Siratul Islam

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

Research Focus

I am passionate about advancing embedded systems and IoT technologies through Real-Time Operating Systems & Embedded Linux, RISC-V Architecture & Processor Design, Smart Grid Communication Protocols, and Power Electronics. My work centers on open-source hardware and software development, and I am actively seeking undergraduate research opportunities and collaborations in in these fields while preparing for graduate studies.

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 Experience

Shahjalal University of Science and Technology Sylhet, Bangladesh
Undergraduate Research Assistant - Department of Electrical and Electronic Engineering *Mar 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
- Technologies: STM32, ESP32, embedded C, MQTT, power electronics, smart relays, IoT protocols

Publications & Presentations

Air Evacuation Time for Holes of Variable Diameters in a Space Station 2024
ResearchGate Publication - University Physics Competition 2024 *Team 750 Problem A*

- Developed comprehensive mathematical model for air evacuation dynamics in space station environment
- Applied fluid dynamics principles and differential equations to analyze variable hole diameter effects
- Won Bronze medal for successful calculation and presentation

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

Open Source Contributions & Technical Leadership

Zephyr RTOS Project Remote

Official Contributor *Jun 2025 – Present*

- Official contributor to Zephyr RTOS with board support for WeAct STM32F446RET6 (PR #91886)
- Implemented device tree configurations, GPIO mappings, and peripheral initialization for ARM Cortex-M4
- Earned Linux Foundation Zephyr contributor badge, enabling global developer adoption
- Contribution impact: 1000+ developers can now use WeAct STM32F446RE with Zephyr RTOS

svelte-cloudinary Remote

Official Contributor *Apr 2024 – Present*

- Official contributor to Svelte Cloudinary library by fixing video player aspect ratio bug (PR #108/#109)
- Contribution impact: 1000+ developers can now use this library with one less bug

Selected Projects

Embedded Systems & IoT Projects

STM32 Zephyr RTOS Board Support | *C, STM32, Zephyr RTOS, Device Tree, ARM Cortex-M4* live link

- Official board support for WeAct STM32F446 in Zephyr RTOS, now part of upstream project
- Complete board bring-up: device tree, KConfig, C sources, pinmux, and documentation
- Official Linux Foundation contributor badge earned
- Hardware: STM32F446

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

ESP32 Radar Smart Switch | *C, ESP32, ESP-IDF, Google Sheets API* source code

- Smart presence-detection switch built with ESP-IDF and RD-03D 24GHz mmWave radar
- Detects human presence to automate appliances using relay control
- Synchronizes data with Google Sheets using API
- Hardware: RD-03D radar sensor, relay modules, ESP32 DevKit

ESP-IDF RD-03D Component | *C, ESP-IDF, UART, Component* live link

- 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 link

- Built the full-stack website for CAM-SUST from ground up replacing the old Wordpress website
- Moved 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 link

- 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 link

- 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 link

- 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), ESP32-S3, nRF52840, RISC-V
RTOS: Zephyr RTOS (official contributor), FreeRTOS, CMSIS-RTOS
Hardware Protocols: GPIO, I2C, SPI, UART, ADC, PWM, interrupt handling
Communication & IoT: MQTT, Wi-Fi, BLE, LoRa, IoT protocols, power electronics, smart relays
Development Tools: STM32CubeIDE, 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, shadcn/ui
Backend Technologies: .NET, Django, Express.js, SQL
Cloud & Databases: Google Cloud Platform, MongoDB, Firebase
APIs & Integrations: Google APIs (Maps, OAuth, Sheets), Facebook Graph API, LinkedIn API
Development Tools: Docker, Git, Linux, Vim, Bash

Certifications & Awards

Certifications: Harvard CS50x, HackerRank certifications in Angular, C#, JavaScript, Java, Python
Open Source Recognition: Linux Foundation Zephyr RTOS Contributor Badge
Academic Awards: Bronze Medal, University Physics Competition 2024
Pre-University Achievements: 1st place Inter Cantonment IT Fest, 1st NCPSC IT Fest, 3rd Notre Dame Science Fest

Teaching & Mentorship Experience

Student Organization Leadership: IT Secretary, Copernicus Astronomical Memorial (200+ members)
Technical Mentorship: Interviewed and mentored software engineering candidates at Hackules Inc.
Educational Content Creation: Developed Python programming tutorials for CAM-SUST
Workshop Organization: IT coordinator and Scientific Organizing Committee member of CAM-SUST Summer School on Astronomy 2025

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 for embedded systems, Real-Time OS kernel development, smart grid communication protocol implementation, power electronics integration in IoT devices, and open-source hardware/software ecosystem advancement
Career Objectives: Seeking research opportunities in embedded systems design, smart grid technologies, and RISC-V processor development while contributing to open-source RTOS projects and embedded Linux communities
Industry Focus: Targeting automotive embedded systems, medical device development, aerospace applications, smart grid infrastructure, industrial IoT systems, and renewable energy solutions