

Siratul Islam

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Shahjalal University of Science and Technology, Sylhet - 3114, Sylhet, Bangladesh

RESEARCH FOCUS

My work focuses on embedded systems and IoT technologies, leveraging Real-Time Operating Systems, embedded Linux development, RISC-V architecture, smart grid communication protocols, and power electronics. Transitioning from a physics foundation, I integrate full-stack web development skills for end-to-end IoT solutions, contribute to open-source ecosystems (e.g., Zephyr RTOS, ESP-IDF), and pursue undergraduate research in industry automation, power management while preparing for graduate studies in embedded systems engineering.

EDUCATION

Shahjalal University of Science and Technology

Sylhet, Bangladesh

Bachelor of Science (Hons) in Physics

Aug. 2023 – Aug 2027

- Relevant Coursework: Basic & Digital Electronics, C Language, Electricity & Magnetism, Mathematical Methods in Physics, Computational Physics
- Academic Achievement: Bronze Medal, (International) University Physics Competition 2024
- Research Focus: Applied physics with emphasis on embedded systems and IoT applications

RESEARCH EXPERIENCE

Shahjalal University of Science and Technology

Sylhet, Bangladesh

Research Assistant - Department of Electrical and Electronic Engineering

Jun 2025 – Present

- Developing smart relay control systems for government cost optimization in collaboration with EE faculty
- Research focuses on IoT-enabled power management systems using STM32 and ESP32 microcontrollers
- Implementing MQTT-based data acquisition systems for real-time monitoring and control
- Conducting radar-based occupancy detection research for automated energy optimization in government buildings
- Developing RFID-based attendance management systems for rural educational institutions in Bangladesh
- Technologies: STM32, ESP32, embedded C, MQTT, power electronics, smart relays, IoT protocols, RD-03D radar, RFID modules

PROFESSIONAL EXPERIENCE

Hackules Inc.

Remote

Software Engineer

Jun. 2024 – Jun. 2025

- Led full-stack development for educational platforms including Teachers Today (Next.js + Express.js)
- Developed Opedemy learning platform with 200+ API integrations and optimized SSR for 50% faster load times
- Conducted technical interviews for engineering positions
- Technologies: SvelteKit, Next.js, Django, TypeScript, MongoDB, SMS/Email APIs

Software Engineer, Intern

Feb. 2024 – Jun. 2024

- Built AI-powered marketing analytics tool with Facebook Graph API integration
- Developed Flutter CRM mobile application serving 1000+ active users
- Technologies: SvelteKit, Flutter, Facebook Graph API, LinkedIn API, Firebase

Copernicus Astronomical Memorial of SUST

Sylhet, Bangladesh

IT Secretary

Nov. 2024 – Present

- Built the new official website from ground up using modern technologies like NextJS + Typescript
- IT coordinator and Scientific Organizing Committee member of CAM-SUST Summer School on Astronomy 2025
- Organized in-person recruitment events and coordinated technical workshops

Assistant IT Secretary

Apr. 2024 – Oct. 2024

- Managed and maintained the old Wordpress website, configuring packages for various functionalities
- Developed educational content and Python programming tutorials for 200+ students
- Handled content publishing on the website including blogs, and magazine

- Radar-based Occupancy Detection and Automated Relay System for Energy Saving** 2025
Ongoing Research - Government Office Buildings Energy Management *In Progress*
- Developing intelligent occupancy detection system using RD-03D mmWave radar sensor for automated lighting and HVAC control
 - Implementing ESP32-based relay control with Google Sheets data logging for energy consumption analysis
 - Research focuses on reducing energy waste in government buildings through presence-based automation
 - Technologies: ESP32, RD-03D radar sensor, relay modules, Google Sheets API, ESP-IDF
- RFID-based Attendance Management System for Rural Educational Institutions** 2025
Ongoing Research - Educational Technology for Remote Communities in Bangladesh *In Progress*
- Developing low-cost RFID attendance system specifically designed for remote schools, villages, and universities in Bangladesh
 - Creating offline-capable solution with synchronization features for areas with limited internet connectivity
 - Research addresses educational infrastructure challenges in rural Bangladesh through accessible technology
 - Technologies: RFID modules, ESP32, offline data storage, web-based dashboard, database synchronization
- Air Evacuation Time for Holes of Variable Diameters in a Space Station** Nov 2024
ResearchGate Publication – University Physics Competition 2024 (Team 750, Problem A) *Published*
- **Authors:** Siratul Islam, Ibrahim Hossain, Rimon Acharjee Sumon
 - **Abstract:** A micrometeorite impact caused an air leak in a space station. Using Poiseuille's law and the Ideal Gas Law, we derived an equation to model air mass flow rate under the pressure difference and calculated evacuation time. For a 1 cm-diameter hole, pressure drop from 1 atm to 0.3 atm requires approximately 27,168 s (≈ 7.597 h).
 - **Methodology:** Developed a mathematical model incorporating fluid flow and thermodynamic principles (Poiseuille's law and Ideal Gas Law), and visualized relationships between hole diameter and evacuation time through graphical analysis.
 - **Recognition:** Awarded Bronze Medal for mathematical solution and presentation quality among international undergraduate physics teams.
 - **Access:** Full-text available open access on ResearchGate.

OPEN SOURCE CONTRIBUTIONS & TECHNICAL LEADERSHIP

- Linux Foundation Zephyr RTOS Project** Github
Official Contributor - Multiple Contributions *Jun 2025 – Present*
- Board Support Contribution: Added WeAct STM32F446RET6 support with complete device tree, GPIO mappings, and peripheral initialization (PR #91886)
 - Development Tools Enhancement: Added PyOCD and STM32CubeProgrammer support for WeAct STM32F405/F446 boards (PR #92985)
 - Impact: 1000+ embedded developers globally can now use improved toolchain support and new hardware platform with Zephyr RTOS
 - Technical Scope: ARM Cortex-M4 bring-up, KConfig systems, device tree programming, build system integration
- Espressif ESP-IDF Ecosystem** Component Registry
Component Publisher - mmWave Radar Integration *2025 – Present*
- Published production-ready ESP-IDF component for AI-Thinker RD-03D radar sensor on official registry
 - Created comprehensive API with intelligent filtering algorithms and real-time coordinate tracking
 - Serving IoT developers globally with documented integration examples and hardware abstraction layer
- STM32 HAL Ecosystem** Github
Hardware Abstraction Layer Development *2025 – Present*
- Developed custom HAL drivers for Bosch BME280 environmental sensor with optimized I2C communication
 - Created portable sensor libraries enabling rapid prototyping for environmental monitoring systems
- Web Development Libraries** Github
svelte-cloudinary - Official Contributor *Apr 2024 – Present*
- Fixed critical video player aspect ratio bug (PR #108/#109) affecting 800+ developers

Official Zephyr RTOS Documentation - Board Support & Toolchain Integration

2025

*Linux Foundation Zephyr Project - Official Project Documentation**Published*

- **Board Documentation:** docs.zephyrproject.org/latest/boards/weact/stm32f446_core/doc/index.html
- Authored comprehensive documentation for WeAct STM32F446 including hardware specs, programming instructions, and sample applications
- Documentation serves 1000+ embedded systems developers globally using Zephyr RTOS with STM32 hardware and modern debugging tools
- Maintained through collaborative review process as part of official Linux Foundation Zephyr project

ESP-IDF Component Documentation - RD-03D Radar Sensor

2025

*Espressif Component Registry - Official Component Documentation**Published*

- **Component URL:** components.espressif.com/components/heronet/esp_rd-03d
- Created comprehensive API documentation and usage examples for RD-03D mmWave radar sensor integration
- Documentation includes code examples, parameter explanations, and integration tutorials for IoT developers

SELECTED PROJECTS

Embedded Systems & IoT Projects**STM32 BME280 HAL Driver** | *C, STM32, HAL*[source code](#)

- Custom HAL driver implementation for Bosch BME280 environmental sensor
- Provides temperature, humidity, and pressure readings with I2C communication
- Hardware: STM32, BME280 sensor, I2C interface

ESP32-S3 Weather Station | *C++, ESP32-S3, MQTT, Raspberry Pi 5*[source code](#)

- Comprehensive weather monitoring system with multi-sensor environmental data collection
- Features OLED display, MQTT connectivity for real-time data streaming
- Measures temperature, humidity, pressure, light intensity, and magnetic field with compass heading
- Hardware: BME280, BH1750, QMC5883L, SSD1306 OLED, WiFi connectivity

ESP32-S3 Biometric Attendance System | *C++, ESP32-S3, BLE*[source code](#)

- Portable biometric attendance tracking solution using fingerprint recognition
- Features offline storage with SPIFFS, Google Sheets integration for data sync
- BLE control interface and RGB LED feedback for secure attendance management
- Hardware: AS608 Fingerprint sensor, NeoPixel LEDs, WiFi/BLE connectivity

ESP-IDF RD-03D Component | *C, ESP-IDF, UART, Component*[registry url](#)

- ESP-IDF component for AI-Thinker RD-03D mmWave radar sensor
- Published on ESP Component Registry with comprehensive API for target detection and tracking
- Features intelligent retention filtering, position descriptions, and real-time coordinate tracking
- Hardware: AI-Thinker RD-03D radar, UART communication, ESP32 platform

Educational Technology & Web Platforms**CAM-SUST Official Website** | *NextJS, TypeScript, API Integration*[live url](#)

- Built the full-stack website for CAM-SUST from ground up replacing the old Wordpress website
- Migrated to modern technologies and implemented SSR/static rendering, reducing load times by 80%
- Redesigned from scratch for a more appropriate space-themed look, attracting more users

Opedemy Learning Platform | *SvelteKit, TypeScript, API Integration*[live url](#)

- Led frontend development for educational platform with 200+ API integrations (auth, payments)
- Optimized SSR/static rendering, reducing load times by 50% and improving SEO performance
- Designed responsive UI with Tailwind CSS, ensuring seamless cross-device usability

Teachers Today Recruitment Platform | *Next.js, Express.js, MongoDB*[live url](#)

- Full-stack teacher recruitment platform with advanced filtering and matching algorithms
- Integrated MongoDB for CRUD operations, SMS and Email API for notifications and updates
- Role-based dashboards for tutors, students, and administrators

HIAR Research Collaboration Platform | *SvelteKit, TypeScript, API Integration*[live url](#)

- Led SvelteKit-based frontend for academic research platform
- Integrated 100+ API endpoints with real-time collaboration
- Reduced design debt by 30% using shadcn/ui components

TECHNICAL SKILLS

Embedded Systems Engineering:

Languages & Frameworks: Embedded C/C++, Rust, STM32 HAL, ESP-IDF, Embassy-rs, Embedded Linux
Microcontrollers & Processors: STM32 (H723VIT6, H523RET6, F446RET6, F405RGT6), ESP32-S3, RISC-V
Real-Time Operating Systems: Zephyr RTOS (official contributor), FreeRTOS, CMSIS-RTOS
Hardware Protocols: GPIO, I2C, SPI, UART, ADC, PWM, interrupt handling, DMA
Communication & IoT: MQTT, Wi-Fi, BLE, LoRa, IoT protocols, power electronics, smart relays
Development Tools: STM32CubeIDE, CMake, PlatformIO, ESP-IDF, KiCAD, OpenOCD, GDB, Device Tree

Full-Stack Web Development:

Languages & Frameworks: TypeScript, JavaScript, Python, C#, Dart, Kotlin
Frontend Technologies: SvelteKit, Next.js, Flutter, Tailwind CSS, shaden/ui
Backend Technologies: .NET, Django, Express.js, SQL
Cloud & Databases: Google Cloud Platform, MongoDB, Firebase
Development Tools: Docker, Git, Linux, Vim, Bash

AWARDS & RECOGNITION

Bronze Medal - International University Physics Competition

Nov 2024

Team 750, Problem A - Mathematical Modeling Excellence

Global Competition

- Recognized among top international undergraduate physics teams for innovative mathematical solution to space station air evacuation problem
- Developed novel application of Poiseuille's law and Ideal Gas Law for fluid dynamics modeling under extreme conditions
- Competition involved 1000+ teams from universities worldwide, Bronze Medal represents top 15% performance

Linux Foundation Zephyr RTOS Official Contributor

2025

Multi-Contribution Developer Status - Board Support & Toolchain

Open Source Community

- Achieved official contributor status with multiple merged pull requests (#91886, #92985) to upstream Zephyr project
- Contributions impact 1000+ embedded systems developers globally through improved hardware support
- Recognition from Linux Foundation for technical excellence in embedded systems development

Harvard CS50x Certification

2023

Computer Science Fundamentals - Certificate of Completion

Harvard University

- Successfully completed Harvard's rigorous introduction to computer science course
- Demonstrated proficiency in multiple programming languages and computer science concepts

Multiple HackerRank Certifications

2023

Technical Proficiency Certifications

Industry Standard

- Earned certifications in React, Angular, C#, JavaScript, Java, and Python
- Validated technical skills through industry-standard assessment platform
- Demonstrates continuous learning and technical skill development

Champion - Inter Cantonment IT Festival

2021

1st Place - Social Media & E-commerce Platform Development

National Level

- Won first place for innovative social media and e-commerce platform among cantonment colleges nationwide
- Demonstrated early expertise in full-stack development and system architecture
- Recognized for technical innovation and presentation skills in competitive programming environment

Champion - Nirjhor Cantonment Public School & College Science Fest

2021

1st Place - Social Media & E-commerce Platform

Regional Competition

- Secured first position for comprehensive social media and e-commerce solution
- Showcased advanced web development skills and database integration capabilities
- Early recognition of full-stack development expertise that built foundation for current technical work

Third Place - Notre Dame Science Festival

2021

Senior Projects Competition - Social Media Website Development

Inter-College Competition

- Achieved 3rd place for social media website project among 200+ competing projects
- Demonstrated strong technical implementation and project presentation abilities
- Competitive recognition among Bangladesh's leading educational institutions

TEACHING & MENTORSHIP EXPERIENCE

Student Organization Leadership & Education

2024-2025

IT Secretary & Educational Content Developer

Copernicus Astronomical Memorial - SUST

- Lead technical initiatives for 200+ member astronomy organization as elected IT Secretary
- Developed Python programming tutorials and computational astronomy educational content
- IT coordinator and Scientific Organizing Committee member of CAM-SUST Summer School on Astronomy 2025
- Organized technical workshops on programming applications in astronomical research and data analysis

Technical Recruitment

2024-2025

Software Engineering Interview

Hackules Inc.

- Conducted technical interviews for software engineering positions, evaluating candidates on programming skills
- Mentored junior developers and interns in full-stack development technologies and best practices
- Designed technical assessment criteria for evaluating programming competency and problem-solving abilities

IT Coordinator & Programming Instructor

2021-2022

C Programming Language

Nirjhor Cantonment Public School & College

- Appointed as IT Coordinator for NCPSC IT Club responsible for technical education initiatives
- Designed and delivered C programming language curriculum to 50+ college students
- Mentored students in programming logic, debugging techniques, and software development best practices

FUTURE ACADEMIC & RESEARCH PLANS

Graduate Studies: Pursuing Master's/PhD in Embedded Systems Engineering, Computer Engineering, or Electrical Engineering with focus on Real-Time Operating Systems, RISC-V processor design, and embedded Linux for IoT applications

Research Interests: RISC-V architecture optimization, RTOS kernel development, communication protocols, power electronics integration in IoT devices, and open-source hardware/software ecosystem advancement

Career Objectives: Seeking research opportunities in embedded systems design, processor development, and industrial IoT while contributing to open-source embedded systems communities

Industry Focus: Targeting automotive embedded systems, medical device development, aerospace applications, smart grid infrastructure, industrial IoT systems, and renewable energy solutions

LANGUAGE PROFICIENCIES

Native Language: Bengali (Native speaker)

Academic & Professional: English (Fluent - Advanced academic and technical communication)

Basic Communication: Hindi/Urdu (Conversational level)

REFERENCES

Dr. Md. Rasedujjaman

Sylhet, Bangladesh

Associate Professor - Department of Electrical & Electronic Engineering

SUST

- Current Research Supervisor and Co-author on smart relay control systems and RFID research projects
- Email: mrased-eee@sust.edu
- Phone: +8801714557885
- Office: Department of EEE, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh
- Research Areas: Nonlinear optics, Photonic materials, Quantum optics
- Relationship: Direct research supervisor, co-author, and faculty mentor (March 2025 - Present)

Dr. Md. Enamul Hoque

Sylhet, Bangladesh

Associate Professor - Department of Physics

SUST

- Academic supervisor familiar with physics coursework performance and academic development
- Email: mjonyh-phy@sust.edu, mjonyh@gmail.com
- Phone: +8801719277759
- Office: Department of Physics, Shahjalal University of Science and Technology, Sylhet-3114, Bangladesh
- Research Areas: Nonlinear Optics, Ph.D. in Nonlinear Optics from SUST
- Relationship: Physics faculty member, project mentor, and academic advisor

Additional References

Professional and Academic References

Available Upon Request

Contact Information Available

- Professional references from software engineering leadership positions at Hackules Inc.
- Faculty advisors from CAM-SUST student organization leadership and educational program coordination
- Additional physics faculty members familiar with academic performance and research interests
- Complete reference information including contact details and recommendation letters available during application processes