle Segmentation (2024)**
[Project Link]

Developed an automated pipeline for Left Ventricle segmentation and Ejection Fraction estimation using the EchoNet-Pediatric Dataset. Implemented the DeepLabV3+ architecture, achieving high-precision segmentation with an Intersection over Union (IoU) of 0.89 (Train) and 0.84 (Test).

2   Title: Seizure Prediction Using ViT Model (2025)   [Project Link]

Applied Vision Transformers (ViT) on Scalogram-converted EEG data (CHB-MIT) for seizure prediction, securing 98% validation accuracy.

3   Title: Financial Statement Analysis (2026)   [Project Link]

Developed a Financial Sentiment Analysis system utilizing the FiQA and Financial PhraseBank datasets. Fine-tuned the FinBERT architecture (a domain-specific BERT model) to classify financial text into tri-polar sentiments (Positive, Negative, Neutral), achieving an overall accuracy of 81%.

Explore my portfolio for a wider range of Machine Learning projects [My Portfolio]

Website Project

1   Title: Telemedicine App (2024)   Project Link

Engineered a comprehensive Telemedicine Web Application using Flask, HTML, CSS, and JavaScript. The platform facilitates seamless virtual consultations via real-time video conferencing and instant messaging. Features include a secure digital prescription system and an interactive patient dashboard that visualizes physician availability, streamlining the appointment scheduling process.

2   Title: Batch Intro: Introduction of my classmates of BME19, KUET. (2020)   [Live Link]

Designed and deployed a Static Web Portal to GitHub as a centralized digital   [Project link]
directory for the BME-19, KUET batch. The platform features detailed student profiles and includes a dedicated Academic Resource Repository, providing curated learning materials and file archives to facilitate knowledge transfer to junior students.

3   Title: Weba: Turn Any Website into a Conversation (2026)   [Live Link]

Developed a RAG-based (Retrieval-Augmented Generation) Web Assistant   [Project Link]
capable of transforming static URLs into interactive conversational interfaces. The pipeline leverages Groq's Llama-3.3-70b for ultra-low latency inference and HuggingFace's all-MiniLM-L6-v2 for dense vector embeddings. Built with Streamlit, the application ingests user-provided links, indexes content, and enables real-time, context-aware Q&A.

4   Title: AI Drug Discovery for Lung Cancer WebApp (2026)   [Live Link]

Built a machine learning pipeline to identify potential EGFR inhibitors using   [Project Link]
Python. Processed bioactivity data from ChEMBL and generated molecular descriptors (Lipinski's Rule) using RDKit. Trained a Random Forest model to classify molecules as Active/Inactive and deployed the solution as a Streamlit web app for instant prediction and reporting.

Explore my portfolio for a wider range of my website projects [My Portfolio]

Instrumentation Project

1   Title: Blood Back Flow Prevention (2023)   [Project Report]

Engineered an Automated IV Backflow Prevention System to enhance patient safety during intravenous therapy. The device utilizes a Load Cell interfaced with an Arduino UNO to continuously monitor fluid depletion. Upon reaching a critical weight threshold, the system triggers a relay-driven solenoid valve to instantly shut off the pipeline. Integrated HC-06 Bluetooth telemetry for remote mobile app control and an LCD module for real-time bedside monitoring.

2   Title: Remote Transcutaneous Nerve Stimulator (TENS) (2023)   [Project Report]

Designed and engineered a Smart TENS (Transcutaneous Electrical Nerve Stimulation) device for therapeutic pain relief and muscle stimulation. The circuit utilizes a 555 Timer for precision frequency oscillation, driving a step-

up transformer to deliver controlled high-voltage pulses (~84V). A key innovation includes an HC-05 Bluetooth interface, enabling remote telemetry and patient-controlled intensity adjustment via a mobile app, alongside a local LCD for real-time safety monitoring.

3 Title: AirBender: Air Quality Monitor (2022)

[Image]

Engineered a novel, cost-effective gas sensing platform featuring a universal "Plug-and-Play" interface. This architecture allows users to instantly swap sensor modules (e.g., from LPG to Dust Sensors) without replacing the core unit. Designed a custom enclosure using SolidWorks and integrated Arduino with HC-05 Bluetooth for real-time remote telemetry. Recognized with 1st Prize in two separate engineering competitions.

Explore my portfolio for a wider range of my instrumentation projects [My Portfolio]

PCB Design Project

1 Title: Dust & Pollution Detection Using OP-AMP (2021)

[Project File]

Engineered an Optical Dust Detection System based on the principle of light scattering (LED-LDR). Designed the analog signal conditioning stage using an Operational Amplifier (Op-Amp) configured as a comparator to trigger an alarm upon detecting high particulate density. Successfully transitioned the design from schematic simulation to a physical layout in Proteus, utilizing auto-routing algorithms to generate a fabrication-ready PCB.

Explore my portfolio for a wider range of my circuit projects [My Circuit Projects]

Simulation Project

1 Title: Blood Flow Behavior in Renal Artery Stenosis. (2022)

[Project Link]

It is done by using COMSOL. Renal artery stenosis (RAS), or renal artery disease, occurs when the arteries that carry blood to your kidneys get too narrow. RAS can lead to serious health problems, including high blood pressure, chronic kidney disease or kidney failure. Here i observed the hemodynamics in the case of RAS.

2 Title: SPR BCF Biosensor (2024)

[Project Link]

This SPR PCF biosensor features a silica core surrounded by four small inner and eight large outer air holes, enclosed by a plasmonic gold layer. At 750 nm, the geometry induces birefringence with effective mode indices of 1.4313 (Y-polarized) and 1.4302 (X-polarized). The design tightly confines the core field while enabling evanescent coupling to the gold surface to excite Surface Plasmon Polaritons (SPP) for sensing.

3 Title: Microstrip Patch Antenna with Novel Design (2025)

[Project File]

Designed and simulated a Compact Microstrip Patch Antenna operating in the K-band (18.4 GHz) using CST Studio Suite. The design features a 20×20 mm² footprint utilizing an FR-4 substrate with a copper radiating element. Conducted a comprehensive analysis of S-parameters to evaluate impedance matching, achieving a return loss (S11) of -9 dB at the resonant frequency.

Explore my portfolio for a wider range of my circuit projects [My Circuit Projects]

Office Suit Project

1 Title: Sales Forecasting (Excel) (2021)   [Project File]

Developed a time-series forecasting model to predict future sales trends, directly informing strategic decision-making in procurement planning, staffing allocation, and marketing campaigns. Validated model performance using rigorous error metrics, including RMSE (Root Mean Square Error) and MAPE (Mean Absolute Percentage Error), to ensure high predictive accuracy.

2 Title: Health Care Dash Board (Excel) (2023)   [Project File]

Developed an interactive Excel Dashboard to visualize physical health metrics across the USA. implemented geospatial heatmaps to categorize and display state-level distribution of BMI statuses (Underweight, Normal, Overweight, Obese).

Participations & Achievements:

1 IEEE 1st International Conference on Quantum Photonics, Artificial Intelligence & Networking (QPAIN) 2025.   Virtual, 2025.

Presented original research titled "Diatracker: A Multimodal Diabetes Assistance Device," a system designed to support diabetic patients with daily health management and monitoring.

2 Participation in "*EUREKA,*" a 3MT Thesis presentation, organized by KUET Research Society.   Virtual, 2025

Presented my thesis work, titled, "Breast Tumor Imaging Using Different Microstrip Patch Antenna Configurations & Detecting Tumor Growth from the Reconstructed Images using Deep learning Based Estimation Algorithm"

3 Poster presentation on *Technomize 1.0*, a national festival held at Khulna University of Engineering & Technology in Bangladesh.   Onsite, 2024

Presented a research-based poster titled "Design and Simulation of Reinforcement learning based MR guided Precision Nanorobotic Drug Delivery System for Crossing Blood Brain Barrier".

4 Participation in "*Battle of Mind*," a business case competition, organized by British American Tobacco Bangladesh.   Virtual, 2024

Me and my team developed a prototype of digital E-commerce platform which is powered by Artificial Intelligence, Augmented Reality & Blockchain technology that will bring customer experience in different level.

5 Poster Presentation, *Civil Convivial 3.0* | Title: "*Extraction of Concrete Constituents from Waste PCB Materials for E-Waste Reduction*"   Onsite, 2023

In this research-based poster, my teammate and I demonstrated that concrete constituents can be effectively extracted from the millions of tons of generated PCB waste, offering a cost-effective and sustainable solution that significantly reduces electronic waste.

5 Business Case Competition Participant | *EEE Day 2023*   Onsite, 2023

Developed and presented two distinct startup proposals: a Waste-to-Energy generation system and an Autonomous Drone Logistics network, focusing on technical feasibility and market viability.

6 Project Showcasing | EEE Day 2023   Onsite, 2023

Showcased a novel Remotely Monitored Digital Stethoscope project, designed to bridge the gap between patients and remote healthcare providers.

7   **Idea presentation in "*Khulna ENVOFRAME: Climate Solutions for Sustainable Future*".**

Onsite, 2023

[Featured in Newspaper]

My team "Coastal Geo Guardian," presented a digital platform designed for data-driven decision making to address climate challenges. The team was awarded **2nd Runners Up** in the program.

8   **Project Showcasing | *WAVE*, a national textile festival organized by Department of Textile Engineering Day 2023**

Onsite, 2023

Showcased a project titled, "Airbender", which is a low-cost plug and play sensor based novel air quality & gas sensor module architecture.

9   **Participation in "*Over the Wall*," a business case study competition, organized by Marico.**

Virtual, 2023

Me and my team presented an idea about mini-pack men/women facewash for busy life.

10   **Participation in "*AGRIBIZ*," organized by SAU Entrepreneurship Development Club.**

Onsite, 2023

Me and my team presented a Agri-tech-startup idea titled, "Floating Farming", a low-cost sustainable farming idea. We secured here **4th position** among 100+ teams.

11   **Participation in *Intra-University Innovative Idea & Project Competition*, organized by FabLab KUET & ICT Division of Bangladesh Government.**

Onsite, 2022

Developed "Airbender," a low-cost, plug-and-play air quality and gas sensor module featuring a novel architecture. Demonstrated the complete system lifecycle—from design and simulation to final hardware implementation—securing **1st Position** in the competition.

12   **Participation in *Hardware Quest* by Hardware Acceleration Club KUET.**

Onsite, 2022

Me and my team demonstrated our "Airbender" project here also and won **runners up** title.

13   **Participation in "*BizBash 2.0*," a business case competition, organized by KUET Career Club.**

Onsite, 2022

Me and my team developed a weekly low-cost subscription model-based startup idea for students. We secured the **1st position** in the competition.

14   **Participation in *Ideation 1.0*, a Visionary Idea Competition, organized by Black Brains.**

Virtua, 2022

Me and my team developed an urban garbage collection & processing-based startup model that would be powered by IoT, digital App & accountability. We have been qualified till semifinal round.

12   **Participation in "*Hult Prize 2022 on Campus Round*"**

Virtual, 2022

Me and my team presented a startup idea titled, "SolutionX," an urban on-demand home service-based app with proper flexibility and safety of customer.

14   **Participation in "*Seminar on Scientific Writing Using LaTeX*," organized by Advance Biomedical Club, KUET.**

Onsite, 2022

Gained hands-on experience in authoring and typesetting scientific literature using LaTeX.

15   **Participation in "*Hult Prize 2021 on Campus Round*"**

Virtual, 2021

Me and my team presented a startup idea titled, "Soil in Soul," a food supply chain re-innovation startup model that could replace meat & sugar items but fit in the market.

Industrial Visit & Attachment:

1	**Industrial Visit: Bangladesh Council of Scientific and Industrial Research (BCSIR) (1 day)**	Onsite, 2024

Industrial attachment at BCSIR focused on biomedical sciences. Gained practical insights into tissue culture, drug discovery, animal research, and strict biosafety (BSL) compliance.

2	**Clinical Visit & Demonstration	Khulna Specialized Hospital (1 day)**	Onsite, 2024

Possess hands-on proficiency in conducting cardiac (ECG), neurological (EEG), and radiological (X-ray) screenings. Comfortable and experienced in navigating professional hospital settings and patient interaction.

4	**2-Day Clinical Visit	Khulna Medical College & Hospital**	Onsite, 2023.

Acquired hands-on experience operating and performing basic troubleshooting on X-ray, MRI, and CT-Scan devices. Observed the clinical application of these systems on patients and prepared a comprehensive report based on the visit. We also observed how oxygen could be generated in hospital arena.

5	**2-Day Clinical Visit	Institute of Nuclear Medicine & Allied Sciences (INMAS), Khulna**	Onsite, 2023

Gained practical experience using nuclear medicine to diagnose and treat patients. This included working with advanced scanners like PET and PET-CT and performing Iodine tests. I also learned the strict safety rules for handling radioactive materials.

Extracurricular Experience:

1	**Ex. Additional General Secretary (AGS),**	2020-2022

KUET Radio.

At KUET Radio (2020–2022), I spearheaded program design and served as a strategic liaison between senior and junior executives. I also drove growth through inter-club collaborations and cross-functional partnerships.

2	**Ex. Trainee Member Control Sub-Team,**	2021-2022

KUET Mars Rover - Team Durbar.

As a Control Sub team Trainee, I developed control systems for Mars Rover functionality. I also specialized in technical visualization, using Blender to create high-fidelity simulations and animations of the rover in Martian environments for the International Rover Challenge (IRC). I worked here from 2020 to 2022.

3	**Ex. Volunteer,**	2021

Hult Prize 2021 at KUET

Hult Prize Campus Volunteer: Driving student engagement and outreach for the world's largest social entrepreneurship competition.

Reference:

Amit Dutta Roy
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I firmly assure you that all information given above is true and complete to the best of my knowledge.

K. M. Sifat