



MARCH 2026

# BYTE STREAM



**COMPUTER SCIENCE AND ENGINEERING**  
**INDIAN INSTITUTE OF TECHNOLOGY (ISM)**  
**DHANBAD**

## **MONTHLY** **NEWSLETTER**

An Insight into the  
Department of Computer  
Science and Engineering,  
IIT (ISM) Dhanbad



Code never lies, comments  
sometimes do.

— Ron Jeffries

## Theoretical Computer Science SIG: Mini-Lecture Series on Fundamentals of Quantum Computing by Dr. Sagnik Chatterjee

A mini lecture series was delivered by Dr. Sagnik Chatterjee, a visiting fellow from TIFR Mumbai, from 16th to 21st March on “Fundamentals of Quantum Computing”. As part of the activities of ANVESH. Dr. Sagnik Chatterjee also delivered a research talk on “Efficient Quantum Agnostic Improper Learning of Decision Trees”.

The sessions for his mini-lecture series with the SIG Theoretical Computer Science were held in the seminar room of the Computer Science and Engineering department. Students from the CSE Department, as well as from other departments such as Chemical, Physics, and Mining, attended the lectures. Faculty members from the CSE and Physics Department were also present.

The broad outline of the topics covered included the motivation for quantum computing with the limitations of classical computation, and the introduction of concepts such as qubits, Dirac notation, the Bloch sphere, superposition, interference, measurement, unitary operators, and quantum gates. On Saturday, 21st March 2026, a special session was conducted on the implementation of quantum algorithms using IBM Qiskit.



## A New Frontier in Predictive Maintenance of Induction Motors



A prestigious research grant has been awarded by TEXMiN in collaboration with MyhyaVerse Private Limited for the project titled “Development and Validation of a Physics-Informed Digital Twin for Predictive Maintenance of Induction Motors.” The project is led by Prof. Partha Pratim Roy (PI) from the Department of Computer Science and Engineering, and co-led by Prof. Omkar Mypati (Co-PI) from the Department of Mechanical Engineering, bringing together strong interdisciplinary expertise in AI, industrial systems, and data-driven modeling. With a total funding of ₹23 lakhs, the initiative aims to advance intelligent automation, asset reliability, and maintenance in India’s mining sector.

The research focuses on developing a next-generation digital twin framework that integrates real-time sensor data, physics-based modeling, and advanced AI/ML techniques for predictive maintenance of critical industrial machinery. By enabling early detection of faults such as bearing wear, shaft misalignment and insulation degradation, the system is expected to significantly reduce unplanned downtime, optimize maintenance strategies, and enhance operational safety in demanding mining environments.

A key highlight of the project is the development of a fully instrumented induction motor testbed, seamlessly integrated with Industrial IoT (IIoT) infrastructure, cloud-based analytics, and an interactive visualization dashboard for real-time monitoring and decision support. The hybrid modeling approach combining domain-driven physics with deep learning places this work at the forefront of next-generation cyber-physical systems and smart industrial technologies.

## SIG EVENTS

### Computing Systems: Exploring Fog Computing for IoT

The Department of Computer Science & Engineering at IIT (ISM) Dhanbad hosted a research talk on Fog Computing for IoT: Challenges and Future Directions on March 13, 2026.



Organized by the Special Interest Group on Computing Systems, the event featured Dr. Abishek Hazra, Assistant Professor at NIT Agartala. Dr. Hazra, an alumnus of NIT Agartala and IIT (ISM) Dhanbad, shared insights from his academic journey and research experience, including his tenure as a Research Fellow at the National University of Singapore. His talk highlighted the pressing challenges in integrating fog computing with IoT systems and explored future pathways for enhancing efficiency and scalability. The session, held at the Seminar Hall of the CSE Department, attracted faculty, research scholars, and students, fostering an engaging discussion on emerging technologies.

### Anvesh: Advancing Frontiers in Quantum and Deep Learning

The March 2026 session of Anvesh featured a vibrant mix of discussions and seminars highlighting cutting-edge topics in computer science. The month began with explorations into machine learning and quantum computing, where Ph.D. scholar Kunal Roy compared classical and quantum approaches, and M.Tech students Parul Saxena and Piyush Yadav presented on data augmentation in deep learning. Mid-month, Dr. Sagnik Chatterjee vered an invited talk on quantum agnostic improper learning of decision trees, enriching the ANVESH Special Session. The session concluded with parallel discussions by M.Tech students on LSTM networks and RNN-based character prediction using PyTorch. With themes ranging from quantum learning to deep learning applications, the March activities underscored Anvesh’s commitment to fostering collaborative inquiry and exposing students to both theoretical and applied dimensions of modern computing.



## Agent Slam

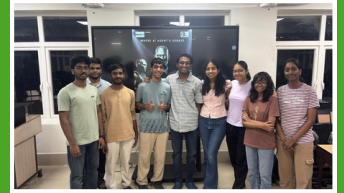
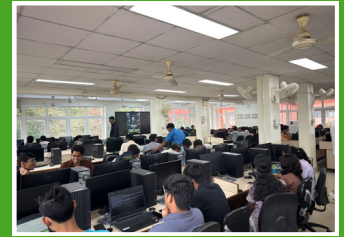
On 29th March, 2026, the CSE Society conducted a new event, Agent Slam. The event was designed around AI-based debate systems, where participating teams deployed agents to compete in structured rounds.

A total of 14 teams participated. The competition, with a total prize pool of ₹30,000, followed a knockout format with five rounds, including a separate match for third place. In each round, agents were required to present arguments, generate rebuttals, and respond within fixed time limits. Evaluation was carried out by a central judging agent, Oracle, developed by the organisers, based on persuasiveness, logical consistency, API robustness, and response agility.

Participants developed agents by integrating language models with predefined logic and prompt structures. A testing session was conducted prior to the event to ensure stable connectivity with the judging agent and to verify system behaviour.

Team aistoleourjobs (Rishap Yadav, Ria Joseph, and Kartik Lolla) secured first place, followed by Team DeepMindset (Anshi Kandulna, Ippili Chinmayi, and Debanjali Bagchi) in second place, and Team Openclaw (Bathina Shajith, Divvela Ashish, and Yeturi Dinesh Krishna) in third place.

The event demonstrated the practical deployment of AI systems in competitive settings, highlighting both the capabilities and limitations of current language model-based agents under structured evaluation conditions.



## IndiaAI Fellowship: Deep Learning based model for Intrusion Detection in IIoT

As Industrial IoT (IIoT) continues to bridge the gap between physical machinery and digital intelligence, while it makes the building smarter and faster, it also gives hackers many more ways for cyber threats. A deep learning-based Intrusion Detection System (IDS) is specifically engineered for the rigors of the industrial floor, capable of detecting and classifying cyber-attacks as well as abnormal activities.

Professor Sachin Tripathi and his student team, including Kumar Harshdeep, who acquired the IndiaAI Fellowship, proposed a system that moves beyond simple rule-based detection by leveraging advanced Deep Learning (DL) architectures on IIoT-specific datasets to learn patterns of normal and anomalous behaviour. The system aims for high detection accuracy with minimal false positives. It also addresses unique characteristics, real-time requirements, legacy systems, and High-Fidelity Detection, which is capable of classifying sophisticated cyber-attacks and operational abnormalities that firewalls miss, while maintaining compatibility with diverse protocols.

## PhDs Awarded in the month of March 2026

Awardee	Supervisor	Thesis Title
Vandana Rathore	Prof. Arup Kumar Pal	Development of chaotic maps based cryptosystems for digital images and videos
Sreenu Naik Bhukya	Prof. A. C. S. Rao	Energy efficient clustering algorithms using metaheuristic approaches for WSNs and IoTs

## Fellowship Approved in the month of March 2026

Applicant Name	Project Guide Name	Project Name	Approved by
Kumar Harshdeep	Professor Sachin Tripathi	Deep Learning based model for Intrusion detection in IIOT	IndianAI team

## Publications:

**Title:** Sweeping Arrangements of Non-Piercing Regions in the Plane

**Authors:** Dalal, S., Gangopadhyay, R., Raman, R.

**Published in:** Algorithmica (Springer), Volume 88, Article 33

**Title: A fusion framework for low-contrast IR-Visible images using wavelet morphology and vision-inspired model**

**Authors:** Manali Roy and Susanta Mukhopadhyay

**Published In:** Infrared Physics and Technology, Elsevier, on 23 March, 2026

**Title: A Zero-Reference Approach Employing  $\gamma$ -Correction + Dilated-ZeroDCE++ for Handwritten Cheque Image Enhancement**

**Authors:** Prabhat Dansena, Ashish Ranjan, Soumen Bag, and Prasun Chandra Tripathi

**Accepted at:** 15th International Conference on Pattern Recognition Applications and Methods (ICPRAM), SCITEPRESS Digital Library, pp. 525–532, Marbella, Spain, Mar 2-4, 2026.

**Title: Deep Learning Approaches for Automated Osteoporosis Classification on Indian Hip X-Ray Data**

**Authors:** Shukla Mondal, Arup Kumar Pal, Pooja Mishra, and Manish Raj

**Accepted at:** 12th IBS Conference on Marketing & Business Strategy (ICOMBS 2026) in Association with Centre of Sustainable Energy (IIT Roorkee), held at IBS Hyderabad, India, 13-14 March, 2026 (Received Best Paper Award)

**Title: Integrated molecular and clinical profiling of primary mitochondrial oxidative phosphorylation disorders in an Indian cohort: Insights from genetics, neuroimaging, and machine learning**

**Authors:** Anjan Chowdhury et al.

**Published in:** Mitochondrion (Elsevier), Volume 89, Article 102150

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