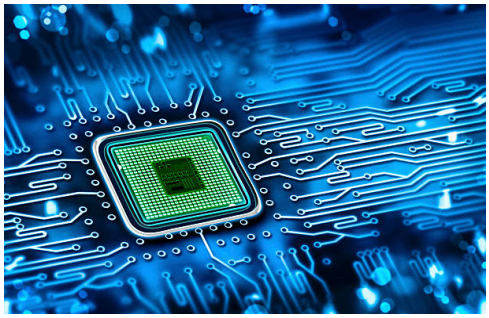
Department of Electronics and Telecommunication Engineering



SMD

A bi – annual Newsletter

July – December 2024

IIEST SHIBPUR

HOD Speaks

Namaskar

Welcome readers to the Department of Electronics and Telecommunication Engineering of Indian Institute of Engineering Science and Technology (IIEST), Shibpur.

As HOD and an alumnus, I feel proud to share few glimpses of the glorious journey of this department that started in the year 1965. The founder of the department, Prof. Shankar Sebak Baral, was one of the distinguished scholars of Prof. Sisir Kumar Mitra, who was a famous Indian Physicist with a crater named after him on moon. The first batch of Electronics and Telecommunication engineers graduated from this department in 1971. The Master's program was launched in 1972 and the first batch of post graduates passed out in 1974.

Department of Electronics and Telecommunication Engineering

At present, the PG specializations offered are: (i) Microelectronics and VLSI Design, (ii) RF & Photonics, and (iii) Communication and Signal Processing. Apart from this, the department has been regularly admitting PhD scholars and offer them rigorous training, both in theoretical and experimental dimensions, in some of the emerging technologies under the above-mentioned specializations. To retain its legacy as one of the premiere national institutes of technical learning and to align the academics with the goal of a self-reliant India, the faculty members are committed to pursue high quality research and manpower training through sponsored projects, patents, publications and research collaboration while continuing the glorious tradition of quality classroom teaching. Our current faculty profile reflects an interesting blending of the zeal of young minds and far-sightedness of experienced brains.

The students in the department are actively involved in various techno-management events organized by the Academic Society of Electronics and Telecommunication Engineering, Institute Innovation Council, Entrepreneurship Development Cell and similar other students' clubs.

Finally, to reinforce its footprint in emerging technological areas, especially IoT systems, Circuits and Systems for AI and ML empowered cyber-physical systems and quantum communication and computing, the department looks forward to all bright and motivated students and academicians to be members of this beautiful family called ETC@IIEST.

Warm regards,

Dr. Tamaghna Acharya
HOD, Department of Electronics and Telecommunication Engineering

Department of Electronics and Telecommunication Engineering

Sponsored Research Project Awarded

Title: AI-based Detection of Acute Respiratory Distress Syndrome (AIDARDS): An Artificial Intelligence aided Framework for Detecting Acute Respiratory Distress Syndrome using Microwave Sensors

- **Investigator**: Dr. Debasis Mitra
- **Agency**: Department of Biotechnology (DBT), Govt. of India

Title: Development of the Microwave-Photonic Hybrid Wearable Sensor for in Vivo Monitoring of Hip Stem Micromovements

- **Investigator:** Dr. Debasis Mitra
- **Agency:** DST-SERB, Govt. of India

Title: Development of Metamaterials Based Glucose Sensor for Tackling the Global Occurrence of Diabetes

- **Investigator:** Dr. Debasis Mitra
- **Agency:** Scheme for Promotion of Academic and Research Collaboration (SPARC)

Title: Development of Prototype Exhaled-Breath-Sensor-Array Using 2D Junction Devices for Detection of Fatty Liver Disease

- **Investigator:** Dr. Partha Bhattacharyya
- **Agency:** Department of Science and Technology (DST), Govt. of India

Title: Techniques for Coexistence & Integration of Communication Satellites and Terrestrial IMT Systems

- **Investigator:** Dr. Tamaghna Acharya
- **Agency:** Indian Space Research Organization (ISRO), Dept. of Space, Govt. of India

Title: Efficacy Assessment of Medicine Preparations on Stratified Epithelial Cancer Growth and Gene Expression Profiles in Cellular Models: A Multimodal Approach

- **Investigator:** Dr. Chirasree Roy Chaudhuri
- **Agency:** CCRH, Ministry of AYUSH, Govt. of India

Title: Underground Mine Monitoring System

- **Investigator:** Dr. Ankita Pramanik
- **Agency:** IBM

Department of Electronics and Telecommunication Engineering

Invited Talk

Invited Talk delivered by **Dr. Partha Bhattacharyya** at 6th International Conference on Emerging Technologies : Micro to Nano (ETMN 2024) at Jamia Millia Islamia, New Delhi on 22 – 23 November 2024 on the topic ***"Application of ZnO based PN Junction and Bipolar Junction Transistor as a Potential Gas Sensor: An Innovative Approach"***

Invited talk delivered by **Dr. Chirasree Roy Chaudhuri** in International Conference on Advanced Materials and Startup Ecosystem organized by Trivandrum Engineering Science and Technology (TReST) Research Park from 13th -15th December 2024 on **"Machine Learning Augmented Graphene Electronic Nanosensor Array for Healthcare and Environmental Applications"**

Invited talk delivered by **Dr. Chirasree Roy Chaudhuri** on **"Electrokinetics Integrated FET and electrochemical sensor platform for early cancer diagnostics and nanoplastics detection in environmental water"**, at International Conference on Advanced Materials and Manufacturing, organized by JIS Institute of Advanced Studies and Research, December 18th -19th , 2024

Invited Talk delivered by **Dr. Ananda Sankar Chakraborty** at VECC Kolkata, West Bengal on 29th October 2024 on the topic ***"Application Specific Compact Modelling and Analog Design"***

Delivered a talk by **Dr. Chirasree Roy Chaudhuri** on **"WATCh: Water Antibiotic Detection by Transistor Channels"** at Mid-Year Symposium of INYAS (INSA) at IISER Kolkata from 26th -28th September 2024

Invited Talk delivered by **Dr. Partha Bhattacharyya** at ATAL Faculty Development Programme (ATAL FDP) on the topic ***"Application of Semiconductors: Past, Present & Future Trends"*** at Abacus Institute of Engineering & Management, West Bengal on 7th August 2024

Research and Collaborations

Existing Collaborations

International

Dr. Robin Augustine, Associate Professor, Uppsala University, Sweden

Dr. Fernando L Teixeira, Professor, Ohio State University, USA

Dr. Alessio Monti, Associate Professor, Roma Tre University, Rome, Italy

Dr. Filiberto Bilotti, Professor, Roma Tre University, Rome, Italy

Spanish Council for Scientific Research, Madrid, Spain

EPFL, Switzerland

University of California Berkeley

Prof. Hans Jörg Fecht, Institute of Micro and Nanomaterials, Ulm University, Germany

Prof. Anita Lloyd Spetz, Div. of Applied Physics, Linköping University, Linköping, Sweden

Prof. Praveen Shekhar, Washington State University, USA

Existing Collaborations (contd ...)

Prof. S. C. Mukhopadhyay, McQuarie University, Australia

Prof. Shekhar Bhansali, Florida International University, USA

Prof. Mon Shu Ho, Department of Physics, National Chung Hsing University, Taiwan

National

Dr. Sonu Gandhi, National Institute of Animal Biotechnology, Hyderabad, jointly published a paper in Biochemical Engineering Journal, 2024

Dr. Sriparna Chatterjee, CSIR-Institute of Materials and Manufacturing Technologies(IMMT), Bhubaneshwar

Dr. HSS Ramakrishna Matte, Center for Nano and Soft Matter Sciences, Bangalore

Prof. Sanatan Chattopadhyay, Calcutta University

Prof. Shankar Ghosh, InBOL Healthcare Education Center, joint conference paper received best paper award in *International Conference on Emerging Technologies: Micro to Nano (ETMN-2024)*, Nov 22-23, 2024, JMI, New Delhi

Terracarb Industries Private

Prof. Sanket Goel, Department of EEE, BITS Pilani, India

Dr. Jamil Akhtar, CEERI Pilani, India

Prof. Anup Dandapat, Department. of Electronics and Communications, NIT Meghalaya, India

Existing Collaborations (contd ...)

Dr. Souptick Chanda, Assistant Professor, IIT Guwahati, India

Dr. Subhasish Sarkar, MBBS, MS (General Surgery), Assistant Professor, College of Medicine and Sagore Dutta Hospital.

Dr. Soumen Banerjee, Principal, Narula Institute of Technology, Kolkata

Mr. Dhruba Das, Scientist, Society for Applied Microwave Electronics Engineering & Research (SAMEER)

Dr. Sandip Paul, Lecturer, Kolaghat Government Polytechnic College, West Bengal.

Prof. Dhrubes Biswas, Department of Electronics & Electrical Communication Engineering, IIT Kharagpur, India

Prof. Subir Kr. Sarkar, Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata, India

Prof. Raj Kumar Gupta, Department of Physics, BITS, Pilani, India

Prof. Chandan Kr. Sarkar, Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata, India

Prof. Mayank Shrivastava and Prof. Sanjiv Sambandan, Indian Institute of Science (IISC) Bangalore

Prof. Gopala Darbha, IISER Kolkata

Existing Collaborations (contd …)

Prof. Shanghamitra Ghosh, Department of Biotechnology, University of Calcutta

Prof. Ravi Kumar Arun, IIT Jammu

Prof. Soumyo Mukherji, Director, BITS Pilani

Prof. Enakshi Bhattacharyya, IIT Madras

Prof. Rabibrata Mukherjee, IIT Kharagpur

Memorandum of Understanding (MoU)

MoU signed in 2024- with Central Council of Research in Homoeopathy, Ministry of Ayush

A project based MoU was signed between CCRH and IIEST on studying the effectiveness of homoeopathic medicines in Stratified oral epithelial cell cancer and gene expression profile in cellular models.

PhD Completed

1) Anirban Ganguly
2) Sourav Chakraborty
3) Aditi Sengupta
4) Ardhendu Sekhar Biswas

Department of Electronics and Telecommunication Engineering

Journal Publications

Sanchita Mallick, **Tamaghna Acharya** and Sumit Chakravarty, *Robust secure beamforming design in cognitive satellite communication for coexistence with terrestrial networks*, Volume 67, Physical Communication (Elsevier), 2024

Tarakeswar Shaw, Bappaditya Mandal, Gopinath Samanta, Thiemo Voigt, **Debasis Mitra** and Robin Augustine, *Rotation insensitive implantable wireless power transfer system for medical devices using metamaterial-polarization converter*, 14, 19688, Scientific Reports, 2024

P Mukherjee, S Sen, A Das, **C Roy Chaudhuri**, "Real Time Estimation of Corneal Damage Using IL-6 in Tears based on Flexi-Graphene FET Sensor Array", IEEE Sensor Letters (in press), 2024, https://doi.org/10.1109/LSENS.2024.3419217

Tai Fei, SC Mukhopadhyay, João Paulo Javidi Da Costa, **Chirasree Roy Chaudhuri**, Lan Lan, Nevine Demitri, "Spatial Environment Perception and Sensing in Automated Systems: A Review", IEEE Sensors, vol.24, pp.21813-21833, 2024, 10.1109/JSEN.2024.3379222

I Sil, B Chakraborty, **P Bhattacharyya**, "*Exploring the Potentiality of ZnO-BJT for Efficient Detection of Low Concentration Alcohols through Innovative Utilization of Transistor Properties*", IEEE Sensors Journal, vol. 24, No. 3, pp. 2887 - 2894, 2024

S Chatterjee, D Bhardwaj, B Prasad, K Sarawadekar, *Scalable Matrix Decomposition-Based Less-Complex HEVC Transform Architecture*, Early Access, IEEE Transactions on Consumer Electronics, 2024

P Mukherjee, S Sen, A Das, S Kundu, **C Roy Chaudhuri**, "Graphene FET Biochip on PCB Reinforced by Machine Learning for Ultrasensitive Parallel Detection of Multiple Antibiotics in Water", Biosensors and Bioelectronics, vol.271, p.117023, https://doi.org/10.1016/j.bios.2024.117023

P Mukherjee, S Kundu, R Ganguly, A Barui, **C Roy Chaudhuri**, "Deformed graphene FET biosensor on textured glass coupled with dielectrophoretic trapping for ultrasensitive detection of GFAP", Nanotechnology 35 (29), 295502, 2024

Journal Publications (contd…)

P Mukherjee, A Chakraborty, D Prakashan, S Gandhi, **C R Chaudhuri**, " Conventional Lateral Flow Immunoassay with Integrated Screen-Printed Electrodes for Dielectrophoretic Trapping of Bacteria Enabling Sensitive, Rapid Detection at Low Concentrations ", Biochemical Engineering Journal, available online 2024, https://doi.org/10.1016/j.bej.2024.109609

Adarsh Singh, Bappaditya Mandal, Bishakha Biswas, Sankhadeep Chatterjee, Soumen Banerjee, **Debasis Mitra** and Robin Augustine, *Microwave Antenna-Assisted Machine Learning: A Paradigm Shift in Non-Invasive Brain Hemorrhage Detection*, IEEE Access, 2024

Tarakeswar Shaw, Bappaditya Mandal, **Debasis Mitra**, Pramod KB Rangaiah, Mauricio D Perez and Robin Augustine, *Metamaterial integrated highly efficient wireless power transfer system for implantable medical devices*, 173, 155010, AEU-International Journal of Electronics and Communications, 2024

Ankita Ray Chowdhury, Saikat Chandra Bakshi, **Ankita Pramanik** and Gopal Chandra Roy, "Design and Study of LoRa-based IIoT Network for Underground Coal Mine Environment," in *IEEE Access*, doi: 10.1109/ACCESS.2024.3470120

Conference Publications

Tamaghna Acharya, Abhilash S, Sutanu Ghosh, Tanmoy Chandra, *Downlink Rate Coverage Probability Analysis for HAP Assisted Backhauling of Small Cells Using 3GPP 3D Channel Models*, 2024 International Conference on Signal Processing and Communications (SPCOM), 2024

Tarakeswar Shaw, Pritam Das Mahapatra, Bappaditya Mandal, **Debasis Mitra** and Robin Augustine, *An Efficient Wireless Power Transfer System using Transmission and Reflection Characteristics of Metamaterial*, 1--4, 2024 18th European Conference on Antennas and Propagation (EuCAP), 2024

Bishakha Biswas, Adarsh Singh, **Debasis Mitra**, Bappaditya Mandal, Robin Augustine, *Brain Hemorrhage Detection Using Antenna System Integrated With Imaging Algorithm*, 2024 18th European Conference on Antennas and Propagation (EuCAP), 2024

Conference Publications (contd...)

E. Saicharan, Saikat Chandra Bakshi, **Ankita Pramanik** and Gopal Chandra Roy, "Positioning Systems for Underground Mines" in IEEE WIECON ECE

Souvik Sen, Pritam Paul, and **Rik Chattopadhyay**, *Channel prediction and phase correction in a vertical FSO link using Recurrent Neural Network*, paper JTu1A.1., in Advanced Photonics Congress 2024, Technical Digest Series (Optica Publishing Group, 2024), 2024

Koyel Naskar, Indrajit Sil and **Partha Bhattacharyya,** "ZnO Homojunction-based Acetone Vapor Sensor for Efficient Detection of Diabetes Mellitus", 6th International Conference on Emerging Technologies: Micro to Nano (ETMN-2024), Jamia Millia Islamia, Delhi, India, 22nd-23rd November, 2024

Ranita Halder, Bikramdeb Chakraborty and **Partha Bhattacharyya**, "MoS_2 Nanoflowers-Based Acetone Sensor for Potential Non-Invasive Point-of-Care Diagnosis of Diabetes", 6th International Conference on Emerging Technologies: Micro to Nano (ETMN-2024), Jamia Millia Islamia, Delhi, India, 22nd-23rd November, 2024

Sujith Sai, Anuvab Sen, Chhandak Mallick, Aakash Mallik, Udayon Sen, Mayukhi Paul, Ananya Sutradhar, **Subhabrata Roy**, *QGAPHnet : Quantum Genetic Algorithm Based Hybrid QLSTM Model for Soil Moisture Estimation*, IGARSS 2024 - 2024 IEEE International Geoscience and Remote Sensing Symposium, Athens, Greece, 2024

Anuvab Sen, Sujith Sai, Chhandak Mallick, **Subhabrata Roy**, Udayon Sen, *HBO-DEViT: Vision Transformer Based Attention-Guided Evolutionary Architecture for Ship-Iceberg Categorisation in Arctic Sar Images*, IGARSS 2024 - 2024 IEEE International Geoscience and Remote Sensing Symposium, Athens, Greece, 2024

Maneet Chatterjee, Anuvab Sen, **Subhabrata Roy**, *ExoSpikeNet: A Light Curve Analysis Based Spiking Neural Network for Exoplanet Detection*, 2024 IEEE 13th International Conference on Communication Systems and Network Technologies (CSNT), Jabalpur, India, 2024

Conference Publications (contd...)

Anuvab Sen, **Subhabrata Roy**, Ariv Debnath, Gourav Jha and Rahul Ghosh, *DE-ViT: State-of-the-art Vision Transformer Model for Early Detection of Alzheimer's Disease*, 30th National Conference on Communications (NCC 2024), Chennai, India, 2024

P. Mukherjee, A. Das, U. R. Dash, **C. Roy Chaudhuri**, Thermally Reduced Graphene FET biochip on PCB for Rapid Antibiotic Detection in Contaminated Water, ISSS International Conference on Micro Nano, and Smart System (ICMNSS), 9-12 July 2024, IISc Bengaluru

P. Mukherjee, S. Kundu, R. Das Kundu, G. Choudhury, S. K. Ghosh, **C. Roy Chaudhuri**, Development of High Frequency Graphene FET Sensor on PCB for Detection of Nucleic Acid in Communicable Disease Diagnostics, 6th International Conference on Emerging Technologies: Micro to Nano (ETMN-2024), Nov. 22-23, 2024, JMI, New Delhi

Piyali Mukherjee, Shalini Dasgupta, Ananya Barui, **Chirasree Roy Chaudhuri**, Graphene FET Biochips on PCB for Exosome based Early Screening of Cancerous Cells, Accepted for presentation in the 39th Indian Engineering Congress, 2024, to be held on 20-22 Dec, 2024, Kolkata

Shalini Patel, Adarsh Singh, Bappaditya Mandal, Robin Augustine, Rupesh Gupta, Virendra Kumar, **Debasis Mitra**, and Chaitali koley, "Non-Invasive Sensor for Hyperglycemia Detection and Monitoring." in IEEE Microwaves, Antennas, and Propagation Conference (MAPCON), 2024

Adarsh Singh, **Debasis Mitra**, Bappaditya Mandal, and Robin Augustine, "Microwave-Based Safe Alternative for X-Ray Scans for Pleural Effusion." in IEEE Microwaves, Antennas, and Propagation Conference (MAPCON), 2024

A. Ganguly, D. D. Mitra, M. Bhanja, A. Chakraborty, **A. Banerjee**, "A Switched Current Mirror based VLSI Architecture of 1-D DCT for Compressed ECG Signal Acquisition," in the proceedings of 8th IEEE Kolkata Section Conference (CALCON) 2024, 14-15th December 2024

Conference Publications (contd...)

M. Chaudhury, B. K. Pandit and **A. Banerjee**, "A Dynamic Window Size-Based VLSI Architecture Design of Moving Average Filter and Its Vulnerability to Hardware Trojans", 2024 28th International Symposium on VLSI Design and Test (VDAT) , Vellore, India, 2024, pp. 1-6, doi: 10.1109/VDAT63601.2024.10705727

Book Chapter

Avik Kumar Das, Saikat Chandra Bakshi, and **Ankita Pramanik**, (2024), "Convolution Neural Network for Sparse Channel and Image Reconstruction in Underwater Acoustic Communication," In Artificial Intelligence for Wireless Communication Systems: Technology and Application, Taylor & Francis. Chapter 7. Editors: Samarendra Nath Sur, Agbotiname Lucky Imoize, Ankan Bhattacharya, Debdatta Kandar, Jyoti Sekhar Banerjee
ISBN 9781032576671
DOI: 10.1201/9781003517689-7

Patents

K Sinha, A Chakraborty, Z Ahmed, P Dutta, C Das Mukhopadhyay, **C Roy Chaudhuri**, "Real time serotonin detection by molecularly imprinted polymer based direct coupled field effect transistor", Patent Granted.: (555099, 26.11.2024)

Smart Underground Mine Monitoring Device (Indian Patent)
Inventors: Saikat Chandra Bakshi, **Ankita Pramanik**, et. al.
Patent Number: 553659
Date of Grant: 30th October 2024

Patents (contd …)

N Samanta, A K Chanda, **C Roy Chaudhuri**, "Non-invasive camera less wireless sensor system for monitoring of elderly people staying alone", Patent granted : No.544190, 4th July 2024

A Das, S Bose, **C Roy Chaudhuri**, "A HANDHELD OPEN-ACCESS MOBILE-INTERFACE POTENTIOSTAT", Indian Patent publication date:19/03/2021, Patent Granted(548144, 20.8.2024)

Partha Bhattacharyya, Indrajit Sil, "A process for formation of highly stable zinc oxide bipolar junction transistor", Indian Patent application no. 202431055093 (Date of patent application/Filing: 19.07.2024)

Recognitions

- Dr. Partha Bhattacharyya has been recognized as World's Top 2% Scientists published by Stanford University and Elsevier in 2022, 2023 and 2024
- Dr. Ankita Pramanik has received the Outstanding Volunteer Award from IEEE Kolkata Section in 2024
- Publication from Dr. Chirasree Roy Chaudhuri's group in Applied Physics Letters (https://doi.org/10.1063/5.0168729) has been included in Nature indexed ranking of IIEST, 2024 (38) (https://www.nature.com/nature-index/institution outputs/generate/all/countries-India/all)

Student's Achievements

Awards

Best oral paper presentation award (1st place) for the paper "ZnO Homojunction based Acetone vapor Sensor for Efficient Detection of Diabetes Mellitus" authored by Koyel Naskar and Partha Bhattacharyya, at 6th International Conference on Emerging Technologies: Micro to Nano (ETMN 2024), 22nd - 23rd November, 2024 Organized by Jamia Milia Islamia University, New Delhi, India

Outstanding Paper Award for the paper "Beyond Graphene 2D FET based Exhaled-Breath Sensor for Point-of-Care Diagnosis of Liver Fibrosis" authored by Bikramdeb Chakraborty and Partha Bhattacharyya, at the 6th Regional Science and Technology Congress (Region-5), 3rd - 4th January 2024 Organized by Kalyani University, West Bengal, India

M.Tech thesis of Ms. Ananya Chakraborty, under the supervision of Dr. Chirasree Roy Chaudhuri on "Real time serotonin detection by molecularly imprinted polymer based direct coupled field effect transistor", has been awarded the FIRST prize under the PG Award 2024 category by Institute of Smart Materials, Structures and Systems, India

Best Paper Award at the 6th International Conference on Emerging Technologies: Micro to Nano (ETMN-2024), Nov 22-23, 2024, JMI, New Delhi.

Student's Achievements (contd ...)

International Visits / Fellowships / Placements

- Academic Visit of Adarsh Singh (Ph.D. Scholar) as visiting researcher at Uppsala University, Sweden, during October-November 2024 under the SPARC-II project
- Anuvab Sen (2020 – 2024) has secured admission in the Doctor of Philosophy (Ph.D.) program in Electrical and Computer Engineering at Georgia Institute of Technology, Atlanta, Georgia, United States
- Karanam Kaarthikeya (2020 – 2024) has secured admission in the Master of Science (M.S) program in Electrical and Computer Engineering (ECE) at Purdue University, West Lafayette, Indiana, United States
- Purbasha Saha (2020 – 2024) has secured admission in the Doctor of Philosophy (Ph.D.) program in Electronic Systems Engineering (ESE) at IISC Bangalore
- Abhinava De (2020 – 2024) has secured admission in the Doctor of Philosophy (Ph.D.) program in Electronic Systems Engineering (ESE) at IISC Bangalore
- Sayantika Roy (2020 – 2024) has secured admission in the Master of Technology (M.Tech) program in Electronic Systems Engineering (ESE) at IISC Bangalore
- Suvam Dey (2020 – 2024) has secured admission in the Master of Technology (M.Tech) program in Electrical Communication Engineering (ECE) at IISC Bangalore
- Praneeth Mosuru (2020 – 2024) has secured admission in the Master of Science (M.S) program in Electrical Engineering (EE) under Prof. Shanti Pavan at IIT Madras

Student's Achievements (contd …)

International Visits / Fellowships / Placements (contd …)

- Ankita Barua (2020 – 2024) has secured admission in the Master of Technology (M.Tech) program in Communication Systems at NIT Trichy
- Priyangshu Pramanick (2020 – 2024) has secured admission in the Master of Technology (M.Tech) program in Electrical Engineering (EE) at IIT Bombay
- Subhadeep Murmu (2020 – 2024) has secured admission in the Master of Technology (M.Tech) program in Electrical Engineering (EE) at IIT Bombay
- Ankan Kumar Das (2020 – 2024) has secured admission in the Master of Technology (M.Tech) program in Electronics and Electrical Communication Engineering (E&ECE) at IIT Kharagpur
- Bipraditya Mukhopadhyay (2020 – 2024) has secured admission in the Master of Technology (M.Tech) in Photonics Science and Engineering (Center for Lasers and Photonics) at IIT Kanpur
- Pathikrit Syam (2020 – 2024) has been offered the role of Associate at PwC
- Soumik Das (2020 – 2024) has been offered the role of Programming Analyst Trainee at Cognizant
- Aritra Samanta (2020 – 2024) has been offered the role of Junior Analog Circuit Design Engineer at Lemon Flip Solutions

Student's Corner

Article by SUDIP MAITY (2022ETB054) 3rd Year UG Student

Leap Beyond Binary Computation With Spintronics

Binary computation, a system that represents information as zeros and ones via the flow of electric charge, is at the core of contemporary electronics. All digital devices, from cell phones to supercomputers, are based on this basic idea. However, the need for faster, more energy-efficient, and more energy-conscious systems is increasing rapidly as we get closer to the physical boundaries of conventional semiconductor technology. Even while the binary system was ground breaking, it is currently struggling to meet the demands of new technology. Beyond charge-based computation, researchers are investigating novel strategies to maintain the momentum of advancement. Among these strategies, spintronics, or spin-based electronics, is one of the most promising.

Transformative Advantages

Spintronics' special capacity to control both charge and spin paves the way for revolutionary developments. Compared to conventional memory systems, technologies like Magnetic Random Access Memory (MRAM) are quicker, more robust, and use less energy. Furthermore, non-volatility is a feature of spintronic devices that permits data retention even when the device is turned off. Stable electron spin states can be used as dependable qubits in quantum computing, allowing for durable and scalable systems to tackle challenging issues. Beyond computation, the high sensitivity of spintronic sensors is establishing new standards in environmental monitoring and biomedical diagnostics.

Student's Corner (contd ...)

Challenges and Future Directions

Notwithstanding its promise, spintronics has some challenges, such as the requirement for specific materials with ideal spin characteristics and efficient heat control in nanoscale devices. These problems are being addressed by collaborative materials science and engineering research, which is backed by international investments and interdisciplinary collaborations.

SUDIP MAITY (2022ETB054)
3rd Year UG
Dept. of ETCE

A Vision for the Future

A significant step toward a sustainable and networked technological future is represented by spintronics. By rethinking the basic principles of electronics, it provides systems that are more intelligent, efficient, and faster. Spintronics holds potential as a foundation for next-generation technology, transforming industries and improving global connections as long as researchers keep coming up with new ideas.

Alumni Corner

When I first joined IIEST Shibpur in December 2020, the world was in chaos due to the pandemic. I remember feeling worried about how I'd learn something as hands-on as electronics without stepping into a real lab. But right from the start, our professors understood what we were going through. They weren't just delivering lectures; they were checking on us, making sure we were okay, and doing everything they could to help us learn under strange circumstances.

By Anuvab Sen (Pursuing Ph.D. in Electrical and Computer Engineering, Georgia Institute of Technology, USA)

In those early semesters, we learned everything online. It seemed impossible at first, especially when it came to working with equipment like a Cathode Ray Oscilloscope (CRO) or understanding digital logic and analog circuits. But our professors got creative. They organized live demonstrations, showing us how to interpret waveforms on a CRO, how to fine-tune the time base and voltage scales, and how to spot signals hidden in noise. For digital logic, they guided us through virtual simulations where we could see logic gates, flip-flops, and counters come to life and so on. It wasn't the same as being there in person, but it helped us understand the concepts deeply, and it proved that they genuinely cared about our learning experience.

Alumni Corner (contd ...)

When we finally got back to campus, it felt like stepping into a world we'd only imagined. The labs were well-equipped, and the professors were just as encouraging in person. They often stayed after class to answer questions, and they never made us feel silly for asking "basic" stuff. If we struggled, they'd guide us through one-on-one sessions, suggesting articles to read or equipment settings to try. They fostered an environment where curiosity mattered more than just getting a right answer. Their mentorship made me see them not as distant authority figures, but as approachable experts who truly wanted us to succeed. This made us feel comfortable.

This supportive environment pushed me to aim higher. With their encouragement, I applied for and received some fantastic research opportunities abroad. I was lucky enough to be a DAAD WISE Scholar in Germany and a Mitacs Globalink Research Awardee in Canada, where I published my first research papers. These experiences were huge stepping stones for me, and they wouldn't have happened without my professors' recommendations and their belief in my potential. They helped me see research not just as an assignment, but as a way of exploring the world.

Back at IIEST Shibpur, they supported my final-year project on Alzheimer's diagnosis. They offered feedback, shared resources, and connected me with the alumni network GAABESU for funding to present my work at a conference in Bangkok. Having them cheer me on, both behind the scenes and at the conference, made the achievement feel truly shared. Their guidance wasn't limited to coursework; they cared about our growth as individuals and future professionals.

Academic Arena

NEW SPECIALIZATION and Courses Introduced:

- New PG Specialization – RF and Photonics
- New PG Open Elective – Wireless Communications for IoT

Editorial Team

EDITORIAL BOARD: