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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

EXPLORE, DREAM, DISCOVER

ISSUE 64 MONTHLY NEWSLETTER JULY 2023

GENESIS

IGNITING THOUGHTS

Contents

Vision

- To be recognized at the national and international level for excellence in education and research in Electronics and Communication Engineering.

Mission

- Inculcating leadership qualities, adaptability, and ethical values
- Imparting quality education in the field of electronics, communication, and related areas to meet the challenges in the industry, academia, and research
- Nurture the growth of each individual by providing a dynamic and conducive learning environment.

DEPARTMENTAL ACTIVITIES

Two-Day Faculty Orientation Program

The Faculty Professional Enrichment Cell (FPEC) at ASIET, organized a comprehensive two-day Faculty Orientation Program on 20 & 21 July 2023. The program aimed to equip newly joined faculty members with essential tools, knowledge, and skills to excel in their teaching careers at ASIET. The orientation provided participants with insights into the institution's culture, policies, and effective teaching practices. Newly joined faculty members of ECE department, Dr. Ramu, Dr. Anagha E. G., Mr. Manesh V. M and Ms. Reshma Lakshmanan, participated in the program. During the program, Dr. Bobby Mathews C, professor and Head of IQAC (Internal Quality Assurance Cell) from ECE department, delivered an excellent class on curricular planning and quality. Ms. Aswathy, Assistant Professor, ECE department, played a significant role as one of the coordinators in the program. The participants left the program with a renewed sense of enthusiasm and readiness to embark on their teaching journey at ASIET.


GPS Map Camera
Kalady, Kerala, India
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Lat 10.17817°
Long 76.43037°
20/07/23 09:53 AM GMT +05:30
Google


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Long 76.430304°
20/07/23 11:10 AM GMT +05:30
Google

CONGRATULATIONS

Congratulations to Ms. Anju George on her successful admission to the Ph.D. program at NIT Calicut.

Congratulations to Abhijith A Pillai, Adithya Krishna M, Adarsh Vinod, and Arjun J of S7 ECE B, under the guidance of Dr. Bipin P R, for having their project titled 'Landslide Prediction, Detection, and Early Warning System using AI' shortlisted for the Grand Finale of IGNI.T.E Darsana 2023.

CONGRATULATIONS

Congratulations to Jaison T paulose of S6, ECE A for getting selected for the paid internship at Suyati Technologies.

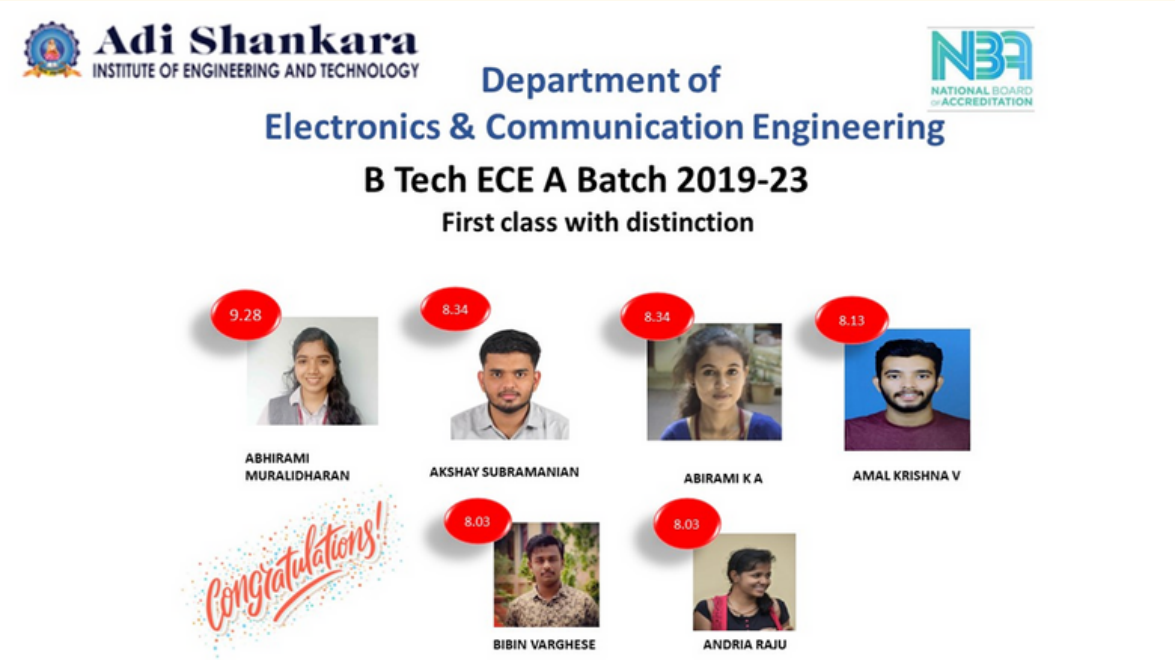
Congratulations to Dr. Ajay Kumar, Head of the Department (HOD), ECE for actively participating in and supporting the students during the 3-day Gnanotsav program held at Central University Kasaragod on July 6th, 7th, and 8th, 2023.

TOPPERS

Congratulations to the following students of the 2022-26 batch of ECE, for achieving an SGPA above 8 in the S-1 KTU University Exam.

TOPPERS

Congratulations to the following students of the 2019-23 batch of ECE, for achieving an SGPA above 8 in the S-8 KTU University Exam.



WARM WELCOME

We are thrilled to introduce and warmly welcome our newest additions to the teaching team at the Department of ECE. These talented individuals bring a wealth of experience, passion, and dedication to our department, and we are excited to have them join our team.

Dr. Resmi N.C

Dr. Rahul Krishnan

TECH TALKS

STAFF ZONE

Wearable Photonics for Health Monitoring

Dr. ANAGHA EG, Assistant Professor, Dept of ECE

Wearable photonics refers to the integration of photonic technologies into wearable devices for health monitoring purposes. The use of light, particularly in the visible and near-infrared spectrum, allows these devices to collect and analyze data in a non-intrusive and minimally obtrusive manner. Unlike conventional health monitoring devices, wearable photonics can offer continuous monitoring without requiring any skin penetration or blood extraction.

The key components in wearable photonic devices include optical sensors, optical fibers and spectrometers. Wearable photonics devices incorporate various optical sensors, such as photodetectors, light-emitting diodes (LEDs), and laser diodes. These sensors interact with biological tissues and fluids to measure parameters like heart rate, blood oxygen levels, and glucose concentration. Optical fibers are used to guide and deliver light to the target areas. They ensure efficient light transmission and enable the collection of data from specific locations, such as veins or arteries. Spectrometers are utilized in advanced wearable photonics devices to analyze the light that interacts with biological tissues. They can determine the concentration of specific molecules, providing valuable information about a person's health status.

These devices offer various advantages compared to conventional techniques such as:

Non-Invasiveness: One of the most significant advantages of wearable photonics is that it offers non-invasive monitoring, minimizing discomfort and reducing the risk of infection.

Real-Time Data: These devices provide real-time data, allowing users to make immediate lifestyle adjustments or seek medical attention when necessary.

Long-Term Monitoring: Continuous monitoring over extended periods allows for a better understanding of an individual's health patterns and can lead to early detection of potential health issues.

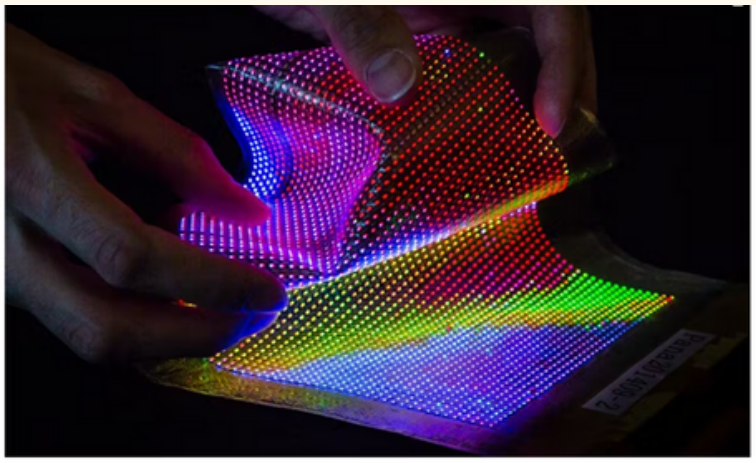


Fig: A micro-LED panel shows how the tiny, closely spaced pixels can be integrated into flexible materials for personal wearable displays

Personalized Healthcare: Wearable photonics enables personalized and data-driven healthcare, tailoring interventions and treatments based on individual health profiles.

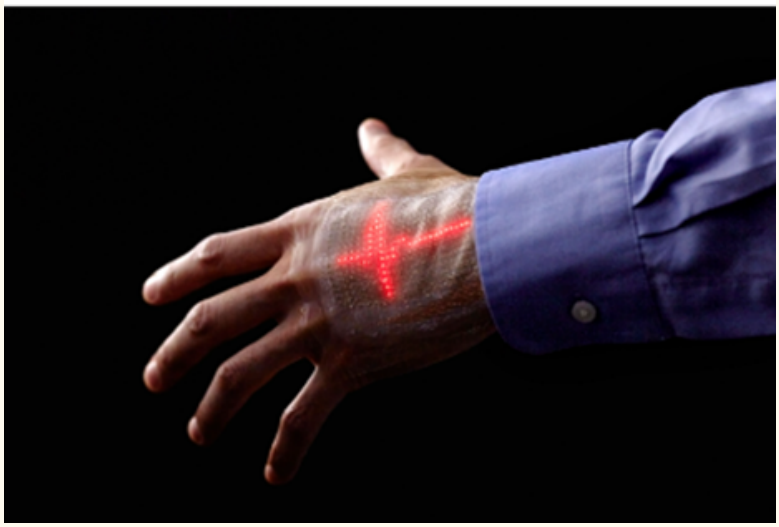


Fig: The skin display conforms comfortably to the back of a hand, displaying a live electrocardiogram recorded by the breathable skin sensors.

Fig: 'Clinic on the wrist' wristband by Rockley Photonics [credits-optics.org/news]

Applications of Wearable Photonics in Health Monitoring:

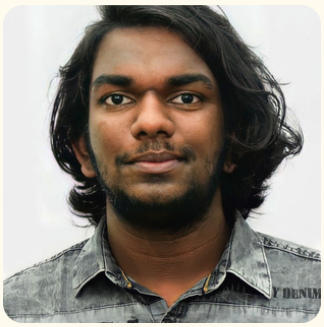
Continuous Vital Signs Monitoring: Wearable photonics devices can continuously monitor vital signs like heart rate, blood pressure, and respiratory rate, enabling early detection of anomalies and timely intervention in critical situations.
Blood Oxygen Monitoring: Through near-infrared spectroscopy, wearable photonics can measure oxygen saturation levels in the blood, especially critical for individuals with respiratory conditions or during physical activities.
Glucose Monitoring: Non-invasive glucose monitoring has been a long-sought goal in diabetes management. Wearable photonics devices offer a potential solution by analyzing glucose levels through the skin, reducing the need for painful finger-prick tests.
Dehydration and Hydration Monitoring: These devices can assess hydration levels by measuring changes in light absorption due to water content in the skin.

UV Radiation Exposure Monitoring: Wearable photonics can also help individuals monitor their UV radiation exposure, providing alerts to avoid overexposure and reduce the risk of skin cancer
While wearable photonics shows great promise, there are some challenges to overcome. Ensuring accuracy, reliability, and user-friendliness are essential aspects that need further refinement. Additionally, privacy concerns and data security must be addressed to gain widespread adoption. As technology advances, wearable photonics is likely to become more sophisticated, enabling a wider range of health monitoring applications. The integration of artificial intelligence and machine learning algorithms can enhance the analysis and interpretation of data, providing more valuable insights to users and healthcare professionals.

In conclusion, wearable photonics represents a revolutionary leap in health monitoring technology, offering a non-invasive, personalized, and continuous approach to understanding and managing our health. As these devices continue to evolve, they have the potential to empower individuals to lead healthier lives and revolutionize the way we approach healthcare in the future.

References:
[1] Shi, Q, Dong, B, He, T, et al. Progress in wearable electronics/photonics—Moving toward the era of artificial intelligence and internet of things. InfoMat. 2020; 2: 1131–1162.

STUDENT ZONE



THE HOLE STORY: A NEW CHAPTER IN ELECTROCHEMICAL ADVANCEMENTS

Yadu Krishnan, S2 ECB

A recent study conducted by University of Cambridge researchers has unveiled a surprising discovery that holds significant potential for the future of electrochemical devices. This breakthrough offers new avenues for advancing materials and enhancing performance in areas like energy storage, bioelectronics, and brain-like computing.

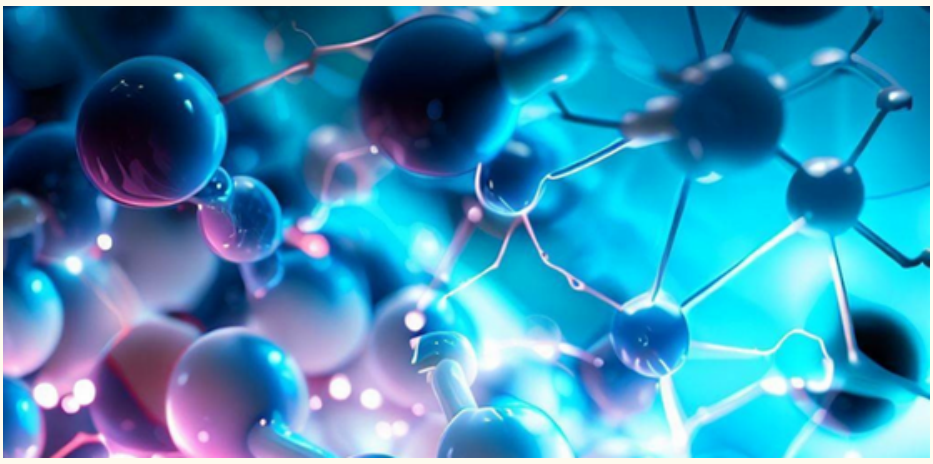
Electrochemical devices heavily rely on the movement of charged particles, encompassing both ions and electrons, to function effectively. Yet, comprehending how these charged particles interact has proven to be a major obstacle, impeding the development of innovative materials for such devices.

In the rapidly evolving field of bioelectronics, researchers employ soft conductive materials called conjugated polymers to create medical devices for applications outside traditional clinical settings. These materials enable the development of wearable sensors for remote health monitoring and implantable devices for active disease treatment.The key advantage of using conjugated polymer electrodes in such devices is their ability to seamlessly couple ions, responsible for electrical signals in the brain and body, with electrons, which carry electrical signals in electronic devices. This harmonious connection between the brain and medical devices bridges the gap between these two types of signals effectively.

The recent study, published in Nature Materials, revolves around conjugated polymer electrodes and their unexpected discovery. Traditionally, it was believed that ions' movement was the slowest part of the charging process due to their higher weight compared to electrons.

However, the research revealed that, in the case of conjugated polymer electrodes, the movement of "holes," which serve as vacant spaces for electrons to occupy, can actually be the limiting factor in the speed of the charging process. By employing a specialized microscope, the researchers closely observed the charging process in real-time and found that at lower levels of charging, the movement of holes becomes inefficient, causing a more substantial slowdown in the charging process than initially anticipated. Surprisingly, ions were found to conduct faster than electrons in this specific material, contrary to conventional understanding. This unexpected finding sheds light on the factors influencing charging speed. Moreover, the research team discovered that by manipulating the microscopic structure of the material, they can regulate the speed at which holes move during charging. This newfound control and ability to fine-tune the material's structure could enable scientists to engineer conjugated polymers with enhanced performance, leading to faster and more efficient charging processes.

The implications of this discovery are far-reaching, offering a promising direction for future research and development in the realm of electrochemical devices for applications such as bioelectronics, energy storage, and brain-like computing.
George Malliaras, the senior author of the study quoted “This work addresses a long-standing problem in organic electronics by illuminating the elementary steps that take place during electrochemical doping of conjugated polymers and highlighting the role of the band structure of the polymer.”
“With a deeper understanding of the charging process, we can now explore new possibilities in the creation of cutting-edge medical devices that can seamlessly integrate with the human body, wearable technologies that provide real-time health monitoring, and new energy storage solutions with enhanced efficiency," added Prof. Akshay Rao, co-senior author, also from Cambridge's Cavendish Laboratory.



Artist’s illustration of an electronic polymer in water conducting both ionic and electronic charges.

Reference: Scott T Keene et al., ‘Hole-limited electrochemical doping in conjugated polymers’, Nature Materials, 2023. DOI: 10.1038/s41563-02301601-5

ACHIEVEMENTS

STUDENT ACHIEVEMENTS

Student Batch	Name	Title of Course attended	Conducted By	Date
2021-25	Anit Sunil	Arduino embedded system(5 day internship)	Techmaghi	23/5/2023
2020-24	Akshay Krishna	Digital marketing and E commerce	Google(coursera)	18/5/2023
2020-24	N Sneha Das	Introduction to embeded system design	INDIAN INSTITUTE OF TECHNOLOGY MADRAS(NPTEL)	29/4/2023

ACHIEVEMENTS

STAFF ACHIEVEMENTS

Name	Designation	Nature of Participation/ Achievement	Title of Participation/ Achievement
Aswathy N	Assistant Professor	Paper presentation	Paper Presentation titled Tomato Health Management Using AI in ACCESS'23.
Aswathy N	Assistant Professor	Reviewer	Reviewer
Anju George	Assistant Professor	Academic Excellence	Admitted to phd program for Monsoon semester 2023 at NIT calicut.
Anagha E G	Assistant Professor	FDP	Attended Faculty Orientation Program organized by FPEC, ASIET on 20th and 21st of July.
		Webinar	Journal Selection and the Dangers of Poor Editorial Quality.
Reshma Lakshmanan	Assistant Professor	FDP	Faculty orientation program
Neetha K	Assistant Professor	Reviewer	TPC member and reviewer


Adi Shankara
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