

Chironjeet Das Joy

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Research Focus

Control, Sensory Infusion, Embedded System, Medical Imaging and Dexterous Manipulation.

Education

BRAC University, Dhaka, Bangladesh

(2020- 2024)

Bachelor of Science in Electrical and Electronic Engineering

Specialization: Electronics (With focus on Robotics and Intelligent System)

CGPA: 3.6/4.0

Publications

T. Mahmud*, T. U. Wara, and **C. D. Joy**, *Risk Factor Identification and Classification of Malnutrition Among Under-Five Children in Bangladesh: Machine Learning and Statistical Approach*. (Under Review at Heliyon).

C. D. Joy, A. H. Kafi, “*Design and Optimization of Propeller-Based Thrust Vector Control Mechanism Using PID and Sensor Fusion Techniques*,” in *Proc. 76th International Astronautical Congress (IAC-25)*, (Accepted).

N. A. Shihab, **C. D. Joy**, M. Rahman, M. M. Chowdhury, P. M. Golpa, F. N. Showrov, R. S. I. Antara, and A. H. Kafi, “A low-cost satellite kit to bridge the educational and technological gap in developing countries,” in *Proc. 76th International Astronautical Congress (IAC-25)*, (Accepted).

M. M. Chowdhury, M. Rahman, K. A. Rahim, H. H. Jui, A. Nawrin, M. T. A. Tonmoy, **C. D. Joy**, R. S. I. Antara, and A. H. Kafi, “*BRACU Diganta: An affordable and inclusive CanSat kit for hands-on training of introductory level students in developing countries*,” in *Proc. 76th International Astronautical Congress (IAC-25)*, (Accepted).

A. H. Kafi, **C. D. Joy**, P. M. Golpa, and R. S. I. Antara, “*Optimizing soybean production with ground sensor terminal-based monitoring system*,” in 74th International Astronautical Congress (IAC), Baku, Azerbaijan, Oct. 2-6, 2023.

C. D. Joy, T. U. Wara, P. M. Golpa, J. Uddin, R. S. I. Antara, and A. H. Kafi, “*Navigating the challenges of inflation and material scarcity in space programmes*,” in 74th International Astronautical Congress (IAC), Baku, Azerbaijan, Oct. 2-6, 2023.

On-Going Work

Flight Control System by Optimizing PID Control Algorithms for Enhanced Thrust Vectoring in Hybrid Rocket Engines - with Abdulla Hil Kafi. (Current)

Working as a Research assistant to build the test bench, TVC mechanism and control algorithm.

Biomimetic Passive Rotor-Assisted Descent Control with Vision-Guided Precision Landing - with Abdulla Hil Kafi. (Current)

Working as a Research assistant to build the vision-guided control algorithm and biomimetic blades.

Research Experience

Laboratory of Space System Engineering & Technology - LASSET with Abdulla Hil Kafi & Raihana Shams Islam Antara.

(Fall 2022 – Current)

Satellite Ground Sensory Terminal Project.

Developed and implemented a time series data collection system for the *Satellite Ground Sensory Terminal Project*, utilizing multiple sensory inputs to monitor crop fields in rural areas via the KITSUNE Satellite.

Designed a compact and easily deployable system, contributing significantly to project ideation and execution.

RAVEN - Research on Aerial Vehicle with Enhanced Neural network.

Inspired by real-world problems with drone stabilization in complex aerodynamics during rescue scenarios, an Inertial Measurement Unit on the flight controller provides data about the drone cartesian position. Despite using regular PID controller, we are hoping a Neural Network approach might lead to better stabilization. I

have built a controlled room with infrared tracking camera completely built from scratch to simulate complex aerodynamics and to take 3D position of the drone for comparing/complementing the IMU data.

BRACU Diganta – A Multipurpose CanSat Kit

- Developed a low-cost, can-sized satellite system designed for multipurpose applications, including educational outreach and research.
- Created a dedicated version of the kit to introduce and promote satellite technology among high school and college students through hands-on learning.
- Currently supervising and mentoring an undergraduate student team in preparation for the upcoming CanSat Competition 2026, focusing on system design, payload integration, and mission operations.

Control & Application Research Center - with Dr. A.K.M. Abdul Malek Azad. (Summer 2022)

Solar Powered DC Compressor & High Voltage Switching.

Developed an experimental fridge with a DC compressor and Solar panel with graduate students. Later designed a high-voltage switching system using solid-state relays for multipurpose applications in collaboration with graduate students

FYDP/Capstone Project - with Dr. Abu S.M. Mohsin

7 DoF Robotic Arm Solution for Automated Medicine Inventory Control.

Project Lead: Led the development of a low-cost robotic arm with seven degrees of freedom for an automated medicine shelving, stacking, and retrieval system. Designed the system using stereovision cameras for enhanced spatial awareness and 12-bit absolute magnetic encoders for precise motion control, aimed at reducing drug misplacement errors and improving accuracy in pharmaceutical environments.

Course and Other Projects

High Performance Flight Controller for Hybrid Rocket Engine - with Abdulla Hil Kafi.

(2025 – Current)

Designed and developed a custom flight controller for a hybrid rocket engine using Teensy 4.1, programming in C/C++ to integrate accelerometers, gyroscopes, and pressure sensors, and implementing custom algorithms for real-time flight control, achieving reliable performance during simulated tests.

SwarmSync Controller Board for Modular Robotic Assembly.

(2025-Current)

Designed a Wi-Fi-enabled circuit with servo control and power-sharing connectors to facilitate autonomous robotic swarm assembly for dynamic structural formations.

SafeFall: A Multimodal Human Fall Dataset Captured via IMU, RGB, and Depth Camera

Sensors - with Md. Mehedi Hasan Shawon.

(2025)

Developed data processing for SafeFall, a multimodal dataset from 30 participants, enhancing fall detection with synchronized RGB, depth, and IMU data, advancing ambient intelligence and activity recognition.

Epileptic Seizure Detection and Classification Using Machine Learning Algorithms.

(2024)

Developed and implemented a machine learning framework to classify three stages of epileptic seizures (normal, pre-seizure, and seizure) using EEG signals from the Physionet dataset, with a focus on leveraging transfer learning in YOLOv8 for superior accuracy.

EEE383 Electronic System Design with Abdulla Hil Kafi.

(2023)

Partnered with five undergraduate students and worked on a NANO Satellite designing project to collect data from multiple ground station to send back the data to a centralized ground control system. Designed and implemented the payload and communication

EEE383 Embedded System Design with Nahid Hossain Taz.

(2023)

Developed a secure lock system using ATmega32 microcontroller, integrated with remote control functionality for enhanced accessibility. The system included real-time control, secure authentication protocols, and low-power operation, ensuring reliability and efficiency in both residential and commercial applications.

Flying Raijin-

Developed a STM32 based FPV drone equipped with custom stereo-vision camera built from scratch. The drone achieved ~150 km/h in 0 to 2 second (as verified by the on-board GPS module).

Awards

BRAC University Research Grant (RAVEN) – 2024, 2023.

BRACU Student Assistant Fund – 2021, 2020.

Dean's List (Spring 2021, Spring 2022, Spring 2023, Fall 2023) – Awarded for academic excellence across multiple terms.

Community Involvement

LASSET, Outreach Team Lead – (2023 – Current)

BARCU EEE Club, Mentor – (2021 – 2023)

BARCU Computer Club, Mentor – (2021 – 2022)

University Student Parliament, General Secretary – (2020 – 2024)

References

Abdulla Hil Kafi

Senior Lecturer of Electrical and Electronic Engineering.

BSRM School of Engineering, BRAC University.

Doctoral Student, Space Robotics Laboratory, Kyushu Institute of Technology.

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Raihana Shams Islam Antara

Senior Lecturer of Electrical and Electronic Engineering.

BSRM School of Engineering, BRAC University.

Doctoral Student, Space Robotics Laboratory, Kyushu Institute of Technology.

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Tasfin Mahmud

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