Atonu Ghosh

Ph.D. Research Scholar
IIT Kharagpur, India
Former Research Intern at Samsung R&D

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Professional Summary

- Submitted Ph.D. thesis in *Computer Science & Engineering* at *IIT Kharagpur, India* and currently finishing a Research Internship at *Samsung R&D*, Bangalore, India.
- 6+ years of hands-on experience in building secure, scalable IoT architectures, focusing on Edge Computing, LPWANs, and Secure Cyber–Physical Systems.
- Filed *16 patents (3 granted, 4 commercialized)* and authored *12 papers (8 journal articles & 4 conference papers)* across top-tier venues, including IEEE TII, TNSE, TICPS, IoT Journal, and others.
- Research focuses on *secure and scalable IoT architectures* such as *TLS-over-LoRa* and *edge system integration with AI/ML* for industrial condition monitoring.
- Led end-to-end system prototyping and field validation through consulting and research projects with *Tata Steel Downstream Products Ltd., India*, *CPHEEO*, and *MeitY*, Government of India.
- Dedicated to advancing next-generation *IoT, Edge Computing, and Low Power Network* research, translating these innovations into scalable, human-centric technologies that create tangible societal impact.

Career Highlights

Patents (Granted)	3	**Patents (Pending)**	13
Patents Commercialized / In use	4	**Journal Articles (Published)**	4
Journal Preprints / Communicated	4	**Conference Articles**	4

Education

2021–2026: **Ph.D., Computer Science & Engineering**.
Indian Institute of Technology (IIT), Kharagpur, India
Supervisor: Prof. Sudip Misra
Thesis Title: *"Architectures and Protocols for Reliable and Secure Low Power IoT"*
IoT, IIoT, Edge Computing, Low Power Wide Area Networks (LPWANs), Condition Monitoring

2018–2020: **Master of Technology, Computer Science & Engineering**.
Maulana Abul Kalam Azad University of Technology (formerly WBUT), Nadia, West Bengal, India
CGPA: 8.93/10
Project on design and implementation of logging system using Ethereum blockchain and IPFS

2014–2017: **Bachelor of Technology, Computer Science & Engineering**.
Institute of Engineering and Management (IEM), Salt Lake, Kolkata, India
CGPA: 7.71/10
Project on implementation of a simple operating system accepting commands

Patents

Granted

PG3 **Atonu Ghosh,** Biswajit Ghosh, Ruelia Saha, Sudip Misra, and Arijit Roy, System for Real Time Intrusion Detection, Actuation and Alert and Method Thereof, *Indian Patent*, Number – 566326, May 16, 2025, (**Commercialized**).

PG2 Subhas Chandra Misra, Debanjan Das, Sudip Misra, Venkanna Udutalapally, **Atonu Ghosh,** and Tanushree Pan, Wireless Network Device for Wireless Communication with User Devices in a Wireless Communication Network, *Indian Patent*, Number – 539308, May 27, 2024.

PG1 Subhas Chandra Misra, Debanjan Das, Venkanna Udutalapally, Sudip Misra, and **Atonu Ghosh**, Blockchain-Enabled IoT System and Method for Securing Real Time Data In a Microcontroller-Based Blockchain Network, *Indian Patent*, Number – 529261, Mar 20, 2024.

Pending

PF13 Syam Sidhardhan, **Atonu Ghosh**, Hub-Side Intelligence for Vendor Agnostic IoT Sensor Battery Life Extension, *Indian Patent*, File No. – 202641080289, Jun 30, 2026.

PF12 Sudip Misra, **Atonu Ghosh,** Spandan Duari, Kumarjit Ray, Rajdeep Ghosh, Panagiotis Sarigiannidis, Nikos Ntampakis, and Vasileios Argyriou, System and Method for Automated Sensor Identification and Data Delivery Over Universal Serial Bus, *Indian Patent*, File No. – 202531114519, Nov 20, 2025.

PF11 Sudip Misra, **Atonu Ghosh,** Bontalakoti Aditya, Kumarjit Ray, and Rajdeep Ghosh, An Intelligent Liquid-Level Sensing and Pump Control System, *Indian Patent*, File No. – 202531098034, Oct 10, 2025, (**Commercialized**).

PF10 Sudip Misra, **Atonu Ghosh,** Biswajit Ghosh, Swaraj Lahiri, Bharat Bhushan, Subrata Ray, and Sonali Pan, Embedded System and Method for Condition Monitoring of Electric Overhead Travelling (EOT) Cranes, *Indian Patent*, File No. – 202531033456, Apr 4, 2025 **(Deployed at Tata Steel Downstream Products Ltd., Jamshedpur, India)**.

PF9 Aparesh Mahapatra, Biswajit Ghosh, **Atonu Ghosh** Suryansh Sharma, Debayan Biswas, Sudip Misra, Partha Sarathi Ghoshal, and Manoj Kumar Tiwari, IoT-Enabled Smart Hardware System with Edge Intelligence for Rapid Leak Detection in Water Distribution Networks, *Indian Patent*, File No. – 202531028121, Mar 25, 2025 **(Deployed for Water Distribution Pipe Monitoring at Haldia, WB, India)**.

PF8 **Atonu Ghosh** and Sudip Misra, LoRaNext: Embedded System and Method for Decentralized HTTP Communication Over LoRa, *Indian Patent*, File No. – 202531024600, Mar 19, 2025.

PF7 **Atonu Ghosh,** Sudip Misra, and Sharath Chandan, Long Range Multiple Input Multiple Output System for High Throughput Communication, *Indian Patent*, File No. – 202431094880, Dec 2, 2024.

PF6 Kumarjit Ray, **Atonu Ghosh,** Biswajit Ghosh, and Sudip Misra, Universal Software-Defined LoRa Gateway Based Network System for Remote Programming and Management of Network Functions, *Indian Patent*, File No. – 202431046371, Jun 15, 2024.

PF5 Ruelia Saha, **Atonu Ghosh,** and Sudip Misra, Confidant: An Internet of Things-Based System and Method for Mental Health Monitoring and Support, *Indian Patent*, File No. – 202431034007, Apr 29, 2024.

PF4 Biswajit Ghosh, **Atonu Ghosh,** and Sudip Misra, An Edge Intelligence Based Programmable Logic Controller, *Indian Patent*, File No. – 202431032957, Apr 25, 2024.

PF3 **Atonu Ghosh,** Sudip Misra, Arijit Roy, and Anandarup Mukherjee, A System for Remote Monitoring, Actuation and Data Prediction, *Indian Patent*, File No. – 202231040824, Jul 17, 2022.

PF2 Sudip Misra, Saswati Pal, and **Atonu Ghosh**, Modularized IoT-Based On-Demand Ambulatory Hospital Recommender System, *Indian Patent*, File No. – 202231008007, Feb 15, 2022.

PF1 Sudip Misra, Debanjan Das, Venkanna Udutalapally, **Atonu Ghosh,** and Pallav Kumar Deb, A Secured Edge-Based Automated Power Control and Communication System for Legacy IoT Infrastructures, *Indian Patent*, File No. – 202131038016, Aug 23, 2021.

Publications

Journal Articles

J5 **Atonu Ghosh**, Akhilesh Mohanasundaram, Srishivanth RF, and Sudip Misra. *Siia*: Secure Industrial IoT Architecture for HTTPS Communication Over LoRa Using TLS. *IEEE Transactions on Industrial Informatics*, 2021.

J4 **Atonu Ghosh**, Sudip Misra, Venkanna Udutalapally, and Debanjan Das. LoRaute: Routing Messages in Backhaul LoRa Networks for Underserved Regions. *IEEE Internet of Things Journal*, volume 10, pages 19964–19971, 2023, DOI: https://doi.org/10.1109/JIOT.2023.3281941.

J3 **Atonu Ghosh**, Sudip Misra, and Venkanna Udutalapally. Multiobjective Optimization and Sensor Correlation Framework for IoT Data Validation. *IEEE Sensors Journal*, volume 22, pages 23581–23589, 2022, DOI: https://doi.org/10.1109/JSEN.2022.3215993.

J2 **Atonu Ghosh**, Ruelia Saha, and Sudip Misra. Persistent Service Provisioning Framework for IoMT Based Emergency Mobile Healthcare Units. *IEEE Journal of Biomedical and Health Informatics*, volume 26, pages 5851–5858, 2022, DOI: https://doi.org/10.1109/JBHI.2022.3172624.

J1 **Atonu Ghosh**, Anandarup Mukherjee, and Sudip Misra. SEGA: Secured Edge Gateway Microservices Architecture for IIoT-Based Machine Monitoring. *IEEE Transactions on Industrial Informatics*, volume 18, pages 1949–1956, 2021, DOI: https://doi.org/10.1109/TII.2021.3102158.

Communicated Journal Articles and Preprints

JC3 Aparesh Mahapatra, **Atonu Ghosh,** Sudip Misra, Sharath Chandan, and Partha Sarathi Ghosal, Breaking the Throughput Barrier of LoRa in IoT: A Multi-Radio MIMO System for WDNs, in *IEEE Internet of Things Journal,* (In Revision, 2026).
arXiv Preprint: https://arxiv.org/abs/2501.07148v1

JC2 **Atonu Ghosh,** David Breuss, Simon Howind, Sudip Misra, Thilo Sauter, and Surjya Kanta Pal, SenseAI: Staged Model Deployment for Resource Constrained AIoT-Enabled Industrial Environments, in *IEEE Transactions on Industrial Cyber-Physical Systems,* (In Revision, 2025).

JC1 **Atonu Ghosh** and Sudip Misra, LoRaConnect: Unlocking HTTP Potential on LoRa Backbones for Remote Areas and Ad-Hoc Networks, in *IEEE Transactions on Network Science and Engineering,* (In Revision, 2025).
arXiv Preprint: https://arxiv.org/abs/2501.02469

In Conference Proceedings

C4 Syam Sidhardhan, T K Ramesh, **Atonu Ghosh**, Inpyo Kang, and Dongwook Lee. *MultiHub*: Smart home iot hub coordination framework for energy-efficient sensing. In *International Conference on Electronics, Computing and Communication Technologies (CONECCT)*. IEEE, 2026 **(Accepted)**.

C3 **Atonu Ghosh**, Debashis De, and Koushik Majumder. A systematic review of log-based cloud forensics. In *Inventive Computation and Information Technologies (ICIT)*, pages 333–347. Springer, 2021, DOI: https://doi.org/10.1007/978-981-33-4305-4_26.

C2 **Atonu Ghosh**, Koushik Majumder, and Debashis De. Android forensics using sleuth kit autopsy. In *International Conference on Mathematics and Computing (ICMC)*, pages 297–308. Springer, 2020, DOI: https://doi.org/10.1007/978-981-15-8061-1_24.

C1 **Atonu Ghosh**. Intelligent appliances controller using raspberry pi. In *Information Technology, Electronics and Mobile Communication Conference (IEMCON), IEEE*, pages 1–5. IEEE, 2016, DOI: https://doi.org/10.1109/IEMCON.2016.7746253.

Book Chapter

B1 **Atonu Ghosh,** Koushik Majumder, and Debashis De, A Systematic Review of Digital, Cloud and IoT Forensics, In *The "Essence" of Network Security: An End-to-End Panorama*, Springer, 2021. DOI: https://doi.org/10.1007/978-981-15-9317-8_2.

Work Experiences

Jan 2026 – July 2026 **Research Intern, *Samsung R&D Institute, Bangalore, India*.**
Worked full-time onsite on cutting-edge research and development projects on energy saving in the *SmartThings* Team.

Jan 2021 – Present **Ph.D. Research Scholar, *Indian Institute of Technology (IIT), Kharagpur*.**
Under the Supervision of ***Prof. Sudip Misra*** on IoT, Edge Computing, Low Power Networks (LPWANs), and Condition Monitoring

- **EOT Crane Condition Monitoring at Tata Steel Downstream Products Limited**
  - Led a team of 4 to build a full-stack Condition Monitoring System for Electric Overhead Traveling (EOT) Crane.
  - Deployed in production at Tata Steel Downstream Products Limited, Jamshedpur, Jharkhand, India.
  - Guided the complete hardware installation onand software deployment
  - Used Raspberry Pi 5, ESP32 Microcontroller, Micropython, Python, MQTT, Django, Bootstrap, Docker, PostgreSQL, Redis, Azure Virtual Server, and Grafana.

- **Water Distribution Pipe Pressure Monitoring at Haldia Water Services Pvt. Ltd., WB, India**
  - Designed an IoT system for domestic water distribution pipe pressure monitoring for Haldia Water Services Pvt Ltd (HWSPL).
  - The system was built as a part of the research project sponsored by the Central Public Health and Environmental Engineering Organisation (CPHEEO), Ministry of Housing and Urban Affairs, Government of India.
  - The system periodically sent pressure readings to the cloud server, where it was stored in a database for further ML-based analysis by a separate team of researchers at IIT Kharagpur. The system could be configured remotely.
  - Used Pressure Sensor, ESP32, 4G Modem, Solar Panel, Rechargeable Battery, Charge Controller, MQTT, AWS EC2.

- **IoT Enablement of Legacy Sensors at Bokaro Steel Plant**
  - Led a 3-member team to deploy a Proof-of-Concept (PoC) at Bokaro Steel Plant, retrofitting legacy Honeywell gas sensors for modern IoT connectivity.
  - Engineered a custom hardware interface to digitize 4-20 mA analog signals, transmitting real-time telemetry over a LoRa backhaul.
  - Built the end-to-end data pipeline using ESP32 (MicroPython) and RFM95W transceivers, seamlessly integrating edge data with an AWS-hosted central server.

- **Automate Ductile Iron Pipe Coating Thickness Measurement at Tata Steel**

- Independently engineered a Proof-of-Concept (PoC) at Tata Steel to completely automate ductile iron pipe coating thickness measurements.
- Retrofitted a hand-held Alcometer gauge and a Siemens S7-1200 PLC, replacing manual checks with an automated system that pushes data directly to networked PLC registers.
- Built the hardware and software bridge using a Raspberry Pi and Python to seamlessly connect the measurement tools with the industrial control system.

– **Full TLS 1.3 Handshake Over LoRa for Secure IoT**

- Proposed and implemented a transparent Wi-Fi-to-LoRa proxy that seamlessly routes secure HTTPS traffic from local devices to remote web servers.
- Establishes an end-to-end TLS 1.3 handshake over LoRa.
- Implemented TLS session resumption, which drastically reduces connection setup time and handshake overhead for low-power networks.
- This is the first work to implement a full TLS 1.3 handshake over LoRa and sets the groundwork for further research.
- Used ESP32, RFM95W LoRa Transceiver, Raspberry Pi 5, Raspberry 3B+, Python, Nginx, TLS 1.3, AWS EC2

– **LoRa MIMO Testbed**

- Designed and implemented an 8x8 MIMO system for LoRa.
- It leverages spatial multiplexing to exchange data in parallel streams. Performed a thorough evaluation.
- Used ESP32, RFM95W LoRa Transceiver, Micropython.

– **Implemented HTTP Over LoRa**

- Designed and implemented an application layer proxy to enable HTTP access over the LoRa channel.
- To address the payload limitations of LoRa, implemented a message chunking and reassembly method.
- For enhanced performance in the presence of interferences, implemented FHSS.
- Implemented a caching mechanism that significantly reduces collisions in a multi-node setup.
- Used ESP32, RFM95W LoRa Transceiver, Micropython.

– **Lightweight Blockchain on Microcontroller**

- Implemented a lightweight blockchain framework on a resource-constrained microcontroller to achieve decentralized, tamper-proof logging and data exchange across IoT nodes without relying on cloud infrastructure.
- Used ESP32 and Micropython.
- Patent granted.

– **Live Ambulatory Patient Monitoring System**

- Led a team of 3 for hardware and software development for an ambulatory patient monitoring device measuring ECG, BP, Body Temperature, and Pulse Rate.
- The device captured measurements, sent those to the local smartphone (with our Android application installed) over Bluetooth.
- The smartphone provides edge ML-based analysis and recommendations, along with relaying data to the cloud.
- A cloud server hosted a web application that displayed the live parameters.
- Used ESP32, Sensors, Micropython, Docker, Django, REST API, ChartJS, Bootstrap.

Oct 2020 – Dec 2023 **Research Fellowship, *Indian Institute of Technology (IIT), Kharagpur*.**
Senior Research Fellowship (Oct 27, 2022 – Dec 31, 2023)
Junior Research Fellowship (Oct 22, 2020 – Oct 22, 2022)

Worked under Prof. Sudip Misra in the ***Ministry of Electronics and Information Technology (MeitY), Government of India,*** sponsored research project entitled *TribeConnect: Integrated Smart Tribal Eco-Platform – A Proof of Concept in Chhattisgarh.*

Project *TribeConnect* aimed at the upliftment and empowerment of the tribal community through the application of IoT and Machine Learning in the fields of agriculture and healthcare.

– **LoRa Network for Research Project Funded by MeitY, Government of India**

- Designed and tested low-power LoRa IoT networks enabling reliable rural communication over kilometers as part of the research project.
- Developed a hardware-based system to enable WiFi-enabled devices to exchange messages over LoRa backhaul.
- Used ESP32, RFM95W LoRa Transceiver, Micropython.

– **IoT Gateway with Optional Electrical Load Controller**

- Designed and implemented an IoT gateway with GSM backhaul to be deployed in the field.
- It collected data and transmitted it to a remote web server exposing an API.
- The gateway could also be attached with an optional power control device, enabling remote control of non-IoT devices in the field.
- The power control device supported multiple wireless protocols.
- Used Raspberry Pi, Solid State Relay, ESP32 Microcontroller, GPS.

– **Live Server Management**

- Was responsible for managing a live web server installed at IIT Kharagpur. Managed users, dockerized web applications and deployed on the server, managed reverse-proxy.
- Used Ubuntu Server, Nginx, Docker, Django

– **Developed IoT Dashboard & Automatic Database Replication**

- Developed a full-stack dashboard for the agricultural vertical of the project.
- Exposed APIs for the insertion and retrieval of data. Had also set up SQL database replication to prevent data loss due to connectivity issues.
- Used Django, MariaDB, Bootstrap, and ChartJS.

Nov 2020 – Oct 2025 **System Architect, *SensorDrops Networks Pvt. Ltd., Kharagpur*.**
Contributed voluntarily without pay to this startup founded by my Ph.D. supervisor.

– **Pet Immune Human Intruder Detection and Alert System**

- Led a team of three to design and deploy an Edge Machine Learning (ML) system for real-time pet immune human intruder detection in domestic and commercial spaces.
- Integrated seamlessly with existing CCTV DVRs, fetched live feed, analyzed, sent phone calls and SMSs along with raising local alarm and actuation.
- Used Python, Django, YOLO, GSM Modem, Custom Circuit, ONVIF, and RTSP protocol.

– **Machine and Ambient Condition Monitoring System**

- Redesigned the existing system to include electrical parameters along with vibration and temperature monitoring of electrical motors.
- Modularized the system so that it can be used for other applications, such as Warehouse Condition Monitoring, with minimal changes.
- Used Raspberry Pi, ESP32, Django, Python, InfluxDB, MQTT, Modbus

– **Smartphone as a Controller for Electrical Lights and Fans**

- Managed a team of 3 to develop a system that connects with existing electrical wiring and enables the existing lights and fans to be controlled using a smartphone application.
- Used ESP8266 Microcontroller, MicroPython, Custom PCB, Android, and UDP.

Academic Achievements & Recognitions

2024 **Qualcomm Innovation Fellowship**, Finalist

2026 Invited as **Session Chair** for Demos at the **IEEE CONECCT 2026 Conference**, Bangalore, India

2022 **Speaker**, Workshop on **Internet of Things**, Maryland Institute of Technology & Management, Jamshedpur, Jharkhand, India

2024 Invited to conduct lab sessions in a **Training Program on IoT**, at **IIT Patna, Bihar, India**

Instructor in Live/Hands-on Sessions

July, 2024 Security for Internet of Things and DevSecOps, **Tata NeuSkills**

April, 2024 Security for Internet of Things and DevSecOps, **Tata NeuSkills**

Jan, 2024 Short Term Course on **Hands-on** Introduction to Internet of Things with Machine Learning, **IIT Kharagpur**

Dec, 2023 Short Term Course on **Hands-on** Introduction to Internet of Things with Machine Learning, **IIT Kharagpur**

Dec, 2023 Security for Internet of Things and DevSecOps, **Tata NeuSkills**

Dec, 2023 Introduction to Cloud Computing, **IIT Kharagpur**

Jul, 2023 Short Term Course on **Hands-on** Introduction to Internet of Things with Machine Learning, **IIT Kharagpur**

April, 2023 Introduction to Cloud Computing, **IIT Kharagpur**

Experiences as Reviewer

Journals **Transactions on Communications**, IEEE

Internet of Things, IEEE

Scientific Reports, Springer Nature

Journal of Computer Virology and Hacking Techniques, Springer Nature

Software: Practice and Experience, Wiley

Books **Technical reviewer for books by Apress, Springer Nature.**

Title: Supply Chain Software Security: AI, IoT, and Application Security.

Title: Biotech and IoT: An Introduction Using Cloud-Driven Labs.

Title: Emerging Technologies in Healthcare 4.0.

Title: Unmanned Aerial Vehicles Swarm for Protecting Smart Cities.

Title: Blockchain, IoT, and AI Technologies for Supply Chain Management.

Title: IoT System Testing.

Title: Build Your Own IoT Platform.

Technology Commercialization / In Production

Nov, 2025 – Ongoing **An Intelligent Liquid-Level Sensing and Pump Control System** — Commercialized through *Indian Institute of Technology Kharagpur, India* under a technology transfer agreement with *Imperial Electrical Appliances Ltd., West Bengal, India*

Nov, 2024 – Ongoing **System for Real Time Intrusion Detection, Actuation and Alert and Method Thereof** — Commercialized through *SensorDrops Networks Pvt. Ltd., India* under a technology transfer agreement with *Imperial Electrical Appliances Ltd., West Bengal, India*

Oct, 2024 – Ongoing **Embedded System and Method for Condition Monitoring of Electric Overhead Travelling (EOT) Cranes** — In use at *Tata Steel Downstream Products Ltd., Bara Plant, Jamshedpur, Jharkhand, India*

Jul, 2024 – Ongoing **IoT-Enabled Smart Hardware System with Edge Intelligence for Rapid Leak Detection in Water Distribution Networks** — In use at *Haldia Water Services Pvt. Ltd., Haldia, West Bengal, India*

NPTEL Teaching Assistantship

The National Programme on Technology Enhanced Learning (NPTEL) — a joint initiative of the Ministry of Human Resource Development, Government of India, seven IITs, and IISc Bangalore (launched 2003) — provides open-access, high-quality courses from IIT faculty to learners across India.

Jan – April, 2026 Introduction to Internet of Things, Prof. Sudip Misra, IIT Kharagpur.

July – Oct, 2025 Introduction to Internet of Things, Prof. Sudip Misra, IIT Kharagpur.

Jan – April, 2025 Introduction to Internet of Things, Prof. Sudip Misra, IIT Kharagpur.

July – Oct, 2024 Introduction to Internet of Things, Prof. Sudip Misra, IIT Kharagpur.

Jan – April, 2024 Introduction to Internet of Things, Prof. Sudip Misra, IIT Kharagpur.

July – Oct, 2023 Introduction to Internet of Things, Prof. Sudip Misra, IIT Kharagpur.

Jan – April, 2023 Introduction to Internet of Things, Prof. Sudip Misra, IIT Kharagpur.

Institute Teaching Assistantship

Spring, 2025 – 2026 Computer Networks Laboratory, Prof. Sandip Chakraborty, IIT Kharagpur.

Autumn, 2024 – 2025	Programming and Data Structures, Prof. Sudip Misra, IIT Kharagpur.
Spring, 2024 – 2025	Programming and Data Structures, Prof. Sudip Misra, IIT Kharagpur.
Autumn, 2023 – 2024	Programming and Data Structures, Prof. Sudip Misra, IIT Kharagpur.
Spring, 2023 – 2024	Programming and Data Structures, Prof. Sudip Misra, IIT Kharagpur.
Autumn, 2022 – 2023	Ubiquitous Computing, Prof. Sudip Misra, IIT Kharagpur.
Spring, 2022 – 2023	Computer Networks Laboratory and Programming & Data Structures, Prof. Sudip Misra, IIT Kharagpur.
Autumn, 2021 – 2022	Programming and Data Structures, Prof. Sudip Misra, IIT Kharagpur.
Spring, 2021 – 2022	Computer Networks Laboratory, Prof. Sudip Misra, IIT Kharagpur.

Skills

IoT Hardware	Raspberry Pi, Microcontrollers (ESP32, ESP8266, Raspberry Pi Pico, 8051), LoRa Transceivers, Sensors, Actuators, Discrete Components
Programming Languages	Python, Micropython, C
Web, Edge, & Cloud	Machine Learning (ML) Integration on Edge and Cloud, Django, Docker, Kubernetes, Nginx, REST API, Apache, HTML, CSS, JavaScript, PHP, AWS, Google Cloud, Azure, OpenStack, and Digital Ocean
Database	SQL, MySQL, PostgreSQL, MariaDB, InfluxDB, SQLite, Redis
Tools	Linux Kernel Modification and Cross Compilation, GitHub, Wireshark, Altium Designer, Fusion 360, Proteus, and Keil μVision, NodeRed
Miscellaneous	Mentoring Interns, Ph.D., M.S., M.Tech., and B.Tech. Students, Project & Lab Management, Academic Research, Consulting Projects, Project Proposal Writing, Selecting and Procuring Instruments and Components for Lab.

Volunteering

2022-2023 **Secretary of IEEE Computer Society Student Branch Chapter**, IIT Kharagpur.

Referees

Details available on request