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भारतीय खनि विद्यापीठ
धनबाद



**IIT
ISM** INDIAN INSTITUTE
OF TECHNOLOGY
INDIAN SCHOOL OF MINES
DHANBAD

SPARK

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DEPARTMENT OF ELECTRONICS ENGINEERING

INDIAN INSTITUTE OF TECHNOLOGY

(INDIAN SCHOOL OF MINES), DHANBAD



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DEPTT. OF ELECTRONICS ENGINEERING

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HOD'S ADDRESS



Dear Readers,

It brings me immense pride to share some of our department's standout achievements and upcoming initiatives. Our community continues to push the boundaries of research, demonstrating excellence both in scholarly publications and on prestigious national platforms.

We began the month with great enthusiasm by welcoming our newest faculty member, Dr. Nirjhar Kumar. We are excited to have him join our fraternity and look forward to his contributions to our department's teaching and research endeavours.

Our department successfully concluded a five-day Instruction Enhancement Program (IEP) on Advanced Semiconductor Design Techniques Using Modern VLSI EDA Tools. The program provided valuable hands-on insights into modern tools and methodologies shaping the semiconductor industry.

Prof. Manodipan Sahoo shared his research in an invited lecture at the IEEE Computer Society Annual Symposium, while Prof. Rajeev Kumar Ranjan had the great honor of giving an invited talk on Memristor Technology and Next-Gen VLSI at JSS Noida and IIT Roorkee.

I would like to highlight the outstanding work of Prof. R.K. Gangwar, Prof. Rajeev Kumar Ranjan, Prof. Devendra Chack, and Prof. Shalu Rani, as well as their respective research scholars, for their recent valuable publications in prestigious journals that have significantly advanced knowledge in their fields.

Furthermore, the Department is extremely delighted to share its recent achievement in the form of a Patent Grant, developed by the inventors Prof. Rajeev Kumar Ranjan along with a best paper award at IEEE SPACE 2026 to Prof. R.K. Gangwar and their research scholars.

Please find the Newsletter for detailed updates and give your valuable feedback to fertilise us to be bigger and better.

Wish you all the best!

Subindu Kumar

*Prof. Subindu Kumar
HoD, Department of Electronics Engineering,
IIT(ISM) Dhanbad*

A New Chapter Begins: Congratulations to Prof. Subindu Kumar

On July 1, 2026, the Department of Electronics Engineering warmly welcomed Prof. Subindu Kumar as our new Head of Department, succeeding Prof. Ravi Kumar Gangwar.

Prof. Subindu stepped into the role bringing a vision of innovation, dedication, and academic excellence aimed at elevating the department to even greater heights. The faculty, staff, and students extended a warm welcome to Prof. Subindu kumar as he began leading our community forward.

Honoring the Leadership of Prof. Ravi Kumar Gangwar

Alongside this new beginning, the department formally recognized and celebrated the impactful tenure of outgoing HoD, Prof. Ravi Kumar Gangwar. Throughout his leadership, Prof. Gangwar's steadfast commitment, thoughtful guidance, and hard work left an indelible mark on the growth and culture of our department. The entire department expressed its sincere gratitude for his dedication and wished him the absolute best in all his future academic and personal endeavours'.

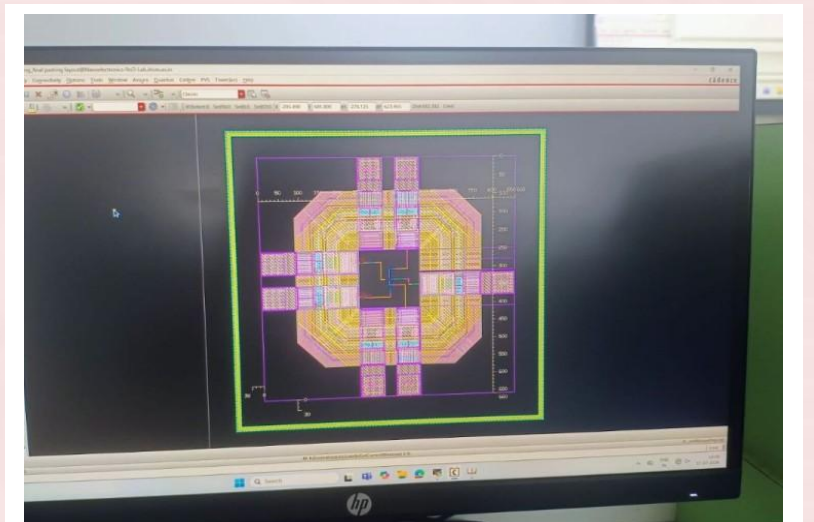
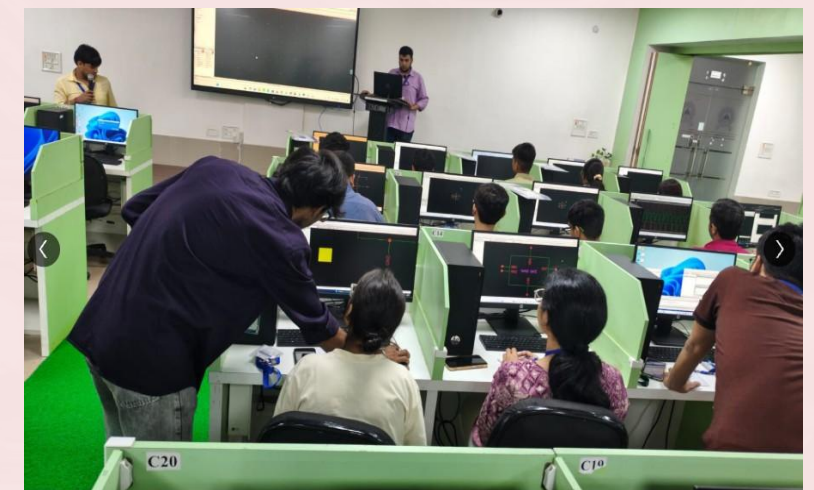


WORKSHOP

The Department of Electronics Engineering, IIT (ISM) Dhanbad, successfully organized a five-day Instruction Enhancement Program (IEP) on Advanced Semiconductor Design Techniques Using Modern VLSI EDA Tools from 13–17 July 2026 under the coordination of Prof. Rajeev Kumar Ranjan and Prof. Manodipan Sahoo, supported by MeITY. The workshop featured invited lectures by distinguished experts from premier academic institutions and the semiconductor industry, providing insights into state-of-the-art VLSI design methodologies and emerging technologies. Participants received comprehensive hands-on training in Cadence Virtuoso, covering the **complete custom IC design flow** from schematic design, simulation, layout, **DRC/LVS verification**, parasitic extraction, post-layout analysis, pad-frame design, dummy fill, seal ring implementation, and final **GDSII generation**. The program successfully bridged theoretical concepts with practical design experience, equipping participants with industry-relevant skills in semiconductor chip design.

Distinguished Expert Speakers

Prof. Shubham Sahay (IIT Kanpur): Reliable TCAD Simulations and Hybrid CMOS–NVM Bayesian Inference Accelerators. Mr. Puneet Kumar (Synopsys): Latest Trends in Semiconductor Design and Verification. Prof. Tapan K. Gandhi, FNAE, FNASc (IIT Delhi): Beyond the Basics: Fundamental Science, Health-care and Next-Generation AI. Prof. Subindu Kumar (IIT (ISM) Dhanbad): Digital System Design with HDL. Prof. Rahul Bhattacharya (IIT (ISM) Dhanbad): Digital System Design using Verilog. Dr. H. S. Jattana (SCL, Mohali): Semiconductor Manufacturing Challenges and CMOS Analog Physical Design. Mr. Anurag Tyagi (ISRO): Applications of Mixed-Signal ASICs and FPGAs for Space-Based Scientific Experiments.



EXCHANGING IDEAS AND INNOVATIONS

Prof. Manodipan Sahoo delivered an invited lecture on his research at the IEEE Computer Society Annual Symposium on VLSI (ISVLSI 2026), held from 7–10 July 2026 at ITC Sonar, Kolkata. The research work, titled “Physics-Informed Machine Learning for Fast BEOL Thermal Hotspot Prediction,” was presented by Prof. Manodipan Sahoo. The paper, identified as Paper ID 150, was co-authored by Jaiprakash and Rahul Kumar Verma from IIT (ISM) Dhanbad.

The presented work focuses on the application of physics-informed machine learning (PIML) to address the challenge of predicting thermal hotspots in the Back-End-of-Line (BEOL) region of advanced semiconductor technologies. Thermal hotspots can significantly affect the reliability, performance, and lifetime of integrated circuits, making their early and accurate prediction an important research problem in modern VLSI design.

By integrating physical principles with machine-learning techniques, the research aims to enable faster and efficient thermal hotspot prediction, potentially reducing computational complexity compared with conventional simulation-intensive approaches. Such approaches can contribute to improved thermal-aware VLSI design and support the development of high-performance and energy-efficient electronic systems.

The participation of IIT (ISM) Dhanbad researchers at ISVLSI 2026 highlights the institute’s continued contribution to emerging areas of VLSI, semiconductor technology, machine learning, and electronic-system design, while providing a platform for researchers to engage with the global VLSI research community.

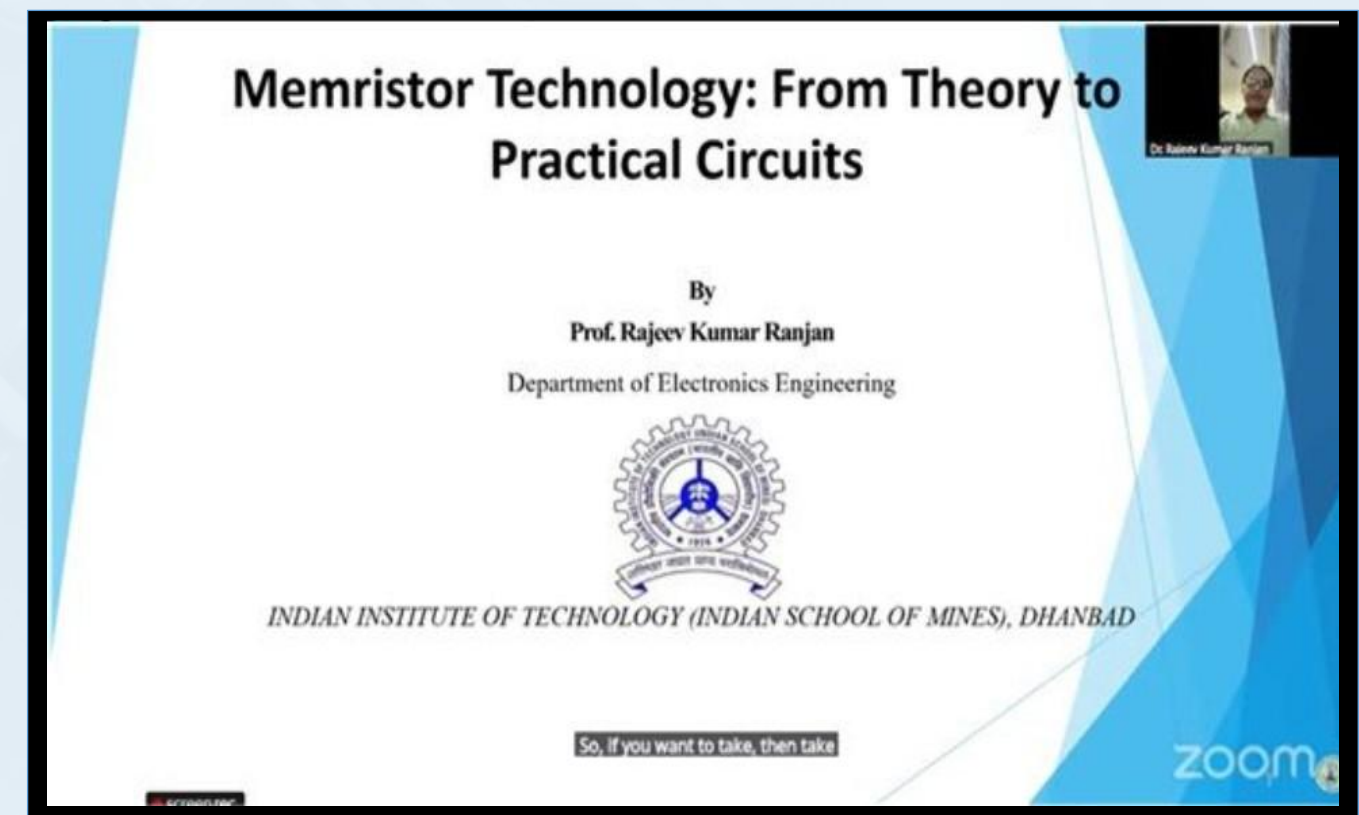


EXCHANGING IDEAS AND INNOVATIONS

- Prof. Rajeev Kumar Ranjan delivered an invited expert lecture on topic “Memristor Technology: From Theory to Practical Circuits” at “One-Day Summit on ”Silicon India 2030: VLSI & Chip Design Summit – From Design to Fabrication”, organized by the Department of Electronics & Communication Engineering, JSS University, Noida, on 24 July 2026. The summit brought together eminent academicians, researchers, industry leaders, innovators, faculty members, and students to deliberate on emerging trends in VLSI design, semiconductor fabrication, AI hardware, advanced materials, and India’s vision of becoming a global semiconductor hub
- Prof. Rajeev Kumar Ranjan delivered an invited expert lecture in the Faculty Development Program (FDP) on Emerging VLSI Devices, Advanced Circuits, and Semiconductor Fabrication organized by the Electronics & ICT Academy, IIT Roorkee, in association with Motilal Nehru National Institute of Technology (MNNIT), Prayagraj, from 27–31 July 2026. His lecture on “Memristor Circuits: Fundamentals, Design, and Real-World Applications” highlighted the fundamentals of memristive devices, CMOS-based memristor emulators, neuromorphic circuit design, and emerging applications in in-memory computing and artificial intelligence. The session was well received by faculty members, research scholars, and industry participants.



Prof. Rajeev Kumar Ranjan

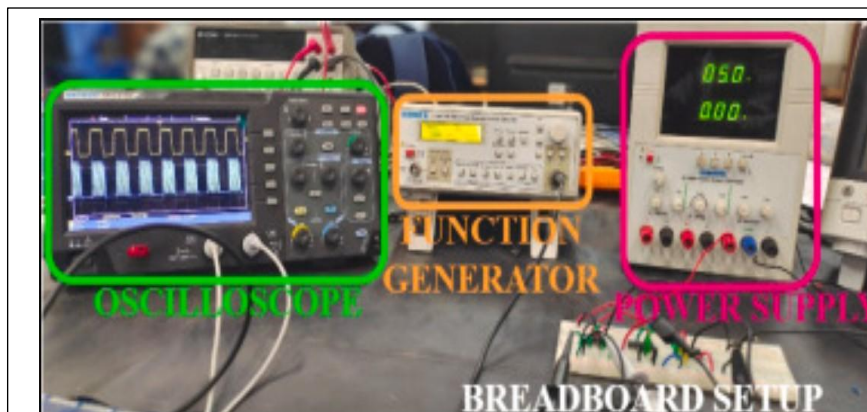


PUBLICATIONS

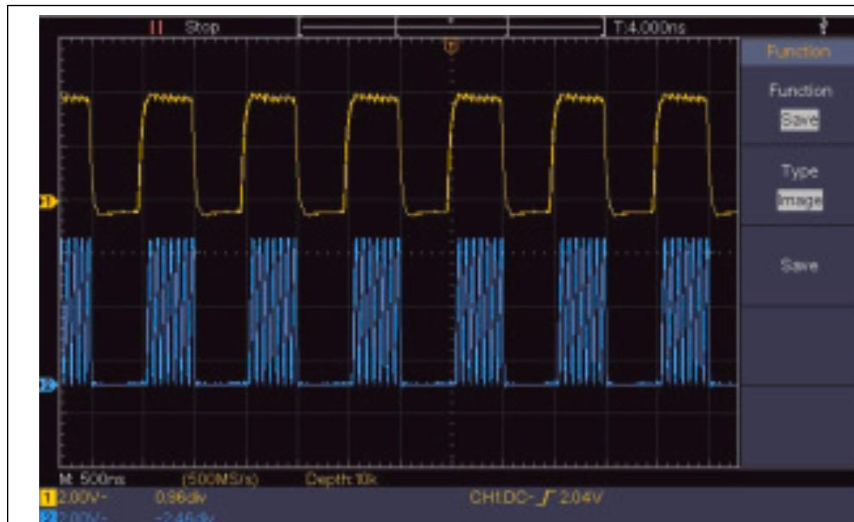
S. Maji, N. Singhal, V. Upadhyay, B. S. Makhdoomi, and R. K. Ranjan, “A compact leaky integrate and fire neuron and memristor-based neuromorphic architecture for shape classifications,” AEU - International Journal of Electronics and Communications, vol. 216, p. 156523, Oct 2026.

DOI: <https://doi.org/10.1016/j.aeue.2026.156523>

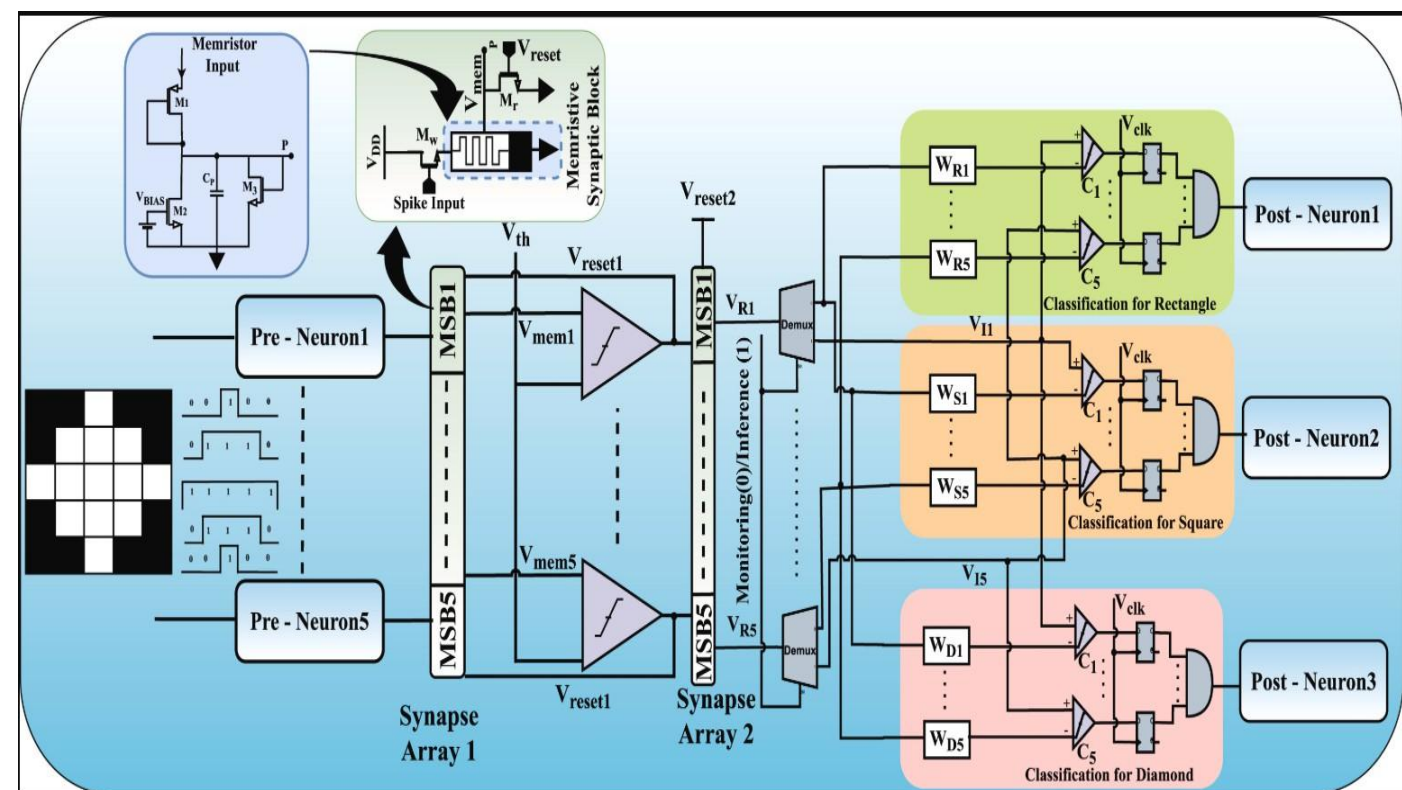
A compact 10T-1C CMOS Leaky Integrate-and-Fire (LIF) neuron architecture has been developed for energy-efficient neuromorphic computing. The proposed design achieves low power consumption and compact area while maintaining biologically inspired spiking behaviour. Implemented in 65 nm CMOS technology, the architecture demonstrates stable operation across a wide frequency range with excellent energy efficiency. Its robustness is validated through post-layout, Monte Carlo, and PVT analyses. The proposed neuron is further integrated with memristor-based synapses to enable efficient pattern classification, demonstrating its practical applicability.



Experimental setup with the function generator, DC power supply, oscilloscope, and breadboard implementation of the proposed neuron.



Measured output responses of the proposed neuron captured using an oscilloscope.



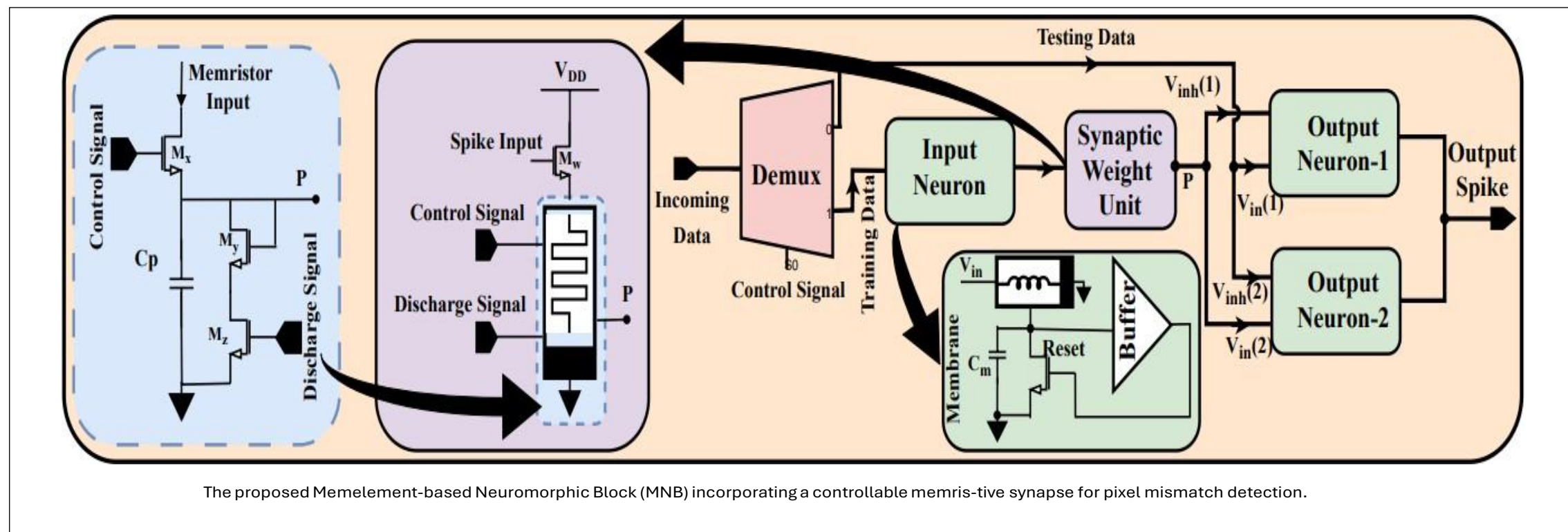
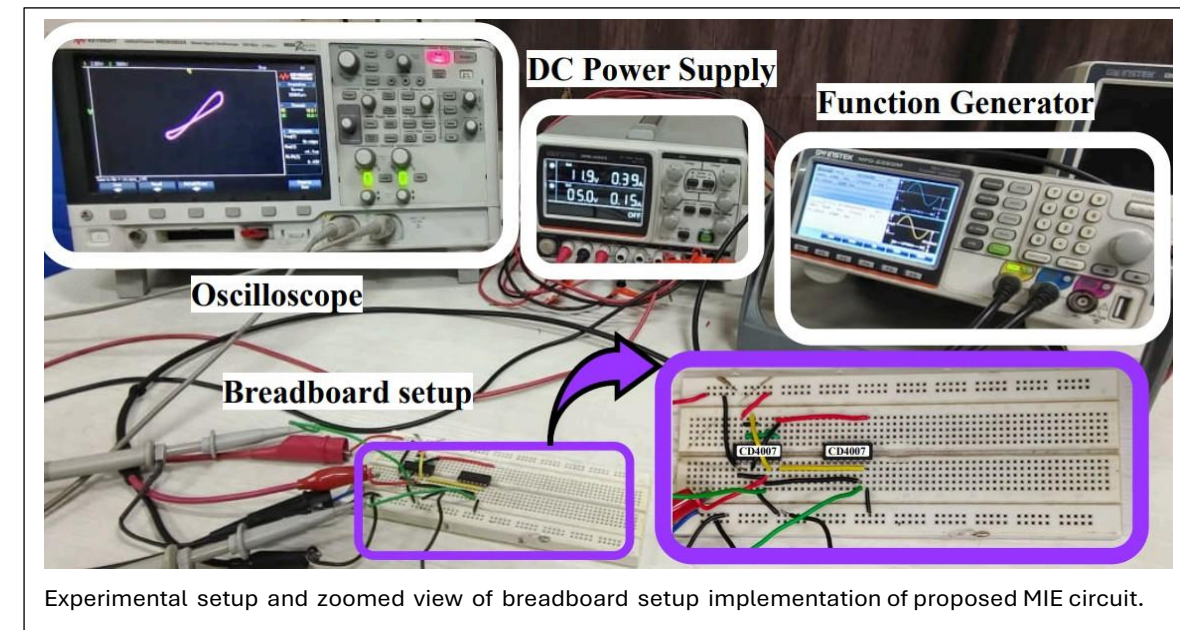
Proposed neuromorphic architecture integrating spike encoding, memristive synaptic arrays, and temporal classification with training and inference paths.

PUBLICATIONS

S. Maji, B. S. Makhdoomi, V. Upadhyay, N. Singhal, R. K. Ranjan, and S.-M. Kang, "A Minimalist CMOS Memelement-Based Neuromorphic Architecture for Energy-Efficient Spike-Driven Pattern Classification," IEEE Transactions on Circuits and Systems for Artificial Intelligence, pp. 1–13, 2026.

DOI: <https://doi.org/10.1109/TCASAI.2026.3702575>.

The work presents a compact memelement-driven neuromorphic architecture integrating a novel 7T CMOS meminductor emulator with memristive synapses for spike-driven pattern classification. Implemented in UMC 65 nm CMOS technology, the proposed design demonstrates ultra-low power operation, high energy efficiency, and compact silicon area. The architecture enables event-driven neuromorphic computing suitable for next-generation edge AI and in-memory computing applications



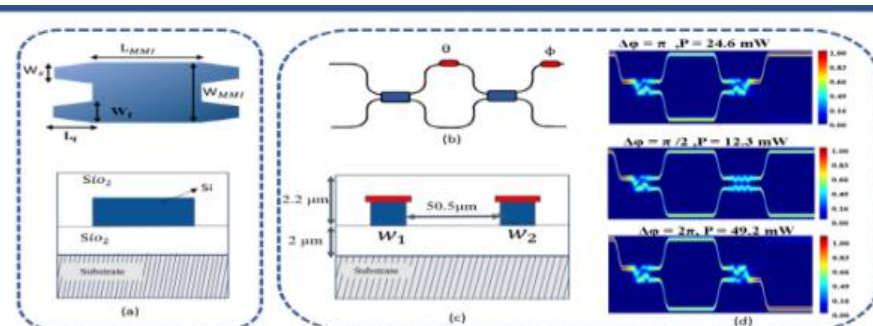
The proposed Memelement-based Neuromorphic Block (MNB) incorporating a controllable memristive synapse for pixel mismatch detection.

PUBLICATIONS

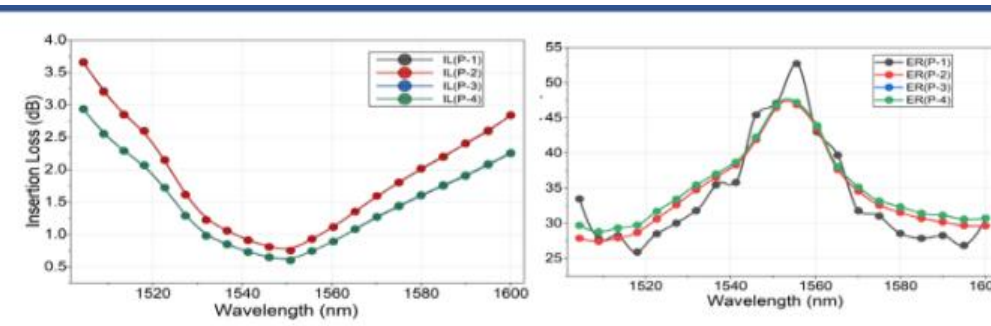
Ravi Roushan Kumar, Prantik Basu, and Devendra Chack , "Adaptive Phase Control of 4×4 Clements MZI Mesh for Stabilizing Noisy Gaussian Boson Sampling in Integrated Quantum Photonics" Advanced Quantum Technologies (Wiley).

DOI: <https://doi.org/10.1002/qute.70353>

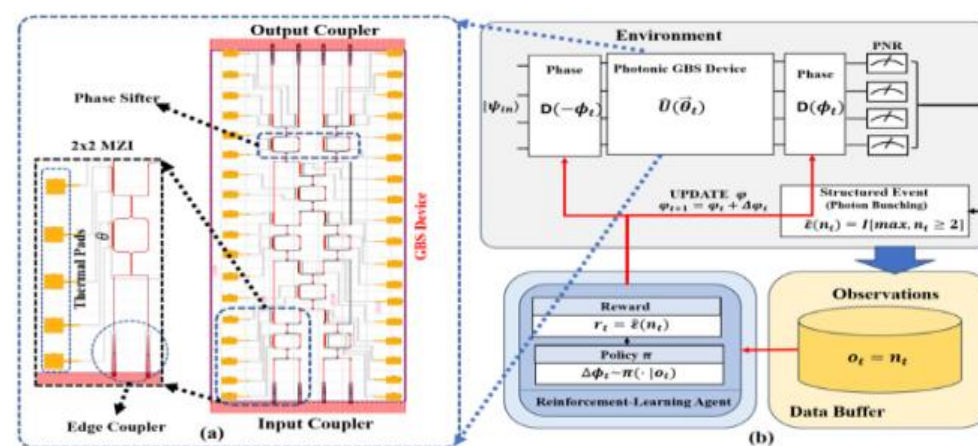
Photonic quantum information processing has emerged as a leading platform for demonstrating quantum advantage. Among these, Gaussian Boson Sampling (GBS) is a powerful model of quantum computation. However, practical GBS devices are intrinsically affected by fabrication imperfections, phase noise, and temporal drift, which distort output photon statistics and ultimately limit scalability and long-term stability. In this work, a noisy GBS device is numerically investigated using a 4×4 reconfigurable interferometer based on the Clements architecture. The interferometer is modeled using a multimode interference using 3D FDTD, yielding an extinction ratio of 47 dB and an insertion loss of 0.6 dB at 1550 nm. Noise and phase drift are incorporated through a Hamiltonian-based noise model. To quantify the impact of noise, graph decoding techniques were employed to characterize structural distortions in the sampled output distributions. Further, the fundamental limitations of static calibration in the presence of time-dependent drift were investigated. This work overcomes these limitations with an adaptive reinforcement-learning controller that can dynamically compensate for Hamiltonian drift and noise. Which maintains stable output statistics close to the target GBS distribution even under non-stationary perturbations. Finally, the potential applications of GBS, with the advantage of adaptive stabilization of GBS devices, were discussed.



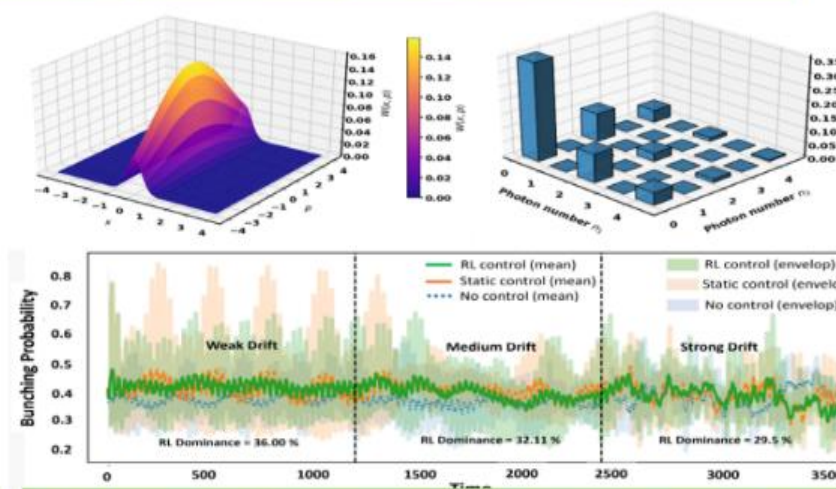
MMI, MZI, waveguide cross-section, and MZI intensity profile



Insertion loss and Extinction ratio of 4 × 4 MZI mesh for GBS



GDS layout of the GBS device with phase vector and Adaptive stabilization control loop



GDS layout of the GBS device, adaptive stabilization control loop, and bunching probability oscillations under weak, medium, and strong drift

PUBLICATIONS

Nibash Kumar Sahu, and Ravi Kumar Gangwar “Zeroth-Order Mode and Anisotropic Behavior-Based Via-Free Metasurface-Inspired Miniaturized Dual-Band Dual-Polarized Wearable Antenna With High Data Rate and Wider Coverage” IEEE Transactions on Microwave Theory and Techniques.

DOI: <https://doi.org/10.1109/TMTT.2026.3715186>

This article proposes a novel miniaturized dualband dual-polarized antenna of size $5 \times 5 \times 0.75 \text{ mm}^3$ with a high data rate and wider coverage for wireless body area network (WBAN) applications. In the lower band, it produces omnidirectional radiation with y -polarization for establishing on-body communication, and in the higher band, it produces directional radiation with right-hand circular polarizations (RHCPs) for establishing on-body communications. The antenna's performances are also characterized by a human body model showing low specific absorption rates in both the bands. A fabricated prototype is carried out that shows excellent matching with simulation results

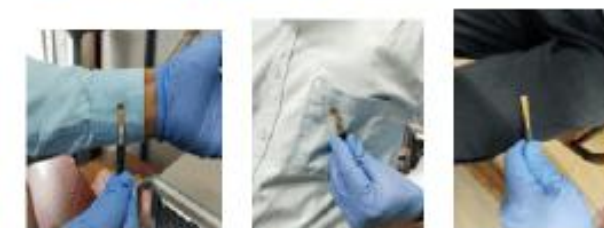
The main contributions of the proposed work are as follows: 1) simultaneous achievement of the 0^{th} -mode at 27 GHz as well as the y -polarized reflection characteristic from 17.5 to 38.5 GHz by the ADLUC; 2) maintaining of a constant phase difference of -180° between the y -polarized reflection characteristic and the x -polarized reflection characteristic from 36 to 44 GHz of the ADLUC; 3) design of the ADLUC by controlling the dispersion characteristics, RPCs, and current orientation; 4) achievement of dual beam characteristics that are in the endfire direction and broadside direction using the up-and-down array configuration of radiators; and 5) achievement of wide impedance bandwidth and AR bandwidth using a compact size.

Fig.: (a) Fabricated antenna and measurement setup. (b) S_{11} in the FS and OB, including wrist (W), thigh (T), and chest (C). (c) Measured gain and AR. (d) Measured radiation patterns.

Individual PCB Layers Ant. with Connector



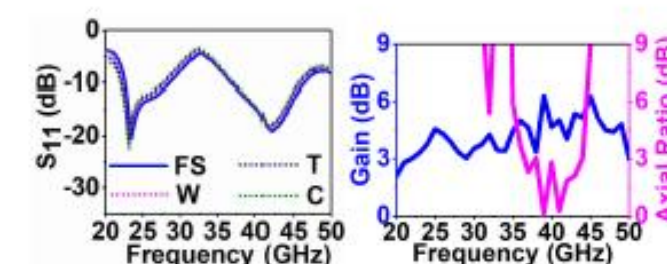
S_{11} Measurement Set-up on Finger, Wrist, Chest, and Thigh using VNA



Anechoic Chamber Set-up

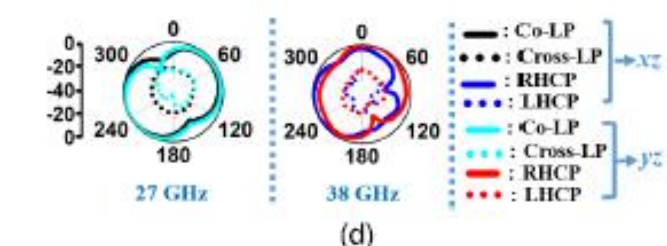


(a)



(b)

(c)

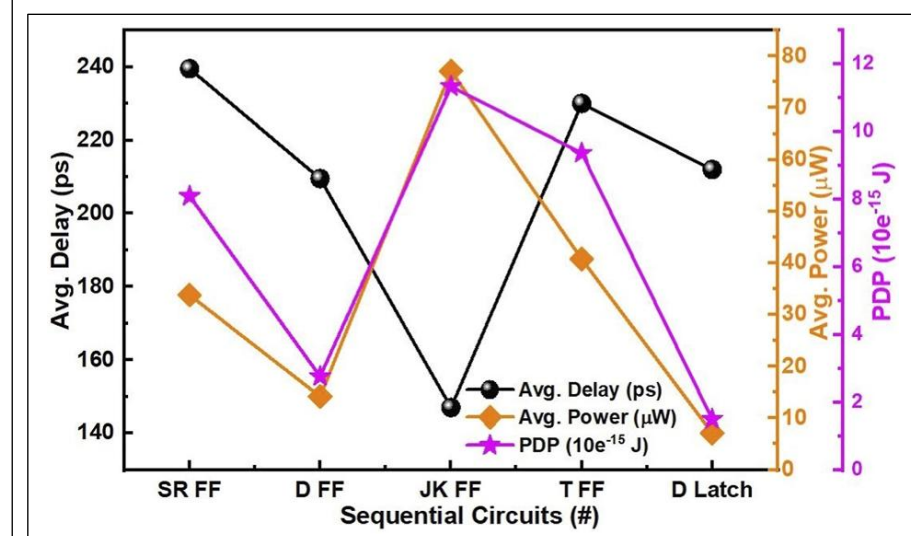
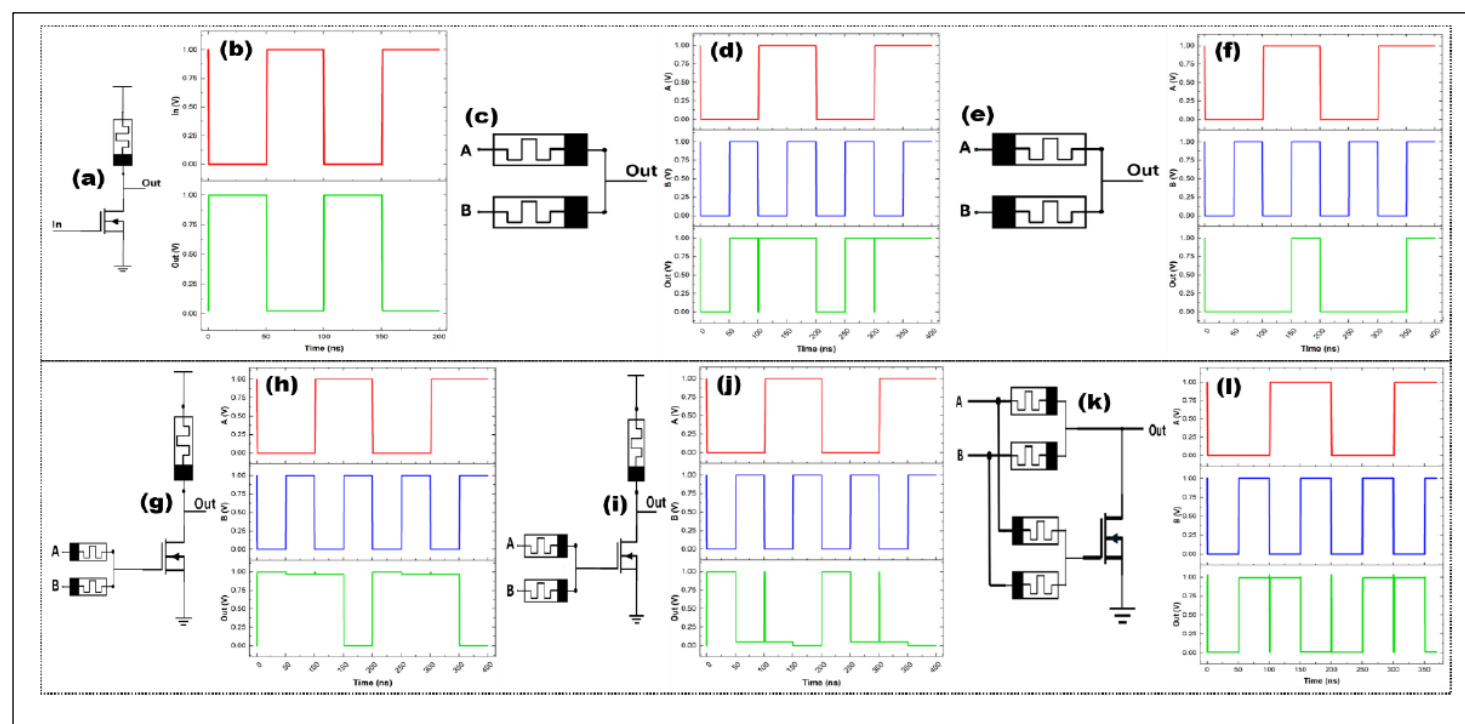
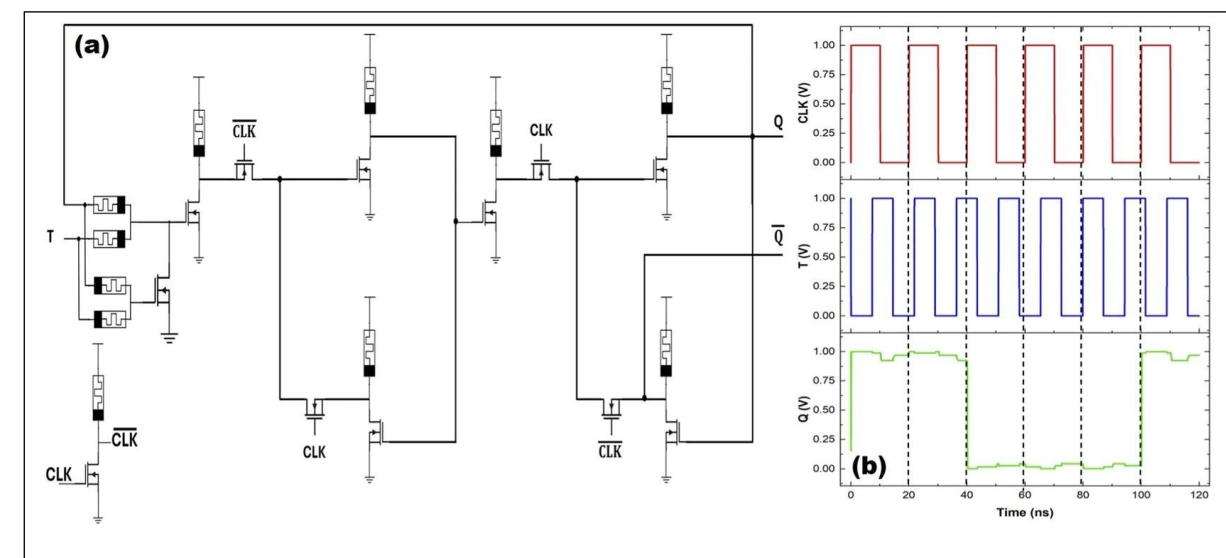


(d)

PUBLICATIONS

Paras Tiwari, Narendra Singh Dhakad, Mohit Kumar Gautam, Shalu Rani*, Sanjay Kumar*, and Themis Prodromakis*.”
Implementation and Performance Evaluation of CMOS-integrated Memristor-driven Flip-flop Circuits”, Frontiers in Nanotechnology-Nanoelectronics, DOI: [10.3389/fnano.2026.1890628](https://doi.org/10.3389/fnano.2026.1890628)

This work reports the implementation of memristor-driven fundamental logic gates, including NOT, AND, NAND, OR, NOR, and XOR, and novel sequential logic circuits, such as D flip-flop, T-flip-flop, JK-flipflop, and SR-flip-flop in SPECTRE in Cadence Virtuoso and integrated with 90 nm CMOS technology node. The utilized memristor framework was experimentally pre-validated with the experimental memristive devices, displaying significantly low values of variability during switching in both device-to-device (D2D) and cycle-to-cycle (C2C) operation.



PATENT GRANTED



Patent Granted for Water Supply Management System

We are excited to share that the Patent Office, Government of India, has officially granted our patent for the Water Supply Management System!

This milestone reflects our team's collective commitment to driving innovation and developing sustainable, smart solutions for water resource management.

Patent Details

- Patent Title: Water Supply Management System
- Patent No.: 594872
- Application No.: 2022311069215
- Filing Date: 30 November 2022
- Grant Date: 09 July 2026

Congratulations to all the inventors on this incredible achievement: Pushkar Srivastava, Rajeev Kumar Ranjan, Rahul Kumar Gupta, Kapil Verma, Ankur Chourasia, Virmani Harshvardhan Solanki, Om Kumar, Sanal Roy, Sachin Kumar, Shubham Kumar Kurrey, and Dr. Bindu Priyadarshini

BEST PAPER



Research Excellence Takes Flight: Best Paper Award at IEEE SPACE 2026

The Department of Electronics Engineering at IIT (ISM) Dhanbad proudly celebrates a milestone achievement as Prof. Ravi Kumar Gangwar and Ms. Divyanshi Srivastava were awarded the prestigious Best Paper Award at IEEE SPACE 2026.

Spotlight on Innovation

Their winning research presents a breakthrough in modern UAV communication systems, addressing critical design challenges in aerodynamics and signal stability.

Paper Title: *"Design and Analysis of Lightweight Conformal Circularly Polarized Antenna for UAV Video Transmission"*

Core Impact: Recognized for its substantial contribution to advanced antenna technologies, enabling seamless, high-quality video transmission for unmanned aerial vehicles.

Focus Areas: RF and microwave engineering, conformal antenna design, and next-generation wireless communications.

About the Conference

The SPace, Aerospace & defenCE Conference (IEEE SPACE 2026) is a premier international forum organized by the IEEE Aerospace and Electronic Systems Society (AESS) and hosted by the IEEE AESS Bangalore Chapter in Bengaluru. The award highlights the department's unwavering dedication to high-impact research that aligns with global aerospace and defense needs.

We extend our heartfelt congratulations to Prof. R. K. Gangwar and Ms. Srivastava on this remarkable accolade and look forward to their continued success in pioneering next-generation wireless technologies!

DR. NIRJHAR KUMAR

Assistant Professor

We are delighted to extend a warm welcome to Dr. Nirjhar Kumar, who joins the Department of Electronics Engineering at IIT (ISM) Dhanbad as our newest faculty member!

Dr. Kumar brings a powerful blend of high-level industry experience and cutting-edge research expertise in advanced photonics, nanophotonics, and optical sensing.

🎓 Academic & Professional Journey

Dr. Kumar's impressive background bridges industry leadership with top-tier academic research:

- GPU Architect | Intel (4 Years): Contributed extensively to GPU modeling and RTL validation.
- Ph.D. in RF & Photonics | IIT Madras: Conducted research at the renowned *Centre for NEMS & Nanophotonics*.
- B.Tech. in Electronics & Communication Engineering | NIT Patna

🔬 Research Breakthroughs

Dr. Kumar's research operates at the intersection of Structured Light, Diffractive Optics, Plasmonics, and Opto-Electrochemical Sensing.

During his doctoral work at IIT Madras, he developed novel approaches for engineering optical vortex beams using diffractive gratings and plasmonic metasurfaces. Key highlights of his work include:

- Single-shot composite vortex beam generation with tunable mode intensities.
- Extending vortex beam concepts toward optical readouts of electrochemical reactions.

🚀 Future Research Focus at IIT (ISM) Dhanbad

At IIT (ISM), Dr. Kumar plans to pioneer next-generation photonic and sensing technologies, focusing on:

- 🔵 Optical Vortex Beam Generation & Structured Light
- 🔬 Diffractive Optics & Plasmonic Metasurfaces
- 🧪 Opto-Electrochemical Sensing
- 📡 Free-Space Optical & Quantum Communication

"We are excited to have Dr. Kumar join our academic family and look forward to his contributions toward high-impact research, technological innovation, and mentoring the next generation of engineers and scientists."

Welcome



CONTACT

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E-mail: nirjhar@iitism.ac.in

MEDIA CORNER

Insights into the Instruction Enhancement Program (IEP), the Patent Grant, and advancements in antenna technology have been featured in various newspapers.

आइआईटी आइएसएम के शोधकर्ताओं को स्मार्ट जल आपूर्ति प्रबंधन प्रणाली पर पेटेंट



धनबाद. आइआईटी-आइएसएम के इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग के एसोसिएट प्रोफेसर डॉ. राजीव कुमार रंजन के नेतृत्व में विकसित "वाटर सप्लाई मैनेजमेंट सिस्टम" को भारत सरकार के पेटेंट कार्यालय से पेटेंट प्राप्त हुआ है। जल संसाधनों के स्मार्ट, प्रभावी व टिकाऊ प्रबंधन के उद्देश्य से विकसित इस तकनीक का पेटेंट आइआईटी आइएसएम के नाम से जारी किया गया है। इस शोध में डॉ. राजीव कुमार रंजन के साथ पुष्कर श्रीवास्तव, राहुल कुमार गुप्ता, कपिल वर्मा, अंकुर चौरसिया, विरमानी हर्षवर्धन सोलंकी, ओम कुमार, सनल रॉय, सचिन कुमार, शुभम कुमार कुर्रे और डॉ. बिंदु प्रियदर्शिनी सह-आविष्कारक रहे। डॉ. राजीव ने बताया कि इस तकनीक का उद्देश्य कम लागत में जल संसाधनों के बेहतर प्रबंधन का समाधान उपलब्ध कराना था। प्रयोगशाला से निकलकर तकनीक का सीधे जमीन पर उपयोग होना इस शोध की सबसे बड़ी सफलता है।

आईआईटी ने बनाया नया जल प्रबंधन सिस्टम

धनबाद, मुख्य संवाददाता। आईआईटी आइएसएम धनबाद के इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग के एसोसिएट प्रोफेसर डॉ. राजीव कुमार रंजन के नेतृत्व में विकसित वाटर सप्लाई मैनेजमेंट सिस्टम को भारत सरकार के पेटेंट कार्यालय से पेटेंट प्राप्त हुआ है। यह तकनीक जल संसाधन के बेहतर, स्मार्ट और टिकाऊ प्रबंधन के उद्देश्य से विकसित की गई है। पेटेंट आइआईटी धनबाद के नाम से प्रदान किया गया है।

इस तकनीक का सफल टेक्नोलॉजी ट्रांसफर भी हो चुका है। शोध के तहत विकसित डिवाइस को कृषि विज्ञान केंद्र (केवीके) बलियापुर में स्थापित किया गया है, जहां इसका उपयोग जल आपूर्ति के बेहतर प्रबंधन के लिए किया जा रहा है। यह पानी सप्लाई मैनेजमेंट सिस्टम जल वितरण और जल संरक्षण को

आईआईटी के डॉ. राजीव के जल आपूर्ति प्रबंधन प्रणाली को मिला पेटेंट यह तकनीक स्मार्ट और टिकाऊ प्रबंधन के उद्देश्य से विकसित की गई

अधिक प्रभावी बनाने में मददगार साबित हो सकता है। कृषि, शैक्षणिक संस्थानों तथा अन्य क्षेत्रों में इसका व्यापक उपयोग संभव है। यह उपलब्ध समाज की जरूरतों के अनुरूप उपयोगी तकनीक विकसित करने और उसे जमीन तक पहुंचाने की दिशा में आइआईटी (आईएसएम) धनबाद के प्रयासों को और मजबूत करती है। शोध एवं आविष्कार में डॉ. राजीव कुमार रंजन के साथ पुष्कर श्रीवास्तव, राहुल कुमार गुप्ता, कपिल वर्मा, अंकुर चौरसिया,

विरमानी हर्षवर्धन सोलंकी, ओम कुमार, सनल रॉय, सचिन कुमार, शुभम कुमार कुर्रे और डॉ. बिंदु प्रियदर्शिनी सह-आविष्कारक रहे। इस पेटेंट के लिए आवेदन वर्ष 2022 में किया गया था।

डॉ. राजीव कुमार रंजन ने कहा हमारा प्रयास ऐसी किफायती और उपयोगी तकनीक विकसित करना था, जिससे जल संसाधनों का बेहतर प्रबंधन किया जा सके। यह हमारे लिए खुशी की बात है कि यह तकनीक प्रयोगशाला तक सीमित नहीं रही, बल्कि टेक्नोलॉजी ट्रांसफर के माध्यम से कृषि विज्ञान केंद्र, बलियापुर तक पहुंच चुकी है। हमें उम्मीद है कि भविष्य में इसका उपयोग और अधिक संस्थानों एवं क्षेत्रों में होगा। उन्होंने बताया कि यह शोध कार्य लगभग सात लाख रुपये की परियोजना के तहत किया गया, जिसे आईआईटी यूएसए का वित्तीय सहयोग प्राप्त हुआ।

इसरो से लेकर रोजमर्रा के उपकरणों तक के लिए सेमीकंडक्टर जरूरी

हल में दुनिया के कई देश सेमीकंडक्टर की कमी से जूझते दिखे थे। ऐसे में भारत को सेमीकंडक्टर क्षेत्र में सशक्त बनाने के उद्देश्य से इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग की ओर से पांच दिवसीय इंस्ट्रक्शन एक्हांसमेंट प्रोग्राम की शुरुआत की गई है। इलेक्ट्रॉनिक्स एवं सूचना प्रौद्योगिकी मंत्रालय के सहयोग से शुरू हुए इस प्रोग्राम का उद्देश्य मॉडर्न वीएलएसआई ईडीए टूल्स का उपयोग करना है। एडवांस्ड सेमीकंडक्टर डिजाइन टेक्निक्स का व्यावहारिक ज्ञान देना है। आईआईटी कानपुर के डॉ. शुभम सहस्र ने सेमीकंडक्टर में आत्मनिर्भरता और ईडीए टूल्स के महत्व पर प्रकाश डाला। उप निदेशक प्रो. शरत कुमार दास और डीन प्रो. के. आशा ने इस तकनीक को अंतरिक्ष अनुसंधान (इसरो) से लेकर रोजमर्रा के उपकरणों तक के लिए महत्वपूर्ण बताया।



ऊर्जा सुरक्षा में परमाणु विज्ञान की भूमिका बढ़ रही: जैन भौतिकी विभाग की ओर से पार्टिकल-गामा को-इनसिडेंस टेक्निक्स इन न्यूक्लियर साइंस पर सिम्पोजियम हुआ। इस दौरान इंडियन न्यूक्लियर फिजिक्स एसोसिएशन (आईएनपीए) की आधिकारिक बुलेटिन न्यूक्लियर होराइजन के दूसरे अंक का विमोचन किया गया। मुख्य अतिथि आईएनपीए के अध्यक्ष प्रो. एके जैन थे। उन्होंने कहा कि भविष्य की ऊर्जा सुरक्षा और क्रिटिकल मिनिस्ट्रस की जरूरतों को पूरा करने में खनन, धातुकर्म और परमाणु विज्ञान की भूमिका लगातार बढ़ रही है। विभिन्न विषयों के बीच सहयोग से ही नई खोजें संभव हैं। इस दौरान ऊर्जा सुरक्षा और क्रिटिकल मिनिस्ट्रस की जरूरतों को पूरा करने में परमाणु विज्ञान की भूमिका पर मंथन शुरू हुआ। संगोष्ठी में देश भर के वैज्ञानिक परमाणु संरचना, न्यूक्लियर रिएक्टर और एट्रोफिजिक्स जैसे गंभीर विषयों पर चर्चा कर रहे हैं।

आइआईटी आइएसएम ने किया वियरेबल एंटीना विकसित

जगरण संवाददाता, धनबाद: आईआईटी आइएसएम के शोधकर्ताओं ने एक अत्यंत छोटा वियरेबल एंटीना विकसित किया है, जो स्वास्थ्य निगरानी उपकरणों, स्मार्ट वॉच और अन्य स्मार्ट वियरेबल डिवाइसों में तेज और बेहतर वायरलेस संचार में सहायक होगा। इस शोध पर आधारित पेपर एक प्रतिष्ठित अंतरराष्ट्रीय जर्नल में प्रकाशित हुआ है। इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग के प्रो. रवि कुमार गंगवार और शोधार्थी निभाष कुमार साहू द्वारा किए गए इस शोध में $5 \times 5 \times 0.75$ मिलीमीटर यानी 18.75 घन मिलीमीटर आकार का एंटीना विकसित किया गया है।

छोटे आकार के बावजूद, यह एंटीना तेज गति से डेटा भेजने और अधिक क्षेत्र में बेहतर सिग्नल उपलब्ध करने में सक्षम है। यह मेडिकल सेंसर, फिटनेस ट्रेकर और

यह एंटीना मेडिकल सेंसर, फिटनेस ट्रेकर और अन्य स्मार्ट उपकरणों के बीच बेहतर वायरलेस संपर्क स्थापित करेगा

अन्य स्मार्ट उपकरणों के बीच बेहतर वायरलेस संपर्क स्थापित करेगा। इसकी एक विशेषता इसका स्पेसिफिक एब्जॉर्प्शन रेट कम होना है, जिससे यह मानव शरीर द्वारा कम विद्युत-चुंबकीय ऊर्जा अवशोषित करता है, और लंबे समय तक उपयोग के लिए सुरक्षित माना जाता है।

प्रो. गंगवार ने कहा कि वियरेबल डिवाइसों का उपयोग तेजी से बढ़ रहा है। हमारा लक्ष्य ऐसा एंटीना विकसित करना था जो कम जगह में अधिक गति से डेटा भेज सके और मानव शरीर के लिए सुरक्षित हो।

आईएसएम में डिजाइन तकनीकों पर पांच दिवसीय प्रशिक्षण कार्यक्रम



देश प्राण संवाददाता

नबाद, 13 जुलाई: आईआईटी आइएसएम) धनबाद के लेक्ट्रॉनिक्स इंजीनियरिंग विभाग ने और से सोमवार को र्मोडर्न वीएलएसआई ईडीए टूल्स का पयोग करते हुए एडवांस्ड मीकंडक्टर डिजाइन टेक्निक्स एक्हांसमेंट प्रोग्राम (आईपी) का भारंभ जे.सी. बोस हॉल में आ। भारत सरकार के लेक्ट्रॉनिक्स एवं सूचना िद्योगिकी मंत्रालय के सहयोग । आयोजित इस कार्यक्रम का देश्य प्रतिभागियों को आधुनिक मीकंडक्टर डिजाइन तकनीकों और वीएलएसआई आधारित लेक्ट्रॉनिक डिजाइन ऑटोमेशन ईडीए टल्स का व्यावहारिक

ज्ञान उपलब्ध कराना है। कार्यक्रम के मुख्य अतिथि आईआईटी के उपनिदेशक प्रो. शरत कुमार दास ने कहा कि वर्तमान वैश्विक परिस्थितियों में सेमीकंडक्टर तकनीक रणनीतिक रूप से बेहद महत्वपूर्ण हो गई है।

उन्होंने प्रतिभागियों से कार्यक्रम के दौरान संस्थान की अत्याधुनिक अनुसंधान सुविधाओं का भी अवलोकन करने और विभिन्न संस्थानों के बीच शोध एवं अकादमिक सहयोग बढ़ाने का आह्वान किया। कार्यक्रम समन्वयक प्रो. राजीव कुमार रंजन ने स्वागत भाषण में कहा कि यह प्रशिक्षण प्रतिभागियों को आधुनिक सेमीकंडक्टर डिजाइन और वीएलएसआई ईडीए टूल्स की गहन समझ के साथ व्यावहारिक अनुभव भी प्रदान करेगा।

आईआईटी धनबाद की टीम ने सूक्ष्म व वियरेबल एंटीना विकसित किया

धनबाद | आईआईटी के शोधकर्ताओं ने बेहद सूक्ष्म वियरेबल एंटीना विकसित किया है, जो स्वास्थ्य निगरानी उपकरणों, स्मार्ट वॉच और अन्य वियरेबल डिवाइसों में तेज और भरोसेमंद वायरलेस संचार को बेहतर बना सकता है। इस शोध पर आधारित पेपर आईआईटी ट्रांजेक्शंस ऑन माइक्रोवेव थ्योरी एंड टेक्निक्स में प्रकाशित हुआ है। इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग के रवि कुमार गंगवार और शोधार्थी निभाष कुमार साहू के अनुसार एंटीना का आकार $5 \times 5 \times 0.75$ मिलीमीटर है। यह उच्च डेटा दर के साथ व्यापक कवरेज देने में सक्षम है, जिससे मेडिकल सेंसर, फिटनेस ट्रेकर और अन्य स्मार्ट उपकरणों के बीच कनेक्टिविटी सुधर सकती है।

Dr. Aman Sikri

Assistant Professor

Research Interest: Reconfigurable Intelligent Surfaces (RISs), Non Orthogonal Multiple Access (NOMA), Free Space Optical (FSO) Communications, Rate Splitting Multiple Access (RSMA).



Dr. Himanshu Bhusan Mishra

Associate Professor

Research Interest: Development of Physical Layer Signal Processing for 5G/6G Wireless Technologies (OFDM, Massive MIMO, OTFS, RIS, ISAC etc.), Implementation of Physical layer algorithms on Software Defined Radio (SDR) based point-to-point wireless setup.



Dr. Debjani Mitra

Professor

Research Interest: Wireless Communication- 5G technologies, Communication Networks, Machine Learning and Statistical Signal processing.



Dr. Govind Murmu

Assistant Professor

Research Interest: Signal Processing and Communication Algorithms, Adaptive Filters, Adaptive Beamforming for 4G/5G, Blind Source Separation (BSS) Algorithms, Adaptive Control.

Dr. Samrat Mukhopadhyay

Assistant Professor

Research Interest: Online Machine Learning, Compressed Sensing, Nonconvex and Stochastic Optimization, Sparse Adaptive Filtering.



Dr. Subhadeep Mondal

Assistant Professor

Research Interest: Quantum computing, machine learning, signal processing, and next-generation communication systems, with an emphasis on developing mathematically grounded algorithms that bridge theory and real-world applications



Dr. Preety Priya

Assistant Professor

Research Interest: Integrated Communications and Sensing, High Mobility Communications, Leo Satellite Communications, OTFS, OFDM, Beamforming, MIMO, Sparse Signal Processing, Synchronization and Channel Estimation, Nonlinear Data Detection (Particle Filter).

Dr. Ugrasen Singh

Assistant Professor

Research Interest: Design and analysis of wireless communication systems. I have been working on Space Modulation Techniques (SMTs), Reconfigurable Intelligent Surface (RIS), Non-Orthogonal Multiple Access (NOMA), Orthogonal Frequency Division Multiplexing (OFDM), Ultra-Reliable and Low-Latency Communication (URLLC), and Physical Layer Security.



Dr. Dheeraj Bharti

Assistant Professor

Research Interest: Computer Vision, SLAM Robotics, Real-time Transformer-based Algorithms, 3-D Pose Reconstruction, SfM, Machine Learning, Statistical Signal Processing



Dr. Mrinal Sen

Associate Professor

Research Interest: Photonic Integrated Circuits, Embedded Systems.

FACULTY PROFILE



Dr. Nirupama Mandal

Associate Professor

Research Interest: Transducer Design, Controller Design, Instrumentation System Design, Smart Sensing System and Smart Instrumentation.

Dr. Jitendra Kumar

Professor

Research Interest: Nano-optoelectronics, Nanoelectronics.



FACULTY PROFILE

Dr. Sushrut Das

Professor

Research Interest: Microwave Passive Networks, Antennas, Wireless Energy Transfer and Energy Harvesting Microwave Filters.



Dr. Amitesh Kumar

Associate Professor

Research Interest: Photonic Integrated Circuits, Fiber Optic Sensors, Microwave Photonics, and Radio-over Fiber Technologies for 5G and beyond.



Dr. Jaisingh Thangaraj

Associate Professor

Research Interest: Optical Networks, Wireless Sensor Networks, VANET, Software Defined Networks, Optical Instrumentation.



Optical communication and Integrated Photonics



Dr. Ravi Kumar Gangwar

Professor

Research Interest: Dielectric Resonator Antennas, MIMO Antennas, Bio-electromagnetics And Microwave Measurements.

Dr. Santanu Dwari

Professor

Research Interest: RF & Microwave Engineering, Antenna.



Dr. Devendra Chack

Associate Professor

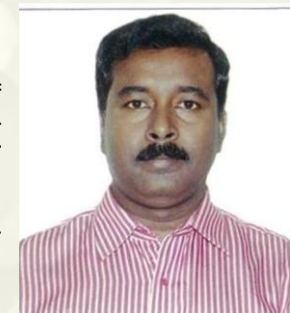
Research Interest: Photonic Integrated Circuits, Advance Optical Communications, Radio-over-Fiber System For 5G/6G.



Dr. Mukul Kumar Das

Professor

Research Interest: Modeling and Design of Semiconductor Devices for VLSI and Optoelectronic Applications, Growth of Semiconductor Interface and Band-gap Engineered Thin Film Transistor and Solar Cell by using PVD Technique, Design and Development of Integrated Modules for Photonic QKD Network Development of Quantum Fiber Optic Network.



Dr. Prashant Kumar Varshney

Assistant Professor

Research Interest: SIW Based Microwave Planar Sensors, Metamaterial Inspired Microwave Sensors for Various Applications.

Dr. Y. M. Asha Latha

Assistant Professor

Research Interest: RF Power Amplifier Design: Broadband, High Efficiency, Switched Mode PAs, Harmonic Manipulation, Harmonic Injection, Load Modulation, Doherty PA, Chip Design: GaN MMIC Based RF Power Amplifier Design.



Dr. Nirjhar Kumar

Assistant Professor

Research Interest: Optical Vortex Beam Generation and Structured Light, Diffractive Optics and Plasmonic Meta surfaces, Opto-Electrochemical Sensing, Free-Space Optical & Quantum Communication



FACULTY PROFILE

Dr. Naresh Sharma

Assistant Professor

Research Interest: Integrated Photonics, Programmable Photonics, Free Space Optics, Photonic Crystals Applications.



Dr. Sanjeev Kumar Raghuwanshi

Professor

Research Interest: Numerical Method of Optical Waveguides, Optical Sensor, Microwave Photonics, Optical Fiber Communication.



Dr. Swati Rajput

Assistant Professor

Research Interest: Silicon Photonics for Next Generation Optical Communication, Nano photonics, Semiconductor Optoelectronics.



Dr. Jeevesh Kumar

Assistant Professor

Research Interest: 2D Materials, Emerging Electronic Devices, Atomistic Simulation, Device Fabrication, material & Device characterizations.



Dr. Shalu Rani

Assistant Professor

Research Interest: Energy Storage Devices for Wearable Electronics Including Advanced Flexible Supercapacitors/Micro-supercapacitors.



Dr. Subindu Kumar

Professor

Research Interest: III-V Semiconductor Nano-structures, Nano-scaled MOS Devices and Circuits, On-Chip Interconnects.

Dr. Rajeev Kumar Ranjan

Associate Professor

Research Interest: VLSI Design, Mem-element (Memristor, Memcapacitor, And Meminductor) Design.



Dr. Manodipan Sahoo

Associate Professor

Research Interest: 2D Materials-based Devices and Circuits, Nanomaterials based Sensors, Heterogeneous 3D ICs, Neuromorphic Circuits.



Dr. Rahul Bhattacharya

Assistant Professor

Research Interest: Modelling Of Analog and Mixed-signal Circuits, Fault Modeling and Testing of VLSI Circuits, FPGA-based Design.



Dr. Kaushik Mazumdar

Associate Professor

Research Interest: VLSI Design, Electronic Low Dimensional Systems, Analysis and Design of MOSFET & Nano-Devices.



Nanoelectronics and VLSI



OPPORTUNITY

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Application form, Guidelines, Terms & Conditions for full-time are available at IIT(ISM) Dhanbad website.

https://admissions.iitism.ac.in/phd/index.php/admission/add_phd/home

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The Department of Electronics Engineering at IIT (ISM) Dhanbad is seeking highly motivated research personnel for multiple ongoing projects in cutting-edge domains such as 6G Communication, VLSI Design, MEMS, and Signal Processing. Applications are invited for various positions, including Junior Research Fellows (JRF) and Project Associates

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<https://people.iitism.ac.in/~research/Projectopening.php>



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