

Atonu Ghosh

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Professional Summary

Ph.D. thesis submitted at IIT Kharagpur, India. **6+ years** of experience in *designing, prototyping, and deploying full-stack IoT, LPWAN, and Edge systems*. Proven track record of leading projects from concept to production for clients like Tata Steel Downstream Products Limited, India. Innovator with **16 patents** (3 granted, **4 commercialized/in use**) and **8 authored journal** articles in *secure, scalable IoT architectures, and LPWANs*. Dedicated to forward R&D in IoT and edge-intelligence for reliable, human-centric systems.

Education

- 2021–2026: **Ph.D., Computer Science & Engineering.**
Indian Institute of Technology, Kharagpur, India
Supervisor: Prof. Sudip Misra
Thesis Title: *Architectures and Protocols for Reliable and Secure Low Power IoT Networks*
- 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
- 2014–2017: **Bachelor of Technology, Computer Science & Engineering.**
Institute of Engineering and Management (IEM), Salt Lake, Kolkata, India
CGPA: 7.71/10

Skills

Programming	Python, Micropython, C
Cloud & DevOps	AWS, Azure, Google Cloud, Docker, Kubernetes, Nginx, REST API, OpenStack
IoT & Hardware	Raspberry Pi, ESP32, ESP8266, Raspberry Pi Pico, 8051, LoRa, Sensors, Actuators
Database	SQL, MySQL, PostgreSQL, MariaDB, InfluxDB, SQLite, Redis
ML, Edge,& Tools	Edge ML Integration, GitHub, Wireshark, Fusion 360, Proteus, Keil μ Vision, NodeRed

Professional & Research Experience

- Jan 2026 – **Research Intern, Samsung R&D Institute India - Bangalore.**
Jul 2026 Worked in the *SmartThings* team on research projects to conserve sensor energy and increase reliability.
- Jan 2021 – **Ph.D. Research Scholar, Indian Institute of Technology, Kharagpur.**
Jun 2026
- **EOT Crane Condition Monitoring at Tata Steel Downstream Products Ltd.**
Led a team of 4 to deploy a **full-stack, production** system. Architected the system using Python, MQTT, **Docker**, PostgreSQL, Redis, and **Azure** for real-time analytics.
 - **TLS 1.3 Handshake over LoRa Backhaul**
Engineered a novel transparent proxy establishing a **full end-to-end TLS 1.3 handshake over LoRa**, enabling secure HTTPS for ultra-low-power, long-range IoT devices.
 - **HTTP-over-LoRa**
Developed an application-layer proxy for HTTP-over-LoRa, implementing message chunking, reassembly, and FHSS to overcome LoRa payload limitations.

Nov 2020 – **System Architect, SensorDrops Networks Pvt. Ltd., IIT Kharagpur.**

Oct 2025 Contributed voluntarily without pay to this startup founded by my Ph.D. supervisor.

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

Architected system to integrate with CCTV DVRs & led a team of 3 to develop & deploy an Edge ML system for real-time pet immune human intruder detection.

- **Machine and Ambient Condition Monitoring System**

Redesigned the existing system to include electrical parameters along with vibration and temperature monitoring of electrical motors. Modularized and made the system extensible.

- **Smartphone 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.

Selected Patents & Publications

Patents (Granted & Commercialized)

- P4 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**).
- P3 **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**).
- P2 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 Traveling (EOT) Cranes, *Indian Patent*, File No. – 202531033456, Apr 4, 2025 (**In Use at Tata Steel Downstream Products Ltd.**).
- P1 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**).

Journal Articles (Published, Preprints, and Communicated)

- J4 **Atonu Ghosh**, Akhilesh Mohanasundaram, Srishivanth R F, and Sudip Misra, *Siiia*: Secure Industrial IoT Architecture for HTTPS Communication Over LoRa Using TLS, In *IEEE Transaction on Industrial Informatics*, 2026, [Accepted].
- J3 **Atonu Ghosh**, Sudip Misra, Venkanna Udutalapally, and Debanjan Das, LoRaute: Routing Messages in Backhaul LoRa Networks for Underserved Regions, in *IEEE Internet of Things Journal*, volume 10, pages 19964–19971, 2023..
- J2 **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*, 2025, [In Revision].
- J1 **Atonu Ghosh**, Anandarup Mukherjee, and Sudip Misra, *SEGA*: Secured Edge Gateway Microservices Architecture for IIoT-based Machine Monitoring, In *IEEE TII*, 2021, [Published].

Achievements & Activities

2024 **Qualcomm Innovation Fellowship**, Finalist

2026 Invited as a **Session Chair** at IEEE CONECCT 2026 Conference, Bangalore, India

2022-2023 **Secretary of IEEE Student Branch Chapter**, IIT Kharagpur, India