TELEKINESIS

ELECTRONICS AND COMMUNICATION ENGINEERING
DEPARTMENT MAGAZINE

VOLUME III
APRIL 2025

National Institute of Technology Meghalaya

An Institute of National Importance

"Telekinesis"

"Telekinesis" combines "Tele," meaning "Distance," and "Kinesis," meaning "Movement" or "Motion."

Together, "Telekinesis" can be interpreted as "Movement at a Distance." It symbolizes the ability to control or influence from afar, aligning with the essence of electronics and communication engineering, where invisible signals, waves, and technologies bridge distances. The name suggests innovation, unseen power, and forward-thinking approaches in the field, making it a great name for this magazine that highlights the latest trends and breakthroughs in electronics and communication engineering.

Table Of Contents

About the Institute

The National Institute of Technology (NIT) Meghalaya is one of the thirty-one NITs in India established under the NIT Act 2007 (Amended 2012) of the Parliament of India as Institutes of National Importance with full funding support from the Ministry of Education (Shiksha Mantralaya), Government of India.

The Vision

A Centre of Excellence vibrant with academic activities and bubbling with youthful creative energy, making significant contributions to the World of Knowledge and Technology and to the Development of the State, the Region and the Nation.

The Mission

To impart quality education in the fields of engineering, science, and technology at undergraduate and postgraduate levels, with special attention to encouraging innovation and creativity in these fields in a clean and healthy environment.

About the Department

The Department of Electronics and Communication Engineering (ECE) was established in 2010 with the inception of the NIT Meghalaya. The department offers a B. Tech Programme with an intake capacity of thirty & an M. Tech Programme with an intake capacity of twenty in ECE and a Ph.D.Program in various specialized areas. The major research areas of the department include high-speed and low-power VLSI, Computer Arithmetic, Wireless Sensor Networks, Cognitive Radio, Antenna Design, and Signal Processing. The major objective of the Department is to impart high-quality technical education and research with a strong foundation in Electronics and Communication Engineering. The department's major areas of faculty expertise include VLSI Systems, High Performance Computing, Signal Processing, Digital Signal Processing, Communication, and RF & microwave engineering.

The Vision

A Centre of Excellence in knowledge and technological innovation research hub in the field of Electronics and Communication Engineering by the creation of skilled manpower to meet the local, national, and global needs of industry and society.

The Mission

- To impart research & training on cutting-edge technologies on VLSI, Signal Processing, and Communication for societal issues.
- To promote competitive academic programs through industry-relevant skills that support entrepreneurial growth and industry readiness.
- To strengthen moral values and ethics with managerial skills to become technocrats and entrepreneurs.

TECHNICAL Articles

Electronics and Communication Department

Neuromorphic VLSI

M.A.SEENIVASAN, Research Scholar, ECE

What is Neuromorphic VLSI?

Neuromorphic VLSI is a brain-inspired hardware design approach that uses VLSI technology to create chips that work like neurons and synapses, enabling machines to process information like the brain does—efficiently, adaptively, and in real time.

Simple Terms:

Neuromorphic VLSI refers to a type of integrated circuit design that mimics the architecture and functioning of the human brain using analog, digital, or mixed-signal electronics. The term "neuromorphic" literally means "brain-like," and the goal is to build hardware that replicates the behavior of biological neural networks for efficient, real-time, and low-power computation. So, neuromorphic VLSI chips try to work like a brain—many neurons talking via spikes, adapting over time, and using minimal power.

In Brain Terms:

- Neuron circuits = artificial neurons
- Synapse circuits = memory for connections between neurons
- Spikes = small electric signals that carry information

Applications:

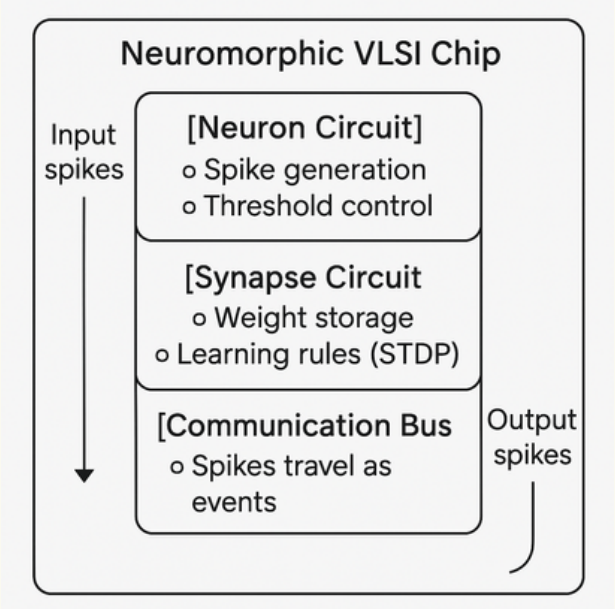
- Robotics and autonomous systems
- Edge AI (real-time processing on devices)
- Brain-machine interfaces
- Sensory processing (e.g., visual and auditory systems)
- Cognitive computing

Example Chips:

- IBM TrueNorth
- Intel Loihi
- SpiNNaker (University of Manchester)

Challenges and Future Outlook:

Neuromorphic VLSI: A challenge because of its novel nature, the need to emulate complex biological systems, and the lack of mature tools and frameworks. **Traditional VLSI:** Tough because of the precision required, sensitivity to variations, and deep understanding of transistor-level circuit design. In general, neuro VLSI is considered more challenging because it is a newer, more interdisciplinary field that requires knowledge of biology, neuroscience, and advanced electronics, along with its event-driven, spike-based computation model. Traditional analog VLSI is well-established, but its challenges are more related to precision and optimization of continuous signals.



Neuromorphic VLSI vs. Traditional VLSI:

Neuromorphic VLSI (Very Large Scale Integration) and analog/digital VLSI are both approaches to designing integrated circuits, but they differ significantly in their focus and applications.

Features of Neuromorphic VLSI

Inspired by the brain: Neuromorphic VLSI is designed to mimic the structure and function of biological neural systems, particularly the brain. The goal is to create circuits that replicate neural processes like learning, adaptation, and sensory processing.

Spiking neurons: Neuromorphic chips often use spiking neural networks (SNNs), where neurons communicate via spikes (short pulses), similar to biological neurons.

Event-driven processing: Neuromorphic systems process data asynchronously, only reacting when there is an event (like a spike) rather than continuously processing data. This results in low power consumption and efficient data processing, especially in real-time applications.

Applications: Neuromorphic systems are used in areas like robotics, real-time sensory processing, autonomous systems, and artificial intelligence (AI), where biological brain-like computation is advantageous.

In short, neuromorphic VLSI is focused on emulating neural activity for AI and brain-inspired tasks, while traditional VLSI handles continuous signals for traditional analog electronics.

Beyond the Hype:

Difficulty Level of Neuromorphic VLSI:

The difficulty of designing neuromorphic VLSI versus analog VLSI depends on several factors, including the complexity of the task, the designer's expertise, and the application. However, generally speaking:

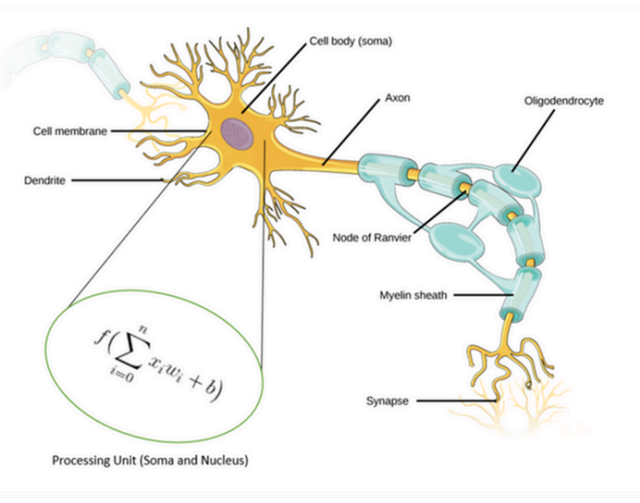
Higher conceptual complexity: Neuromorphic design involves replicating the brain's highly complex processes, including neural spikes, synaptic weights, learning mechanisms, and parallel distributed processing. Understanding and implementing biological systems in silicon is intellectually demanding.

Asynchronous processing: Designing circuits that function asynchronously (without a global clock) can be challenging since they require event-driven architecture, which is not as straightforward as clocked systems.

Cutting-edge research: Neuromorphic VLSI is still an emerging field, meaning many aspects of it are not standardized, and designers often need to pioneer new approaches, algorithms, and circuit architectures.

Tools and support: The tools and methodologies for neuromorphic design are less mature compared to traditional VLSI design, which adds to the complexity.

Biological Neuron and Mathematical form

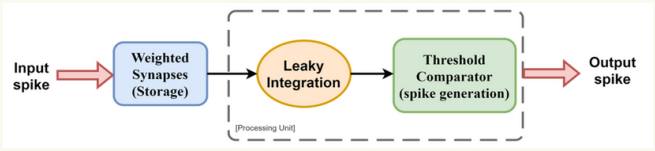


Neuromorphic systems

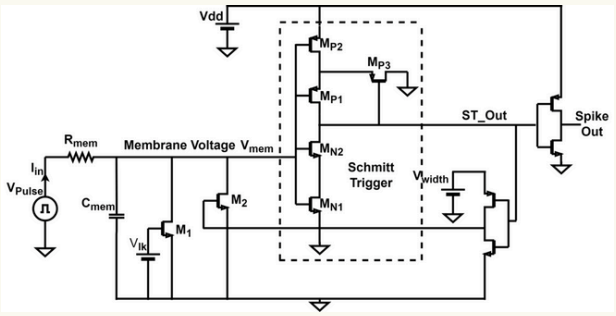
- Inspired by biology and implementing the theory of the human brain modeling by neurons and synapses. In Neuromorphic, the Brain is based on a large collection of neurons, each of which has

  Soma, Axon, Dendrites, Synapse
- Interconnected networks of processing units called spiking neurons that loosely mimic the axons found in the human brain.
- Nervous system inspired by analog computing systems. Neurons are power efficient and will be important for the future of computing. The neuron model and spike signals are depicted as follows:

IF Neuron Model



Integrate & Fire Neuron circuit



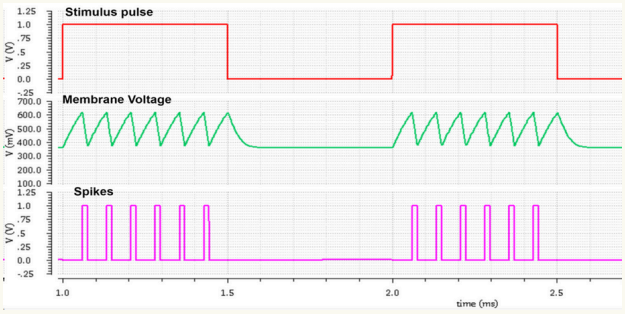
Essential characteristics for NNs

Synaptic device: synaptic memristors and synaptic transistors are emerging nano-electronic devices.
Ex: HfO2 resistive switching memory

I&F Neuron circuit: Spatial/temporal leaky integration, asymmetric pulse generation, back-propagation for STDP learning. Refractory period.

Spiking neural networks (SNNs) are another form of artificial neural networks (ANNs) that more closely mimic biological neuronal functionality through the act of processing visual information with spiking events over several time steps.

I & F Neuron Spike signals



Conclusion

- The basic computational unit in SNNs is a neuron that behaves similarly to real neurons, which is crucial for hardware-based SNNs.
- The hardware-based SNNs can autonomously and efficiently control the weight updates between neurons through synaptic circuits that can be operated with resistive synaptic devices.
- So, neuromorphic VLSI chips try to work like a brain, with many neurons talking via spikes, adapting over time, and using minimal power.

THE SYNERGY OF MINDS: UNLEASHING INNOVATION THROUGH COLLABORATIVE RESEARCH

Jintu Borah, Smart System Co-Design Laboratory, Dept. of ECE, NIT Meghalaya

In today's fast-paced technological landscape, research is no longer confined to the isolated efforts of individuals working in silos. Instead, collaborative research has emerged as a powerful model, fostering innovation, accelerating discoveries, and addressing complex global challenges. For institutions like the National Institute of Technology Meghalaya, fostering an environment of collaboration can significantly enhance research output, industry partnerships, and societal impact.

Breaking Disciplinary Boundaries

One of the most significant advantages of collaborative research is its ability to bridge disciplinary gaps. In fields such as Embedded Systems, IoT, and Deep Learning, advancements often require expertise from multiple domains—electronics, computer science, healthcare, and even social sciences. When researchers collaborate across disciplines, they bring unique perspectives, leading to holistic solutions that single-domain research might overlook. For instance, integrating AI with healthcare informatics has enabled breakthroughs in predictive diagnostics and personalized medicine.

Enhancing Resource Utilization

Collaboration allows institutions and researchers to pool their resources, including funding, infrastructure, and human capital. Large-scale projects, such as the development of smart healthcare systems or disaster prediction models, require significant computational power and data access. Through partnerships with industry and international research networks, institutions can access cutting-edge technologies and datasets that might otherwise be out of reach.

Global Networking and Knowledge Exchange

Engaging in collaborative research expands academic and industrial networks, opening doors to funding opportunities, joint publications, and cross-border innovation. Research consortia and international collaborations allow scholars to participate in global discussions, ensuring that their work is relevant and impactful beyond their immediate environment. Programs like Marie Curie Fellowships and international research grants exemplify how collaborative frameworks enable researchers to contribute meaningfully to global scientific advancements.

Accelerating Innovation and Real-World Impact

Collaborative research ensures that theoretical advancements translate into real-world applications more effectively. Industry-academic partnerships, for example, bridge the gap between research and commercialization. A research group working on IoT-based smart home technologies, when collaborating with smart appliance manufacturers, can expedite the transition from prototype to product, benefiting both academia and industry.

Conclusion

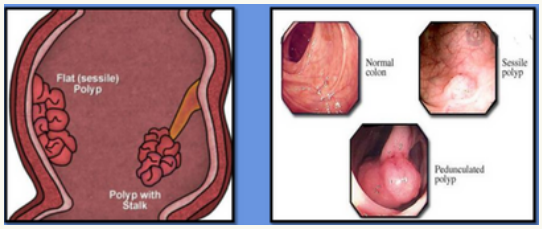
At NIT Meghalaya, fostering a culture of collaborative research can position the institution as a leader in technological advancements. Encouraging interdisciplinary teamwork, industry engagement, and global partnerships will not only enrich the research ecosystem but also ensure that innovations have a tangible impact on society. As researchers, embracing collaboration is not just an option—it is the key to driving meaningful progress in science and technology.

From Detection to Deployment: The Evolving Role of AI in Polyp Segmentation

Debaraj Rana, Research Scholar, ECE

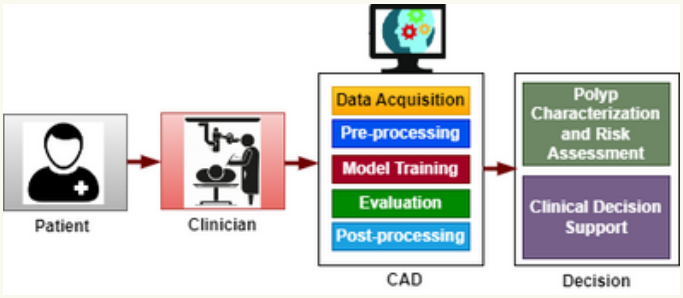
AI: Core of Medical Image Segmentation

Medical image segmentation is the process of outlining anatomical regions of interest in diagnostic imaging. It has become one of the most impactful applications of artificial intelligence (AI) in healthcare. From tumor boundaries in MRI scans to vessel tracking in retinal images, segmentation enables precision diagnostics, targeted therapies, and automated clinical workflows. One critical area where AI-powered segmentation holds transformative potential is gastrointestinal endoscopy, specifically in the detection and identification of colorectal polyps. These mucosal growths are often benign initially but can evolve into malignant tumors over time through a well-understood progression known as the adenoma–carcinoma sequence.



[Visual examples of colorectal polyps]

Colorectal cancer (CRC), which frequently originates from these polyps, is one of the most prevalent and deadly cancers globally. According to the World Health Organization, CRC is the third most common cancer and the second leading cause of cancer-related deaths worldwide. Unlike many other cancers, however, CRC is highly preventable, the early detection and removal of precancerous polyps during routine colonoscopy can drastically reduce both incidence and mortality. Despite the effectiveness of colonoscopy, studies indicate that up to 25% of polyps are missed during routine screenings, especially those that are flat, small, or poorly illuminated. Factors such as operator fatigue, rapid camera motion, and variable lighting can impair visibility. This diagnostic gap has catalyzed research into computer-aided detection (CADe) and diagnosis (CADx) systems, particularly those based on deep learning segmentation models.



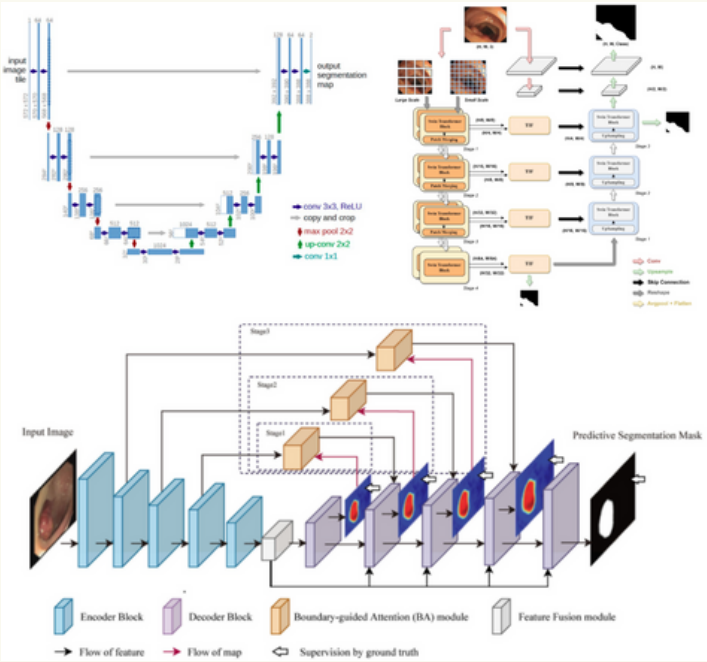
[Workflow of a CAD System in medical imaging]

Polyp segmentation is the pixel-wise identification of polyp boundaries in endoscopic images. It is not only essential for accurate detection but also for real-time decision-making, biopsy guidance, and lesion characterization.

Progress in AI-Based Polyp Segmentation

In the early stages of research, polyp segmentation was primarily approached using traditional image processing techniques such as edge detection, region growing, and thresholding. However, these methods struggled with challenges like complex backgrounds, diverse polyp shapes, and variable lighting conditions. To overcome these limitations, CNN-based approaches emerged, offering automatic feature extraction and improved robustness in diverse imaging scenarios. U-Net and its derivatives (ResUNet, Attention U-Net, UNet++) have become foundational architectures for medical image segmentation. These models leverage skip connections and encoder-decoder structures to preserve spatial information, enabling high precision in boundary delineation.

To improve performance in challenging scenarios, researchers are increasingly exploring transformer-based hybrid architectures, which combine the global contextual modeling capabilities of transformers with the spatial precision of convolutional networks. Models like TransUNet, ColonFormer, and Polyp-PVT have demonstrated improved capability in segmenting polyps, particularly those with irregular shapes or low contrast against mucosal backgrounds.



[Evolution of AI-based approaches for polyp segmentation]

While these methods are effective in capturing complex textures and global contextual features, they often come with high computational overhead. In scenarios where sharp boundary detection is essential: particularly under constrained computational resources, the edge-guided and boundary-aware approaches (MEGANet, BLE-Net) are emerging as efficient alternatives, offering improved contour precision with reduced complexity.

Benchmarking and Datasets : The availability of annotated datasets has accelerated development. Notable datasets include: Kvasir-SEG, CVC-ClinicDB, and ETIS-LaribPolypDB. These benchmarks enable reproducibility and fair comparison, with metrics like Dice coefficient, Intersection over Union (IoU), and pixel accuracy commonly used for evaluation.

Challenges and Limitations

Many models perform well on public datasets but falter in real-world settings due to variation in endoscopic equipment, and lighting conditions. Cross-domain generalization remains a critical issue. Along with that models often struggle to identify diminutive or flat lesions, which are clinically significant but less visually prominent.

Deep learning models continue to function as "black boxes," raising critical concerns about explainability in high-stakes clinical applications. While interpretability tools such as attention maps and Grad-CAM provide some visual insight into model decisions, they remain insufficient for meeting the transparency standards required by regulatory bodies.

Future Scope

AI-powered polyp segmentation is at the forefront of medical image analysis, offering the potential to significantly reduce colorectal cancer incidence through early and accurate detection. While transformer-based and edge-guided models have achieved impressive results, real-world adoption will require not only algorithmic excellence but also robust deployment strategies, regulatory clarity, and clinical trust.

As a future scope rather than replacing clinicians, the next wave of AI systems will likely focus on human-AI collaboration, offering explainable outputs, uncertainty estimates, and interactive interfaces for decision support. Also, hardware-aware training, and quantization pipelines will further enable real-time inference on edge devices such as endoscopic cameras, FPGA boards, and mobile diagnostic tools. This would bring AI support directly into the procedural workflow.

DEPARTMENTAL INFORMATIONS, EVENTS & AWARENESS PROGRAMS

NEWLY JOINED FACULTY

Dr. Bibhas Manna is presently working as an Assistant Professor in the Department of Electronics and Communication Engineering at NIT Meghalaya. Previously, I worked as a postdoctoral researcher at Pennsylvania State University, USA, and TU Wien, Austria. I have completed my PhD at the Indian Institute of Technology Kharagpur, India. My research interest primarily includes Experimental design of semiconductive sensors, modelling and simulation of FETs, first-principle-based transport in 2D semiconductors, device-algorithm co-design for Neuromorphic/In-Memory computation, Electronic Design automation, etc.

FACULTY ACHIEVEMENTS

Dr. Shubhankar Majumdar receiving award during the Institute Day Celebration, NIT Meghalaya

Dr. Shubhankar Majumdar has received several awards and achievement this year.

1. He have been awarded the ***Best Researcher Award*** for the second consecutive year at NIT Meghalaya in the Institute Day Celebration 2025.
2. He have done the demonstration and commissioning of the 5G laroratory settings in January 2025.
3. He have also delivered a talk on ***5th Intenational Conference on Micro/Nanoelectronics Devices, Circuits and Systems (MNDCS 2025)***.
4. He have attended the **FIST Review presentation** at IIT Bombay in February 2025.

PH.D AWARDEE (JAN 25 -MAR 25)

DEBBARNI SARKAR

Thesis Title: ***Performance Evaluation of Intelligent Reflecting Surface-Assisted 6G Wireless Networks***

Supervisor Name: **Dr. Satyendra Singh Yadav**

Date of Award: **22/01/2025**

DEPARTMENTAL PROGRAM

- **B.Tech**
  - 2021-2025 Batch: 35
  - 2022-2026 Batch: 29
  - 2023-2027 Batch: 37
  - 2024-2028 Batch: 32
- **M.Tech**
  - 2023-2025 Batch: 02
  - 2024-2026 Batch: 12
- **Ph.D.**
  - Total: 30 (Full Time)

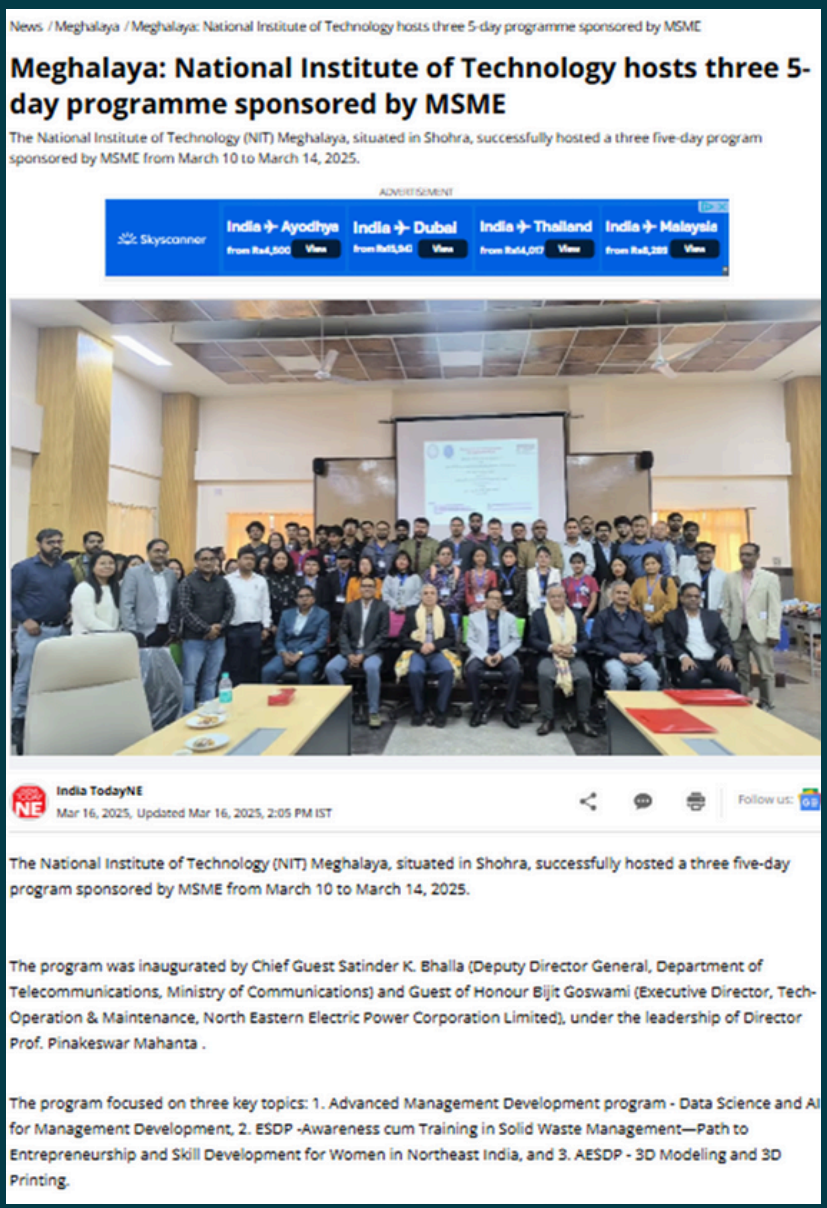
About the advanced management Development Programme (A-MDP)

The Advanced Management Development Programme (A-MDP) is an initiative sponsored by the Ministry of Micro, Small and Medium Enterprises (MSME), Government of India. It is designed to equip professionals, entrepreneurs, and business leaders with advanced management skills, strategic decision-making capabilities, and technological insights. The program focuses on enhancing leadership qualities, improving operational efficiency, and fostering innovation in business practices. A-MDP plays a crucial role in strengthening India's entrepreneurial ecosystem by bridging skill gaps, promoting self-sufficiency, and enabling businesses to adapt to dynamic market conditions. By empowering participants with cutting-edge management techniques and industry-relevant knowledge, it contributes to sustainable business growth, job creation, and economic development, particularly benefiting MSMEs and enterprises in emerging sectors.

The A-MDP organized by National Institute of Technology Meghalaya

The Advanced Management Development Programme (AMDP) on Data Science and AI for Management was successfully conducted at National Institute of Technology (NIT) Meghalaya from March 10 to 14, 2025, with support from the Ministry of Micro, Small and Medium Enterprises (MSME), Government of India. The program aimed to equip 25 entrepreneurs from various parts of Assam with advanced knowledge and practical skills in data science, artificial intelligence, and their applications in business and management. Participants were exposed to key topics, including Talking AI: The Evolution of Speech Technology, Data Analytics for Businesses, AI for Everyone, How to Start a Venture, Hands-on Training on Data Management, Internet of Things (IoT), Textiles and AI, AI for Project Managers, Application of Analytics in Business, Financial Management, Entrepreneurship, Solid Waste Management, and Agri-Waste Management as an Opportunity for Entrepreneurship.

The program was inaugurated by Chief Guest Satinder K. Bhalla, Deputy Director General, Department of Telecommunications, Ministry of Communications, and Guest of Honour Bijit Goswami, Executive Director, Tech-Operation & Maintenance, North Eastern Electric Power Corporation Limited, under the leadership of Prof. Pinakeswar Mahanta, Director, NIT Meghalaya. This initiative received widespread media coverage, highlighting its impact in empowering aspiring entrepreneurs, bridging skill gaps in AI and data science, and fostering innovation and business growth. By integrating cutting-edge technology with business management, AMDP has played a crucial role in strengthening India's entrepreneurial ecosystem, particularly in northeastern India, reaffirming NIT Meghalaya's commitment to fostering entrepreneurship and innovation for future business leaders.



News / Meghalaya / Meghalaya: National Institute of Technology hosts three 5-day programme sponsored by MSME

Meghalaya: National Institute of Technology hosts three 5-day programme sponsored by MSME

The National Institute of Technology (NIT) Meghalaya, situated in Shohra, successfully hosted a three five-day program sponsored by MSME from March 10 to March 14, 2025.

India TodayNE
Mar 16, 2025, Updated Mar 16, 2025, 2:05 PM IST

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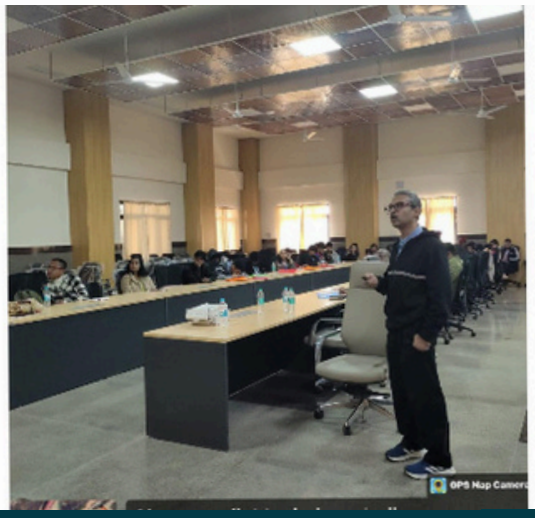
The program was inaugurated by Chief Guest Satinder K. Bhalla (Deputy Director General, Department of Telecommunications, Ministry of Communications) and Guest of Honour Bijit Goswami (Executive Director, Tech-Operation & Maintenance, North Eastern Electric Power Corporation Limited), under the leadership of Director Prof. Pinakeswar Mahanta .

The program focused on three key topics: 1. Advanced Management Development program - Data Science and AI for Management Development, 2. ESDP -Awareness cum Training in Solid Waste Management—Path to Entrepreneurship and Skill Development for Women in Northeast India, and 3. AESDP - 3D Modeling and 3D Printing.

Gllimpse of the event



About the Management Development Programme (MDP)

The Management Development Program (MDP) on "Smart Management: Tools and Techniques for Success" was hosted by the National Institute of Technology Meghalaya (NIT Meghalaya) and sponsored by the Ministry of Micro, Small & Medium Enterprises (MSME), Government of India. The program aimed to equip professionals, academicians, entrepreneurs, and women's wing with cutting-edge management strategies, digital tools, and data-driven decision-making approaches essential for success in today's dynamic business environment. The five-day event featured expert-led sessions on various aspects of modern management, including business analytics, leadership skills, financial strategies, innovation in entrepreneurship, and digital transformation. The sessions were designed to bridge the gap between traditional management practices and emerging technological trends, ensuring participants gained practical insights into optimizing business operations, improving decision-making, and fostering innovation. Through interactive discussions, hands-on workshops, and case study analyses, the MDP provided a comprehensive learning experience that empowered attendees to adapt to the evolving corporate landscape and enhance their managerial competencies. The program also emphasized strategic thinking, problem-solving methodologies, and the integration of AI and data analytics in business management, making it a valuable initiative for professionals looking to stay ahead in the industry. The NIT Meghalaya MDP 2025 served as a collaborative platform for knowledge-sharing among academicians, industry professionals, entrepreneurs, and policymakers, fostering a culture of innovation, efficiency, and sustainable business practices. With MSME sponsorship, the program underscored the government's commitment to empowering small and medium enterprises by equipping them with the necessary skills and tools for growth and competitiveness in the global market.

625 trained in NIT Meghalaya's MSME-sponsored workshops Meghalaya camping

Syllad | The Rising Meghalaya
March 31, 2025

NIT Meghalaya has successfully concluded a series of 15 workshops under the Entrepreneurship Skill Development Programme (ESDP) Scheme, sponsored by the Ministry of MSME, Government of India.

Held at the Sohra Campus from February 25 to March 28, 2025, the initiative featured an Advanced Management Development Program (AMDP), one Advanced Entrepreneurship-cum-Skill Development Programme (A-ESDP), one Entrepreneurship-cum-Skill Development Programme (E-SDP), and ten Entrepreneurship Awareness Programmes (EAP), attracting 625 participants.

Designed to equip aspiring entrepreneurs with practical skills, strategic business insights, and hands-on training, the program aimed to strengthen the region's entrepreneurial ecosystem.

Gllimpse of the event

ALUMNI MESSAGE

DR. SHEIKH WASMIR HUSSAIN

He is currently working as an Assistant Professor in the Department of ECE, Indian Institute of Information Technology Guwahati, India.

Message:

“NIT Meghalaya didn’t just shape my research career—it shaped who I am today.”

It’s a great honor to share my journey as an alumnus of NIT Meghalaya. Pursuing both my M. Tech and Ph.D. in VLSI Design here was truly a life-shaping experience.
The institute offered more than just academics—it provided a nurturing environment filled with inspiring mentors, collaborative peers, and a research-driven culture that sparked my interest in semiconductor memory and low-power VLSI circuits. Those formative years laid the groundwork for the work I do today.
After completing my Ph.D. study, I joined the prestigious IIT Bombay as a Senior Research Scientist in the MeLoDe Lab, where I worked on advanced memory technologies. In 2023, I began a new chapter as an Asst. Professor at IIIT Guwahati, where I now teach, mentor, and continue to pursue impactful research.
From the scenic hills of Meghalaya to premier research platforms, my journey has been both humbling and empowering. NIT Meghalaya gave me the direction, confidence, and drive to keep moving forward.
To current and future students—believe in yourself, embrace the challenges, and trust the journey. NIT Meghalaya has the potential to transform lives. It certainly transformed mine.

REUBEN SANNAME LYNDEM

Batch: 2019-2023
ECE Department
Roll No.: B19EC007

He is currently pursuing MTech in Wireless Communication and Networks at IIT Kharagpur.

Message:

Greetings!
It is an honor to address the readers of this magazine. I had the privilege of attaining my Bachelor's degree from NIT Meghalaya, graduating in 2023.
I remain grateful to my professors, who taught me much more than what textbooks offered. Their lessons helped me develop a passion for research and study and pushed me to continue my academic journey. It is without a shadow of a doubt that I could do so because of the support and encouragement my professors at NIT Meghalaya provided.
Keeping academics aside, I fondly remember the fun and memorable experiences with my friends during our time together. The homemade lunches we shared daily, the cultural event practice sessions, and the trips we took outside the city; I hold on to these moments dearly!
I look back to my time at the institute with great joy and fulfilment, and I have complete confidence that the institute will go from strength to strength in the years to come.

PUBLICATIONS

CONFERENCE, JOURNAL AND BOOK CHAPTERS

Journal

- *J. Potsangbam, S.S. Devi. EMViT-BCC: Enhanced Mobile Vision Transformer for Breast Cancer Classification. International Journal of Imaging Systems and Technology 2025 Mar; 35(2):e70053. https://doi.org/10.1002/ima.70053*
- *R. Saikia, R. Deka, A. Sarma, N.H. Singh, M.A. Khan, S.S. Devi. VNLU-Net: Visual Network with Lightweight Union-net for Acute Myeloid Leukemia Detection on Heterogeneous Dataset. Biomedical Signal Processing and Control 2025 Mar; 107:107840. https://doi.org/10.1016/j.bspc.2025.107840*
- *Malvika, J. Talukdar, B. Choudhuri and K. Mummaneni, "Analytical modeling and TCAD simulation of surface potential and drain current for pocket doped negative capacitance field-effect transistor" Physica Scripta, vol.100, no. 3, 2025.*
- *Kumari D, Chaudhary M, Bandari SK. Intelligent reflecting surface assisted sparse vector coding based short packet communication for 6G wireless networks. AEU-International Journal of Electronics and Communications. 2025 Mar 11:155751.*
- *Penchala S, Bandari SK, Mani VV. Performance evaluation of RIS mounted UAV communication system with RF energy harvesting. Telecommunication Systems. 2025 Mar;88(1):32.*
- *Penchala S, Bandari SK, Mani VV, Drosopoulos A. Controlled Wireless Channel using Multi-Antenna Multi-IRS Assisted Communication System: A Comprehensive Performance Analysis. IEEE Latin America Transactions. 2025 Jan 23;23(2):114-24.*
- *Mukhopadhyay S, Sarkhel A, Sarkar PP, Yadav SS. Passive metasurface reflector for 6G wireless signal coverage enhancement in indoor environment: Design and experimental demonstrations. Physical Communication. 2025 Mar 15:102664.*
- *UPTA C, Yadav SS. Deep Learning Based Channel Estimation for UAVs: A Modified U-Net Approach. Advances in Electrical & Computer Engineering. 2025 Jan 1;25(1).*
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- *J.Talukdar, Malvika, B.Das, K. Mummaneni, Performance Assessment of MoS2-Based Non uniform Tunnel Field Effect Transistors for Low-Power Applications Micro and Nanoelectronics Devices, Circuits and Systems, 2025 (presented).*
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- *Suting, Habanaibok, Soumendu Ghosh, Abhishek Sarkhel, and Prabir Saha. "A Single-Layered Linear-to-Circular Polarization Converter for Dual-Band 5G Millimeter Wave Communications Systems Using Frequency Selective Surface." In Millimeter Wave and Terahertz Devices for 5G and 6G Systems,. Springer, Nov 2025.(accepted)*
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RESEARCH AND DEVELOPMENT PROJECT

S. No	Name of the faculty member	Title of the Project	Period (From-To)	Sponsoring Organisation	Amount [INR]
1.	Dr. S. Majumdar.	Fully acoustics testing of low velocity impact damage in composite plate using the concept of local defect resonance	2022-25	Aeronautics R and D Board	24,02,800/-
2.	Dr. P. Rangababu, Dr. A. Sarkhel. Dr. S. K. Bandari, Dr. S. Majumdar, Dr. S. S. Yadav, Dr. P. K. Rathore, Dr. Prabir Saha, Dr. A. Dandapat.	AI Empowered Advanced Wireless Communication Systems	2021-2026	DST-FIST	80,00,000/-
3.	Dr. P. K. Rathore	Development of High Sensitivity CMOS-MEMS Integrated Pressure Sensor and System for Space Application	2019-2024	Indian Space Research Organisation (ISRO), Department of Space, Government of India	32,46,000/-
4.		Design and Development of Highly Sensitive Non-Conventional Ring Channel Shaped MOSFET Based Current Mirror Integrated Pressure Sensors	2021-2024	Department of Science & Technology, Ministry of Science and Technology, Government of India	44,93,601/-
5.	Dr. S. Majumdar	BRO Project - Sensor Based Big Data Analysis for Prognostics and Health Management of RCC Bridges	2023-2025	BRO	37,00,000/-
6.	Dr. P. Saha, Dr. P. K. Rathore, Dr. S. Majumdar.	SMDP Project - Development of On-chip MEMS Pressure Sensor based Tensiometer for Agriculture.	2023-2028	MIETY	1,10,00000/-
7.	Dr. P. Saha, Dr. A. Sarkhel, Dr. S. K. Bandari, Dr. S. Majumdar, Dr. S. S. Yadav.	TCIL Project- UAV Assisted Soil Moisture Content Determination through 5G Network	2023-2028	DoT	1,14,00000/-
8.	Dr. A. Sarkhel, Dr. S. S. Yadav.	Design and Development of Intelligent Reflecting Surface for Ubiquitous Connectivity Among IoT Enabled Devices	2025-2027	36,25,189	36,25,189/-

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