



# *BNM Institute of Technology*

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## **IEEE Signal Processing Society (SBC14831C)**

### **List of Events Organized during 2023-24 & 2024-25**

<b>Sl. No</b>	<b>Event Title</b>	<b>Date</b>	<b>No. of Participants</b>
1	Bid2Build	17th October, 2025	50
2	Why you should be a Tech CEO & Decoding the Brain: Foundations of designing Neurotech	8th October, 2025	60
3	Inside the Network: Life of a Packet & Routing Fundamentals	25th July, 2025	120
4	<i>EntreprenYOU: Crafting Your Startup Story in College</i>	23rd July, 2025	80
5	Meeting Report for IEEE Google Meet Discussion	17th July, 2025	9
6	Artificial Intelligence in Drug Discovery: Bridging High-Content Screening to Target Discovery	4th July, 2025	140

### IEEE SPS BNMIT Office Bearers

Sl. No	Name	Position Held
1	Harsha M S	Chair
2	Devasmitha Pathak Shrisharvari S	Vice-Chair
3	Nagaraja M Adhya Prashanth	Secretary
4	Maanya Naveen Kumar Sindhu M N	Treasurer
5	Kirtan Mohan	Webmaster

**Faculty Advisor:** Dr. Jyoti R Munavalli

**An Autonomous Institution under VTU, Approved by AICTE**

**Event Title:** Bid2Build

**Organizing Unit:** IEEE Signal Processing Society (SPS) Student Branch Chapter, BNM Institute of Technology (BNMIT), Bengaluru

**Event Type:** Technical Workshop / Hackathon

**Date:** October 17, 2025

**Time:** 9:00 AM - 5:00 PM IST

**Venue:** Main Seminar Hall, BNM Institute of Technology, Bengaluru

**Target Audience:** Undergraduate engineering students from all branches.

**Number of Participants:** 50 students

1. Abstract

Bid2Build 2025 was a flagship hackathon organized by the IEEE SPS Student Branch Chapter at BNMIT as a key event during IEEE Week. The event was uniquely designed to merge strategic resource management with technical innovation. Participants engaged in a competitive bidding process to acquire electronic components before building and demonstrating functional prototypes. This event successfully created a dynamic environment that challenged students to balance budget constraints with technical ambition, fostering critical thinking, on-the-spot problem-solving, and collaborative teamwork.

2. Event Objectives

The primary objectives of Bid2Build 2025 were:

- To foster innovation: Encourage students to develop creative solutions to real-world problems.
- To develop strategic thinking: Introduce participants to resource management and strategic planning through a component bidding system.
- To enhance technical skills: Provide a hands-on platform for students to apply their knowledge in electronics, coding, and system integration.
- To promote teamwork and collaboration: Facilitate a competitive yet collaborative environment where students work in teams to achieve a common goal.
- To simulate real-world engineering challenges: Mirror the industry scenario where projects are constrained by budgets and available resources.

3. Event Proceedings

The event was structured into four main phases, executed over a single day:

1. Inauguration and Briefing (9:00 AM - 9:30 AM): The event began with an inauguration ceremony. Dr. Jyoti R. Munavalli, Faculty Advisor, delivered the opening remarks, highlighting the importance of practical skills in engineering. The coordinators then explained the rules, objectives, and the unique bidding format to all participating teams.
2. The Bidding Session (9:30 AM - 10:30 AM): Each team was allocated a fixed number of virtual points. A list of available components (microcontrollers, sensors, motors, displays, etc.) was presented, and an auction was conducted. Teams had to strategically bid for the components they needed for their project, forcing them to prioritize and make critical decisions before the building phase even began.
3. The Buildathon (10:30 AM - 3:30 PM): With their acquired components, teams entered the five-hour building phase. They worked on developing their prototypes, ranging from IoT-based home automation systems to signal processing applications and robotic arms. Volunteers and coordinators were present to provide technical assistance and ensure a smooth workflow.
4. Project Demonstration and Judging (3:30 PM - 4:30 PM): Teams presented their completed prototypes to a panel of judges. Each presentation included a demonstration and a Q&A session. Projects were evaluated based on innovation, technical complexity, completion, and the efficiency of component usage.

5. Valedictory and Prize Distribution (4:30 PM - 5:00 PM): The event concluded with the announcement of the winners. Dr. Munavalli congratulated all participants for their enthusiastic involvement and presented awards to the winning teams, officially closing the event.

#### 4. Outcomes and Impact

Bid2Build 2025 was a resounding success, achieving its intended objectives.

- **Skill Development:** Participants gained invaluable hands-on experience in rapid prototyping, circuit design, and programming under pressure. The bidding process significantly sharpened their strategic planning and resource allocation skills.
- **Participant Feedback:** Feedback from students was overwhelmingly positive. They appreciated the innovative format, which distinguished it from a traditional hackathon and added a thrilling layer of strategy.
- **Innovation Showcase:** The event successfully showcased the technical prowess and creative potential of the students, with several high-quality prototypes being developed within the limited timeframe.

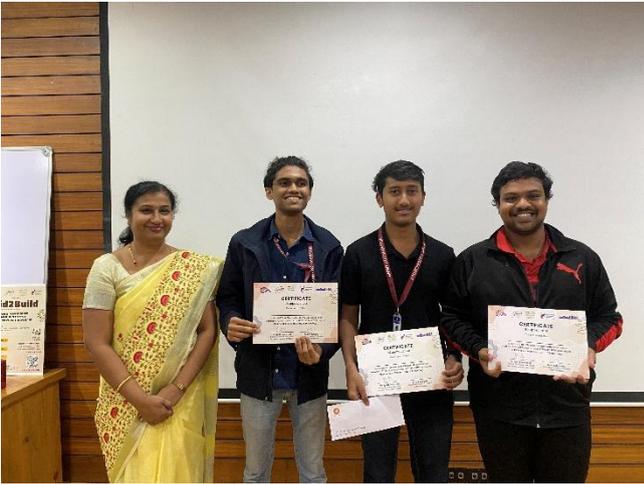
#### 5. Acknowledgements

We extend our heartfelt gratitude to our Faculty Advisor, Dr. Jyoti R. Munavalli, for her unwavering support and guidance throughout the planning and execution of this event. We also thank the management and faculty of BNMIT for providing the necessary facilities and encouragement. Finally, this event would not have been possible without the dedicated efforts of our student volunteers, coordinators, and the enthusiastic participation of all the teams.

#### 6. Conclusion

Bid2Build 2025 successfully created a platform for young innovators to push their boundaries. It stands as a testament to the success of activity-based learning in engineering education. The IEEE SPS BNMIT Student Branch Chapter looks forward to organizing more such impactful events in the future to continue fostering a culture of innovation and excellence.





# *B.N.M. Institute of Technology*

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## Why you should be a Tech CEO & Decoding the Brain: Foundations of designing Neurotech

Organized by ED Cell and IEEE SPS BNMIT

8th October 2025

Duration: 11:15 am – 1:00 pm

No of participants: 60



**First Speaker: Dr. Soumya Bhattacharjee**

**Topic: “Why you should be a Tech CEO”**

Dr. Soumya Bhattacharjee Head of Research and Data at Nexstem delivered a compelling presentation challenging the traditional academic career path and advocating for scientist-entrepreneurs as drivers of technological innovation. His systematic approach deconstructed conventional academic models while building a strong case for tech entrepreneurship.

**The Academic Status Quo: A Historical Engine**

For decades, the academic path often summarized as PhD PostDoc Faculty—was the principal driver of groundbreaking science.

Academic Superstars: Real-world examples include Nobel Prize winners like Hodgkin and Huxley (computational neuroscience) and David Baltimore (biotechnology), who built their careers within institutions.

Why it Worked Historically: The model was effective before the 1970s because universities provided the only access to expensive resources (like supercomputers), intellectual freedom, stability (tenure), and network effects for top talent, as venture capital for risky tech was non-existent.

**The Reality of Modern Academia**

The traditional model is now burdened with major obstacles that stifle innovation and creativity:

- Financial Scarcity: A huge funding crunch means low success rates for grants (e.g., only 20% for NIH grants), leading to poor wealth creation for faculty.

- Bureaucracy and Red Tape: Academics often spend 50% of their time on administration and grant writing, resulting in "long road, dead creativity" as peak innovation years are consumed by the 10-15 year climb to a faculty position.
- Political Vulnerability: Research can be highly susceptible to political interference and government budget cuts.

### **The Rise of the Tech CEO Model**

The presentation advocates for a return to the historical model where scientific pioneers found their own funding, scaled up, and executed their vision outside of formal institutions.

- History Repeats: Historically, figures like Thomas Edison (Menlo Park, funded by telegraph profits) and Marie Curie (relied on private donors) were financially independent.
- The Modern Catalyst (SpaceX Model): Companies like SpaceX, Kernel, and Neuralink demonstrate that profound scientific and technical challenges can be solved efficiently outside of academia, driven by a powerful economic incentive to create wealth and pursue moonshot goals.
- VC as the New Grant Funding: Venture Capital firms are now flush with money and have pressure to invest in high-risk, high-reward ventures, offering the potential for 100x returns in early-stage startups.
- Holistic Growth: The role of a Tech CEO expands intellect beyond a single domain, requiring skills in Business Strategy, Negotiation, Market Forces, Team Building, and Public Speaking, making it "More Fun" and multi-dimensional.

### **Steps for founding a company**

The presentation concludes with a simple pathway for those looking to transition to a Tech CEO role: 1.Find a Co-founder ,2.Ideate,3.Market Validate,4. Business Model,5.Business Pitch

### **Second Speaker: Dr. Aditya Asopa**

#### **Topic: "Decoding the Brain: Foundations of designing Neurotech"**

Dr. Aditya Asopa, Research Scientist at Nexstem, Bengaluru, provided comprehensive technical exploration of neurotechnology fundamentals. His presentation demonstrated practical applications of the entrepreneurial mindset advocated by Dr. Bhattacharjee within neuroscience domains, making complex brain-computer interface concepts accessible to undergraduate students while highlighting enormous business opportunities.

#### **The Paradox of Scale and Practical Applications**

**The C. elegans Paradox:** Despite knowing all 302 neurons' functions, electrical behavior, and connections in the tiny nematode worm, scientists can "only barely" predict worm behavior. This illustrates the complexity gap between component understanding and system behavior, highlighting challenges in morphology, ion channels electrophysiology connectome, and network activity.

**Practical Success Despite Complexity:** Contrasting this complexity, reading just 1000 neurons (0.0000003% of human brain) enables robot control and video game interaction. Real-world examples include Utah arrays and Neuralink's N1 implants, proving complete system understanding isn't necessary for practical applications and commercial success.

### **Bio signal Technologies and Market Applications**

Current Technologies with Commercial Potential:

- EEG (Brainwave activity): BCI applications, sleep monitoring, neurofeedback - massive consumer device market
- ECG (Heart rhythm): Fitness tracking, medical monitoring - established wearable technology market
- EMG (Muscle activity): Prosthetics, rehabilitation - healthcare and assistive technology markets
- PPG (Blood volume): Pulse monitoring, SpO2, fitness tracking - massive consumer adoption potential
- GSR/EDA (Skin conductance): Emotion detection, stress monitoring - wellness and mental health applications
- NIRS (Cortical oxygenation): Cognitive load measurement - research and clinical applications

- IMU (Motion/position): Gait analysis, tremor detection, fatigue monitoring - movement disorder applications

### **Three Engineering Challenges as Business Opportunities**

**Challenge A - Sensor Development:** Current brain recording resembles "concert hall of billions of neurons" where scientists hear either few individuals clearly or entire hall bustling. Market opportunity exists for companies developing smaller, more sensitive sensors capable of brain-depth recording, advancing from Hans Berger's 1929-1938 EEG observations to modern personalized medicine applications.

**Challenge B - The Decoding Revolution:** Despite abundant data availability, signal translation remains problematic with unclear mapping between EEG signals and cognition, uncertain neural code patterns. Nexstem exemplifies commercial success, discovering better ways to translate EEG signals into actionable brain states: sleep, focus, decision-making, and cognitive load for enterprise and consumer applications.

**Challenge C – The Interface to the mind:** Currently "one-way street where reading is easy, writing is hard." Optogenetics works for few neurons but not large areas; TMS affects large areas but lacks precision. Future progression toward brain-computer symbiosis where machines learn, understand, and adapt to individual users represents the ultimate market opportunity.

### **Engineering Stack and Future Market Timeline**

Entrepreneurial Opportunities Across Technology Layers:

- Application Layer: UX design, consumer games, VR experiences, therapy applications
- Intelligence Layer: AI algorithms, machine learning platforms, signal processing solutions
- Systems Layer: Real-time operating systems, portable high-fidelity processing devices
- Hardware Layer: Advanced sensors, amplifiers, biocompatible materials, compact circuits
- Wetware Layer: Experimental protocols, surgical technologies, non-invasive interfaces

**Market Timeline and Convergence Opportunity:** This represents a "special time" due to neuroscience-AI convergence, electronics advancement, data availability, and computing power enhancement.

### **Future Market Projections:**

- 2030: Closed-loop depression treatment systems
- 2035: Thought-controlled exoskeleton markets for paralyzed patients
- 2040: Direct brain-to-brain communication platforms
- 2050: Mainstream cognitive enhancement becoming commonplace
- 20XX: Human-AI merger and complete integration markets

### **Q&A Session**

The technical talk concluded with an interactive question and answer session, where participants engaged the speakers with thoughtful and diverse queries. Dr. Bhattacharya and Dr. Asopa addressed a range of questions from students and faculty, providing deeper insights into entrepreneurship, transitions from academia to industry, neural engineering, commercialization of neurotechnology, and practical steps for pursuing innovation. Their responses clarified complex topics, inspired future research, and highlighted challenges and opportunities in neurotechnology and technology entrepreneurship.

## **Conclusion and Future Implications**

This comprehensive technical talk successfully demonstrated the powerful synergy between scientific expertise and entrepreneurial execution. Dr. Bhattacharjee's advocacy for scientist-entrepreneurs provided the essential motivational and strategic framework, while Dr. Asopa's technical presentation showcased concrete opportunities within neurotechnology, creating a complete roadmap for student career development.

The central insight emerged that technical expertise combined with entrepreneurial thinking represents the optimal path for driving scientific and technological innovation in the modern economy. Students departed with practical frameworks for both technical development and business execution, positioned to contribute meaningfully to the transformation of scientific research through entrepreneurial applications. The convergence of neuroscience, artificial intelligence, and entrepreneurial opportunity represents a unique historical moment for technically-trained leaders to drive unprecedented innovation and economic impact.

# *BNM Institute of Technology*

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**Event Title:** Inside the Network: Life of a Packet & Routing Fundamentals

**Organizing Unit:** IEEE Signal Processing Society (SPS) Student Branch Chapter, BNM Institute of Technology (BNMIT), Bengaluru

**Event Type:** Technical Workshop

**Date:** 25th July 2025

**Time:** 11:00 AM – 3:00 PM IST

**Venue:** Room A215, B.N.M. Institute of Technology, Bengaluru

**Number of Participants:** 120 students

## **Resource Person:**

**Ms. Sanyukta S. Pawaskar**

*Technical Consulting Engineer, Cisco Systems*

## **Overview of the Workshop**

The IEEE Signal Processing Society (SPS) Student Branch Chapter of BNMIT successfully organized a hands-on technical workshop titled “*Inside the Network: Life of a Packet & Routing Fundamentals*” on 25th July 2025. The session was conducted by Ms. Sanyukta S. Pawaskar, Technical Consulting Engineer at Cisco Systems, who provided deep industry insights and practical expertise to participants.

The workshop aimed to strengthen students’ understanding of networking through a blend of theoretical learning and practical demonstration, bridging the gap between classroom concepts and real-world applications.

## **Topics Covered**

- **TCP/IP Model:** Overview of the four layers :- Application (HTTP), Transport (TCP/UDP), Internet (IP), and Link (Ethernet/Wi-Fi).
- **Switching vs. Routing:** Explained Layer 2 (MAC-based switching within LANs) and Layer 3 (IP-based routing across networks).
- **IPv4 Addressing:** 32-bit format, structure, and importance of subnetting and network identification.
- **MAC Address:** Unique hardware identifiers used in Layer 2 frame forwarding.
- **Address Resolution Protocol (ARP):** Mapping IP addresses to MAC addresses for local communication.
- **Ping Utility:** Demonstrated ICMP-based connectivity and latency testing for network diagnostics.

## **Hands-on Session**

A key highlight of the workshop was the Command Line Interface (CLI)-based lab session, where students configured routers and switches, assigned IP addresses, and implemented static routing. These practical exercises helped participants gain a real-world understanding of packet flow within a network. The interactive Q&A session that followed allowed students to clarify concepts, discuss troubleshooting methods, and connect theoretical knowledge with industry use cases.

## **Outcomes and Impact**

- Enhanced understanding of **core networking concepts** and their real-world applications.
- Strengthened **technical and analytical skills** through guided practical exercises.
- Introduced students to **industry-relevant tools** and Cisco-level configuration environments.
- Encouraged interest in **network engineering and communication systems** among participants.

## Acknowledgements

The IEEE SPS BNMIT Student Branch Chapter extends its sincere gratitude to **Ms. Sanyukta S. Pawaskar** for delivering an informative and interactive session. Special thanks to **Dr. Jyoti R. Munavalli**, Faculty Advisor, for her mentorship and continuous support. The Chapter also acknowledges the **management and faculty of BNMIT** for their encouragement and facilities, and appreciates the **student coordinators and volunteers** for their dedicated efforts in organizing the event successfully.

## Conclusion

The workshop, *“Inside the Network: Life of a Packet & Routing Fundamentals,”* provided students with a comprehensive understanding of how data travels within networks — from packet generation to routing decisions. By combining theory and practice, the event effectively enhanced participants’ technical proficiency and interest in networking technologies. The IEEE SPS BNMIT Student Branch Chapter looks forward to hosting more such impactful technical sessions to foster learning, innovation, and professional growth among students.

**B. N. M. Institute of Technology**  
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Department of Electronics and Communication Engineering

IEEE Signal Processing Society  
In Association with  
IEEE Women In Engineering & IIC

Organizes a Workshop on  
**“Inside the Network: Life of a Packet & Routing Fundamentals”**

Date: 25.07.2025  
Time: 11.00am  
Venue: A215

**Organizers**

**Dr. Jyoti R. Munavalli**  
Head, ED Cell, BNMIT  
Faculty Advisor SPS

**Dr. Vrusha Kusnur**  
Associate Professor, ECE

**Dr. Yasha Jyothi M Shirur**  
Professor & HoD

**Dr. Bindu S**  
Faculty Advisor-WIE, ComSec

**Sri. Narayan Rao R. Maanay**  
Chairman GB  
BNMIT

**Prof. T. J. Rama Murthy**  
Director  
BNMIT

**Dr. S. Y. Kulkarni**  
Additional Director & Principal  
BNMIT

**Prof. Eishwar N. Maanay**  
Dean  
BNMIT

**Dr. Krishnamurthy G. N.**  
Deputy Director  
BNMIT

Logos: IEEE, AICTE, VTU, BNMIT, and various industry partners.



# *B.N.M. Institute of Technology*

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- **Event Name:** *EntreprenYOU: Crafting Your Startup Story in College*
- **Organized by:** IEEE Signal Processing Society & IEEE EMBS Student Chapters, BNMIT
- **Supported by:** Institution's Innovation Council (IIC), Entrepreneurship Development Cell – BNMIT, IEEE BNMIT Student Branch
- **Date & Time:** 23rd July 2025 | 12:00 PM – 1:30 PM
- **Venue:** N401, BNMIT
- **Total Participants:** 80 students

## **Objective Of The Event:**

The purpose of this session was simple but powerful: to show us that we don't need to wait until graduation to start building something meaningful. The event focused on how our college life—filled with ideas, curiosity, and energy is actually the perfect time to start a venture. Whether it's a simple problem we notice around us or an idea we can't get out of our heads, this session was all about turning that into action.

## **Event Summary:**

The event "*EntreprenYOU*" was designed to motivate students to explore entrepreneurship during their college years. It featured young founders who started their journeys while still in college, sharing real stories of how they turned simple ideas into impactful ventures.

An inspiring Speaker was invited:

- **Mr. Rana Vivek Singh** (Co-Founder & CEO, Magicroll.ai) shared his experience of building AI products as a student, and how starting small helped him scale his idea into a company.

The speaker emphasized how college can be the best time to start up when students have access to resources, peer collaboration, and freedom to experiment. His journeys encouraged attendees to believe in their ideas, take risks, and think beyond academics.

The session also had an engaging Q&A, where students asked questions about starting up, finding co-founders, facing failures, and approaching investors.

During the Q&A, Mr. Singh addressed practical challenges students often face when thinking about startups like how to find co-founders, validating your idea, balancing academics with building something on the side, and understanding the mindset needed when pitching to investors. His honest responses and practical suggestions resonated deeply with the audience. The event ended on a high note, leaving students energized and inspired.

## **Key Takeaways:**

- Start where you are. No idea is too small.
- Use college resources and networks to experiment and build.
- Solving real problems can lead to impactful startups.
- It's okay to fail what matters is learning and growing.

Photos from the event:



IEEE BNMIT Student Branch

Meeting Report for IEEE Google Meet Discussion

Date: 17th July 2025

Platform: Google Meet

### Meeting Highlights:

The IEEE BNMIT execom members met online today to plan and discuss upcoming activities. The session focused on sharing ideas for events over the academic year, potential collaborations, and organizational tasks.

During the meeting, it was discussed that there is going to be an interactive session featuring two student entrepreneurs on 23<sup>rd</sup> July. The objective of this event is to provide IEEE members with insights into student-led ventures and entrepreneurship.

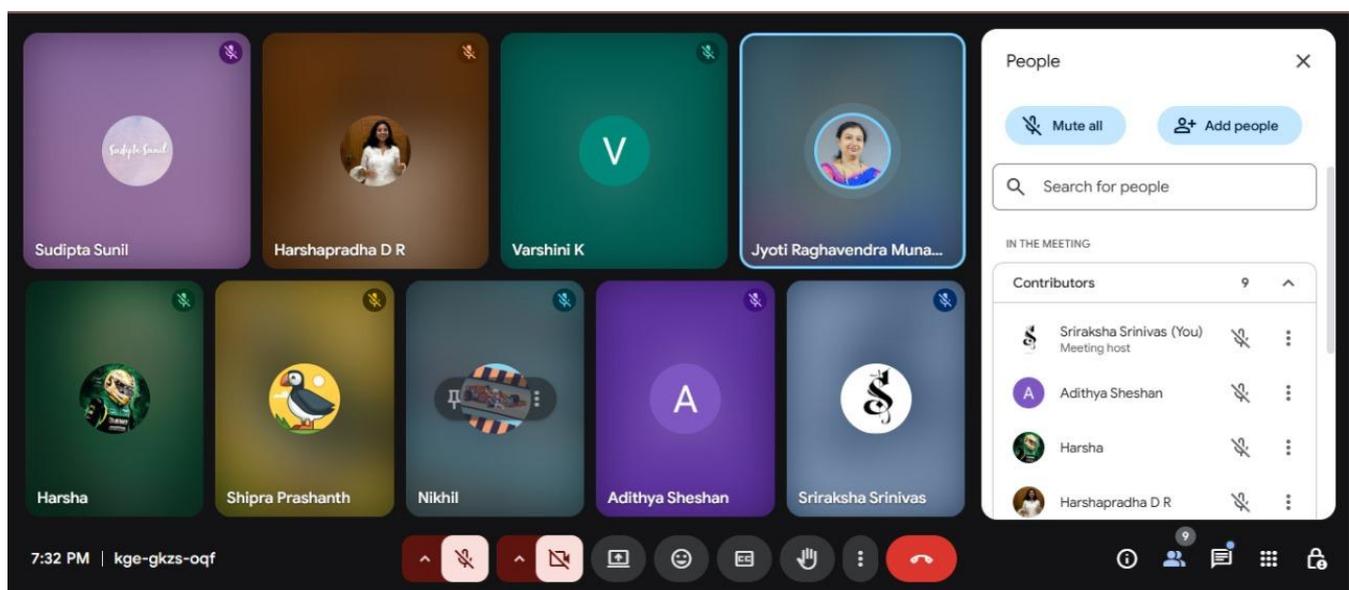
A felicitation program is scheduled for 26th July 2025 to recognize and honor senior IEEE members for their contributions. This event will also serve as a farewell to the outgoing office bearers, acknowledging their dedicated efforts and service to the IEEE BNMIT Student Branch. As part of the program, the outgoing members will interact with the current team, sharing their experiences, insights, and tips to help guide the next set of office bearers in their roles.

The team discussed arranging two educational visits aimed at giving members real-world industry exposure. One of the proposed visits is to Hassan Mission Control Facility, where students would get an opportunity to learn about satellite operations and how mission control centers function. A visit to Akaashvani (All India Radio) is also being planned, offering members a chance to understand the workings of radio broadcasting from a technical and operational perspective. Both visits are planned with the objective of broadening students practical understanding beyond classroom learning.

It was also discussed that EMBS and SPS would collaborate on events focusing on healthcare technology, biomedical applications, and signal processing in medical systems. The collaboration aims to organize joint workshops, webinars, and technical sessions that align with the interests of both societies.

The meeting was hosted by Harshapradha D.R., Chair of the IEEE SPS Student Branch, and Sriraksha Srinivas, Chair of the IEEE EMBS Student Branch, in the presence of the faculty advisor Dr. Jyoti R. Munavalli ma'am. The office bearers present in the meeting were Adithya M Sheshan, Harsha M S, Nikhil Patil, Shipra Prashant, Varshini K, and Sudipta Sunil.

The meeting ended on a positive note, with clear plans laid out for the upcoming activities and collaborations.



*IEEE BNMIT EMBS and SPS Office Bearers' Online Meeting held on 17th July 2025.*

**Report of “Artificial Intelligence in Drug Discovery”**

**Title of the Event:**

**Artificial Intelligence in Drug Discovery: Bridging High-Content Screening to Target Discovery**

**Date:** 4th July, 2025

**Time:** 11:30 am to 1pm

**Venue:** Room A215, BNMIT Campus

**Participants:** 140

**Organized by:**

Department of Electronics and Communication Engineering,

B.N.M. Institute of Technology (Autonomous), Bengaluru

In association with IEEE Signal Processing Society – BNMIT Student Branch Chapter

and IEEE Engineering in Medicine & Biology Society (EMBS) – BNMIT Student Branch Chapter

**Objective of the Event:**

The primary aim of this technical talk was to:

- Highlight the pivotal role of research in accelerating innovation within the field of Artificial Intelligence.
- Inspire students and professionals to contribute actively to AI-driven biomedical research, especially in drug discovery.

The Department of Electronics and Communication Engineering at B.N.M. Institute of Technology, in collaboration with the IEEE Signal Processing Society and the IEEE Engineering in Medicine & Biology Society (EMBS) student chapters, organized a technical talk titled “*Artificial Intelligence in Drug Discovery: Bridging High-Content Screening to Target Discovery*” on 4th July 2025. Delivered by Prof. Arvind Rao from the University of Michigan, the session highlighted how AI is transforming the landscape of biomedical research by enabling the conversion of microscopy images into quantifiable data, analyzing cellular responses to compounds, and bridging screening results with target identification. The talk offered students and faculty valuable insights into the future of AI-driven innovation in drug discovery and the practical challenges of integrating these tools into research workflows.

Artificial Intelligence is revolutionizing drug discovery by transforming complex microscopy images into quantifiable data through deep learning techniques, enabling precise analysis of cellular structures and behaviors. Once this data is extracted, AI models can assess how cells respond to various pharmaceutical compounds, identifying subtle phenotypic changes and predicting therapeutic outcomes. Furthermore, AI aids in connecting high-content screening results to target identification and validation by uncovering correlations between compound effects and molecular pathways. Despite its promise, integrating AI into research workflows presents challenges such as data variability, model interpretability, and the need for high-quality labeled datasets. Looking ahead, AI is poised to drive the future of drug discovery by accelerating research timelines, reducing development costs, and enabling personalized medicine through predictive and adaptive modeling.

