

# DEPARTMENT OF ELECTRICAL ENGINEERING NEWSLETTER

## Vision

*To be centre of excellence in  
Electrical and Electronics  
Engineering for the better of  
society.*

## Mission

- *To bestow high  
quality education  
through excellence  
in its faculty and facilities.*
- *To transform young minds  
into competent and full  
fledged professionals.*
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## Inauguration of Electrical Association

The Electrical Association conducted inauguration function on 17th May 2022 at the Sopanam Hall. The inauguration ceremony commenced by the group of dignitaries including Mahatma Gandhi University Pro Vice Chancellor Prof. Dr. C T Aravindakumar. The session began with the welcome note by Dr. Johnson Mathew, Head of department, Electrical and Electronics engineering. He mentioned about the significance of Electrical association and its activities. Dr. C Satish Kumar, Principal RIT Kottayam presided over the function. Dr. Shanifa Nissam, President of association,

detailed the future plans including conducting Vidhyuth, techno cultural fest conducted by Electrical department. Prof. Binoykumar A C, Associate professor of EEE department motivated everyone to actively participate in all activities. The event was concluded by Gopika A, student of S8 EEE.



## ARTICLE

### Signal processing and analysis of electrical circuit

The analysis of electrical circuits is an essential task in the evaluation of electrical systems. Electrical circuits are made up of interconnections of various elements Such as resistors, inductors, transformers, capacitors, Semiconductor diodes, transistors and operational amplifiers. Electrical signals, acoustic and vibrations carry useful information. They are known as diagnostic signals. Electrical circuits are used for equipment, circuit protection, circuit control, computers, electronics, electrical engineering, cars, planes and trains.

Signal processing is an electrical engineering sub field that focuses on analysing, modifying and Synthesizing signals such as sound, images and Scientific measurements. signal processing techniques. It can be used to improve transmission, storage efficiency and subjective quality and to emphasize or detect components of interest in a measured signal.

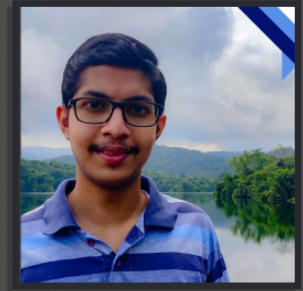
Article by **Anju Thomas, S4 EEE**

### Awareness program on IPR

The Electrical Association, in association with National Intellectual Property Awareness Mission (NIPAM) organised an awareness programme with Smt. Devika R Nair on Intellectual Property Rights (IPR)



## ACHIEVEMENTS



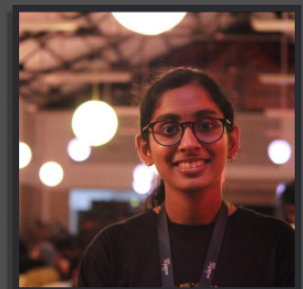
**ABEL JOE VINCENT**

- IAS SBC Vice Chairperson
- Ecospeak by IA/IE/PELS Jt. Chapter Kerala - **First**
- NEO Phase 1 qualified



**VAISHAKH US**

- Won idea grant of ₹ 1 Lakh from Kerala startup mission



**SREELAKSHMI**

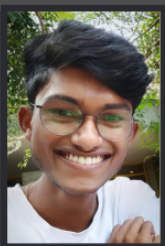
- International IEEE event IFSFS 2020 Ambassador Program - **First**
- IEEE QUIZ by MITS - **Second**
- IEEE 2021 TSUMEGO, Technical Crossword - **First**



on 21 December 2021 at the EEE seminar hall through Webex meetings.

The session began with the welcome note by Dr. Johnson Mathew Head of department, Electrical and electronics engineering. He shared his insights on the relevance of intellectual property rights in the present scenario. Smt. Devika R Nair, presented an interesting and informative presentation in which she talked about copyrights, patents, validations, and various procedures required for IPR. An interactive session was conducted at the end. The event was concluded by Swathi G Krishna, S5 EEE.

## ACHIEVEMENTS



**ABHIRAM L HAREENDRAN**

And

**SWATHI S**

- International Energy Hackathon IEEE MSC SBC- Third
- Idea pitching contest ASCEND- First
- Smart innovation DYUTHI - First
- Hack Kochi 3.0 IEEE Kochi - First

## ARTICLE

### Introduction to Smart Grid

Nations across the world face the challenge of increasing power production while reducing the carbon footprint. They need to minimize power loss and downtime, harness alternative power sources and so on. The numerous challenges facing them have one comprehensive and integrated Solution- Smart grids.

Smart grid is the digital upgrade to the existing electric grid technology. It is the integration of electrical infrastructure with information infrastructure. In a Smart grid, electric power infrastructure is modernized by incorporating the current and future requirements and advanced functionalities to its consumers. Cyber System is integrated with the physical power system and adoption of Cyber System has made the grid more energy efficient and modernized.

Article by **Merin James** , S4 EEE

### Art of Digital Editing - Interactive session

The department of Electrical and Electronics Engineering in association with Industry Institute Interaction Cell of RIT hosted a session on the



topic 'The art of digital editing and film making' on 30 November 2021. The session was handled by well known film editor in the industry Mr. Sujith Sahadev. The dignitaries on the dais, as well as the audience, were greeted by Unnikrishnan S of S5 EEE. Dr. Johnson Mathew, Head of Electrical department inaugurated the event. Dr. Prince A. professor, electrical department addressed the gathering.

### Carbon coated nickel enables fuel cell precious metals

Conventional hydrogen fuel cells have a lot of potential as clean, efficient energy sources for vehicles and other applications. But they rely on precious metal catalysts which raises the cost. Scientists have now developed a precious metal-free-hydrogen fuel cell that has unrivalled performance and durability as well as low catalyst costs. Hydrogen, the most abundant element in the universe, has long been marketed as a clean and abundant energy replacement to fossil fuels. Instead of producing pollutants like fossil fuels, when hydrogen combines with oxygen in fuel cells to generate electricity, all that is left is water.

Standard hydrogen fuel cell rely up acidic chemicals and catalysts made of precious metal such as platinum to drive the reaction that generate electricity. Alkaline polymer electrolyte fuel cells on the other hand rely on alkaline chemicals and can use earth abundant metals as catalysts, eliminating the need for precious metals. However, these latter fuel cells still fall short on performance and durability compared to conventional fuel cells.

Scientists have now invented a precious-metal free alkaline polymer electrolyte fuel cells with a record high peak power density of 210 milliwatts for square centimetre, which is more than five times that of its predecessors. The new device is based on catalyst with a sold nickel core and is 2 nanometre thick carbon doped with nitrogen shell. The catalyst is found at the anode, where hydrogen oxidised, and is combined with a manganese catalyst at the cathode, when oxygen is reduced. The carbon layers on the new anode catalyst aid raise hydrogen oxidation rates and the nitrogen in these carbon layers can act as oxidation sites, resulting in improved fuel cell performance. Furthermore , the anode catalyst's shell prevents the nickels form oxidising and forming nickel oxides. Carbon monoxide tolerance of the new catalyst was also significantly higher than that of platinum

Research co-author Héctor D. Abruña, an electrochemist of Cornell University in Ithaca, New York, points out that "One has to keep in mind that acidic fuel cells have been under development for decade while alkaline fuel cells have been under development for less than 10 years". "We feel confident that with further developments and some optimization, we could reach 1 watt per square centimetre within two to three years, which would be a major and enabling breakthrough. While these results are very promising, a significant amount of work before these devices can be broadly deployed" he notes.

### AKIASSC'22 from 6-8 May 2022

IEEE SB RIT hosted AKIASSC'22, the flagship event of IEEE IA/IE/PELS Jt. Chapter Kerala.

The event was inaugurated by Dr. K N Raghavan IRS, Executive Director, Indian Rubber Board, Former International Cricket Umpire, on 6th May 2022 at 5:30 IST. The event had Industry Visit to

dolphin rubber industries Kottayam and RUBCO Factory Kottayam, Field trip to Kumarakam and other sessions like student professional awareness sessions, interactive panel discussions.

The event received positive feedback from delegates and professionals. Through this event, participants become aware of IEEE membership benefits and the mission and vision of IEEE.

# CONGRATULATIONS ON ACHIEVING YOUR PHD



**BINCI K JOSE**

**Ph.D** based on the thesis entitled *Investigations in Grid-Integrated PV Systems and Efficient Energy Harvesting Under Partially Shaded Conditions* - awarded by Mahatma Gandhi University, Kerala.



**FOSSY MARY CHACKO**

**Ph.D** based on the thesis entitled *Investigation on a Modified SRF Theory-Based Multifunctional Control Strategy for Power Quality Enhancement in Grid Integrated Photovoltaic Systems* awarded by APJ Abdul Kalam Technological University, Kerala



**GINU ANN GEORGE**

**Ph.D** based on the thesis entitled *Modular Cell Balancing Integrated with Intelligent Mono Circuitry for Electric Vehicle Applications* awarded by APJ Abdul Kalam Technological University, Kerala



**PROF. JOHNSON MATHEW**

**Ph. D** based on the thesis entitled *Model Based Maximum Power Extraction Techniques for Photovoltaic Systems Operating Under Partially Shaded Condition* awarded by Mahatma Gandhi University, Kerala



**SHANIFA BEEVI S**

**Ph. D** based on the thesis entitled *Theoretical and Experimental studies on Irradiance Estimation and MPPT Techniques for PV systems under non-uniform Operating Conditions* awarded by Mahatma Gandhi University, Kerala.

## Project Exhibition

Project exhibition was held on 3rd June 2022. S8 students had displayed their project prototypes. The exhibition helped the students to interact with the faculty and other students and obtain consecutive feedback.



Congratulation to **Adheena V Abraham** for Getting placed at **GE Aviation!**



## ■ ARTICLE

### Electrified Kerala

On 2017 May, Kerala became the first state to fully electrify all its households. The per capita consumption of power in Kerala has been 549 units. The Strategic Business Unit-Distribution of Kerala State Electricity Board Ltd is responsible for the distribution of electricity in the State of Kerala except in Thrissur Municipal corporation, Munnar (Kannan Devan Hills) areas, and in the areas of seven other licensees which are mainly small industrial parks.

At the end of fiscal year 2021, the installed power capacity across Kerala in India was around 5,837 megawatts. Kerala's consumption is predominantly domestic, which accounts for 49% of the total consumption, which is only 22% nation-wide. Industrial consumption is only 30% in Kerala, while it is 45% at the national level. KSEB Ltd has 31 hydro-electric projects, 7 solar projects, 2 diesel power plants and 1 wind farm. Power generation is also undertaken by Captive Mode Projects, Independent Power Mode Projects & Co-generation mode projects other than KSEBL. In 1933, the first hydro electric power station in Kerala began at Pallivasal, Idukki.

Power System in Kerala encompasses hydel, thermal, solar and wind sources. Hydel energy is the most reliable and dependable source in Kerala. Of the total installed capacity, 2746.19 MW, the lion's share of 1933 MW of installed capacity comes from 31 hydel stations, rest is contributed by the thermal projects including NTPC at Kayamkulam which is...Kerala's dedicated thermal station and wind projects like Kanjikode wind farm.

Kerala depends on other states for atleast 75 percent of its requirement. In financial year 2020-21, consumed 22,000 lakh crore units of power, procuring 78 per cent of it from other states. In order to meet the estimated demand for providing 24x7 power supply in the state, the state has planned additional capacity availability of 2332.75 MW by FY 2018-19 through own generating stations, renewable energy sources, central generating stations ,etc.

Kerala has good potential for promotion and development of renewable and non-conventional energy projects, particularly, solar, wind, small hydro projects (SHP) and biomass. State has already issued liberal policies for promotion of renewable energy generation in the state.

Article by **Althaf Ashraf , S4 EEE**

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