AUGUST 2021 | VOL 1 | ISSUE 2

CHRIST
(DEEMED TO BE UNIVERSITY)
BANGALORE · INDIA

THE PULSE

NEWSLETTER
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Vision

To emerge as a centre of academic excellence in the field of Electronics & Communication Engineering to address the dynamic needs of the industry upholding moral values.

Mission

- Impart in-depth knowledge in Electronics & Communication Engineering to achieve academic excellence.
- Develop an environment of research to meet the demands of evolving technology.
- Inculcate ethical values to promote team work and leadership qualities befitting societal requirements.
- Provide adaptability skills for sustaining in the dynamic environment.

MESSAGE FROM FACULTY

A Celestial Wonder

H.L.Viswanath*

This incident happened on Friday the 27th of August 2021. I was walking on the terrace of my house as advised by my Doctor. It was a cloudy evening and the Sun had just set on the western horizon of Bangalore. It was around 6.45 PM. I saw a bright light in the western part of the sky. I thought it might be lightning, as it was very cloudy. The flashes of lightning generally last for a very short duration, maybe a fraction of a second, but the illumination in the sky did not diminish and upon careful observation, it was found that the illuminated sky almost looked like a flower rotating amidst the clouds. It was rotating at a speed of about 5 to 6 times a minute.
I was dumbfounded to see this spectacular wonder of nature. The size of the illumination might have been one or two Kilometres in radius, but gradually it went on blooming to several Kilometres in radius. Then it started moving in an eastwardly direction, i.e., towards my house. When it started covering the space above my house, the doors and windows of the houses rattled. I had not carried my mobile phone with me. Otherwise, I would have video recorded this strange phenomenon which I had never experienced in my life and sent it to some TV channels and Newspapers.

Initially, I thought that the illumination in the sky may be due to one of the following reasons:

1. A laser show organized by someone.
2. Whenever a circus show is on in a city, the circus company focuses a very bright light beam towards the sky which can be seen from most parts of the city. It may have been one such thing.
3. Some companies advertise their products using the same type of lamps as used by the circus companies, with the beam focused towards the sky, which was another possibility.
4. In some of the science fiction movies it is shown that when an extra-terrestrial space vehicle hovers over the land, similar effects are noticed i.e., rotating light beams illuminating some parts of a city or town.
5. A whirlwind that is similar to a tornado in its weak form, might have caused this strange phenomenon.

MESSAGE FROM FACULTY

A Celestial Wonder

The first point was ruled out because the spiraling light was moving in the sky which is not possible in a laser show. Also, there are several obstructions like buildings and trees in Bangalore which would have caused hindrance to the laser show. Another observation was that the illumination went on spreading to several kilometers in radius, which is impossible in a laser show. The second and third points above were also not appropriate, as there was no light beam being focused on the clouds from the ground. If that was true, there should have been a light beam that could be seen originating from some part of the city, which could be seen with naked eyes. The fourth point was also not relevant as there was no flying object noticed anywhere.
The last inference seems to be appropriate due to the following reasons:

At the beginning of a tornado, the colour of the sky changes and a funnel-like formation occurs due to a whirlwind. The energy in the tornado is so high that it can uproot trees, cause damage to vehicles, electric poles and buildings. There will be lightning between the land and clouds.
I referred to some of the literature available on tornedos and lightnings, which supported my observations. The Abstract of “Tornadoes Associated with an Absence of Cloud-to-Ground Lightning” by JARED L. GUYER AND ANDREW R. DEAN, NOAA/NWS/NCEP Storm Prediction Center, Norman, Oklahoma:

Thunderstorm forecasts and observed lightning occurrence are important situational awareness factors for the issuance of severe thunderstorm and tornado-related convective outlooks, watches, and warnings. However, tornadoes are occasionally associated with convection that has an observed absence of cloud-to-ground (CG) lightning. At least 2% of tornadoes during 2005-2014 were found to be associated with an absence of CG lightning. This preliminary study examines the climatology and environmental conditions of nearly 300 United States tornado events that were not associated with observed CG lightning. The lightning between two layers of clouds occurs because the cold air has ice crystals. The warm air has water droplets. During the storm, the droplets and crystals bump together and move apart in the air. This rubbing makes static electrical charges in the clouds. The clouds at higher altitudes carry positive charges and the ones at lower altitudes carry negative charges.

MESSAGE FROM FACULTY

Fig.1 The devastation caused by a tornedo in Oklahoma, USA on May 20, 2013

Fig.2 Sky as seen during a tornedo

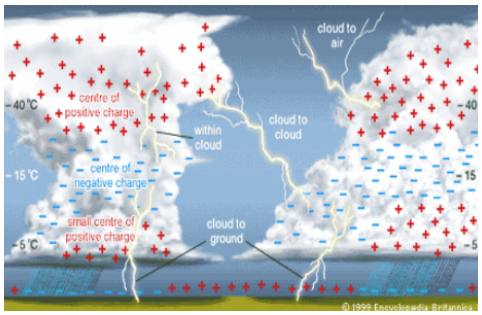

Fig.3 A typical tornedo

Fig.4 The process of lightning formation

From the above literature study, I concluded that the phenomenon observed by me on 27-08-2021 must have occurred due to a whirlwind and the collision between the droplets and crystals must have got spread out in a helical form so that the charge produced between two layers of clouds would have been uniform and rotating. This has produced an uninterrupted rotating illumination. As the whirlwind had become weak, it got spread out in the sky the illumination also spread out proportionately. Due to the direction of the wind from west to east, the rotating wheel-like illumination also moved in the same direction. The rattling of doors and windows due to the whirlwind lasted for a few seconds and the people of Bangalore may not have noticed it. As it was raining on and off that day, not many Bangaloreans would have noticed this phenomenon, which can be a good material for researchers working on the study of the environment.

*The author is presently working as a Professor in the Department of ECE, SoET, CHRIST(Deemed to be University)

- H.L.VISWANATH

EVENTS

CUESTIC Inauguration

CUESTIC Inauguration for the academic year 2021-22 was conducted on 27/8/2021. The event started with a welcome address by Prof* Kishore Kumar, CUESTIC faculty coordinator, followed by the felicitation of 2020-21 achievers and CUESTIC report video.

School of Engineering and Technology
Department of Electronics & Communication Engineering
CUESTIC - AY 2020-21

LIST OF ACHIEVER'S

Category	POSITION	4BTEC	6BTEC
Best in Academics	I	LINGALA MANISHA	GLADIS P SAJI / SAGINALA LAKSHMI LAHARI
	II	MEHUL M JAIN	SAI DHIKSHITA BHANDARU
	III	APARNA SOMASEKHARAN	NANDYALA VEERA MEGHA CHANDRA REDDY
Best in Co-curricular	I	PREM KUMAR R	SAI DHIKSHITA BHANDARU
	II	EROL JOHN DSILVA	NIYATI KAUTILYA K MANCHUR
	III	B CHARAN TEJ	NANDYALA VEERA MEGHA CHANDRA REDDY
Best in Extra-curricular	I	EROL JOHN DSILVA	SAI DHIKSHITA BHANDARU
	II	SHREECHARAN D	HARINI N
	III	JASON DAVID S	PALLAPU YOSHNITHA SONJA
Best in Sports	I	B.SOMASEKHAR REDDY	ARNOLD ROY NAZARETH
	II	B SAI MADHAV	PALLAPU YOSHNITHA SONJA
	III	G ROHITH KUMAR	HARINI N

The induction of newly elected office bearers was done, followed by the release of the departmental newsletter.

Megha Chandra Reddy
President
7BTEC

Gonugunta Bhaskar
Vice-President
5BTEC

Lekha Sree
Secretary
3BTEC

EVENTS

CUESTIC Inauguration

Dr Iven Jose, Dean SoET graced the session with his words of motivation. Dr Somasubhra Chakrabarty*cross-check spelling* research staff, Nanyang Technological University, Singapore was the chief guest for the event, and gave a talk on "The current status of electronic memory technology: From research to manufacturing"

The second talk of the day was given by Dr Sourav Roy, Assistant professor, Department of Electronics and Communication Engineering, CHRIST (Deemed to be) University.

The final session of the day was to encourage the students to participate in various competitions and hackathons. The different competitions and opportunities available were also showcased, and the required information was provided to the students.

FACULTY CONNECT

"Best teacher is always a Best Learner", these words are made a reality by our faculty members who participated in different technical seminars and faculty development programmes on various topics that include “Intelligent Interactive Medical Services”, “A Deep Dive into Deep Learning Modeling : Advanced Neural Networks”, “5G and Emerging Technologies”, “Automatic CUDA Code Generation and Deployment on Embedded Platforms”, “Development of Wireless Communication Applications using MATLAB and Simulink”, “3D Printing - The next Industrial Revolution”, “Advances in Indian Space Program in centenary Years”, “5G Networks”, “Recent Advances in Antennas for Wireless Communications” and “Global Webinar on AI and ML for core Departments with focus on current Industrial trends”.
Our faculty members organised invited talks on topics such as “Intelligent Interactive Medical Services”, “Overview of Cultural Glory of Medieval India Through Inscriptions”, “Functional Digital therapeutics”, “Biomedical Optical Imaging: Inverse Problem”, “Profile Building”, “Current Status of Electronic Memory Technology : From Research to Manufacturing”, and “ReRAM with Functional Quality As Non-Volatile Memory and Biosensor Devices”.
One of our faculty submitted the project proposal on the topic titled “Analysis and Restoration of Scripts of Heritage Documents of Karnataka”.

The details of above mentioned events are described in the following link. Here

Recent technology

Wireless ‘Neurograin’ network connects to brain neurons

Super stretchy solid-state light

What is Quantum Computing?

STUDENT CONNECT

Pulse Oximeter

A Pulse Oximeter is a biomedical embedded electronic device primarily used to measure the percentage of oxygen (saturation) level in the blood (SpO2%). It can also measure the human heart rate(Beats per minute -BPM). As a consequence of the COVID-19 pandemic, most of us have begun using one.Testing the oxygen level has now become a mandatory prerequisite medical test too. The human blood consists of a protein called haemoglobin(Hb) that mixes with oxygen and forms oxygenated haemoglobin or oxyhaemoglobin(HbO2). As it travels through our body, it provides oxygen to body parts for various functions like brain activities and muscular movements. Once the oxygen in it is used up it is referred to as deoxygenated haemoglobin or deoxyhaemoglobin(Hb).It is observed that oxygenated haemoglobin absorbs more of the infrared light and deoxygenated haemoglobin on the other hand absorbs more of the red light. Arterial blood carries oxygenated haemoglobin whereas the venous blood carries deoxygenated haemoglobin.

Oximeters measure a ratio between oxyhaemoglobin and deoxyhaemoglobin in the arterial blood. At hospitals, an invasive method is used to calculate the arterial oxygen saturation(SaO2) but the Oximeters present a non-invasive alternative to calculate the peripheral oxygen saturation(SpO2) level, which gives a reliable measurement of oxygen saturation in the blood. The Oximeter consists of two LEDs(light emitting diodes) on its top surface, one for red light and the other for infrared and a photodiode at the bottom surface. We insert our finger(the index or third finger of any hand is recommended) and these lights are passed through the finger at regular intervals and the transmitted(non-absorbed by haemoglobin) light is measured by the photodiode. The photo-diode converts this light signal to current and this is given to a processor to compute the oxygen level. The processor(for example, Microcontroller - Kinetis K53 from Freescale Semiconductors) calculates the ratio of Oxygenated haemoglobin and compares it to an empirically predefined table of percentages to produce the SpO2 reading on the Oximeters. In the light of the pandemic, those affected with COVID-19 or with its symptoms are recommended to check their oxygen levels regularly.

For reliable reading, it is recommended that our hands are not cold, we rest five minutes before taking the reading and avoid physical movements, brightly lit rooms, pigmented fingernails, coloured or false nails while taking the reading. A SpO2 reading between 95 to 100 % and a pulse rate between 50 - 90 is considered normal. A unique advantage of this device is that it helps detect and handle asymptomatic COVID-19 cases.

ANGELA MARIA PETER
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M.Tech, 1st Year

STUDENT CONNECT

The Radio Pill

Faith defines the human body as a temple of the divine. Science sees it as a vast and dizzying array of mechanisms that flow through the body to maintain balance and timely function. What happens when a part fails to function properly? The entire mechanism is disrupted. The human body is a sensitive system. In certain situations, doctors are unable to detect the presence of a disease, leading to a delayed cure. The area most affected by this problem was the digestive tract in humans. It was difficult to detect diseases present in the internal regions, thereby resulting in a lack of early treatment.

In 1957, professor Bertil Jacobson at the Karolinska hospital, Stockholm developed a device known as the radio pill. The radio pill also called the Endoscopy capsule is a radio telemetry device that uses the process of wireless transmission. A capsule-like structure containing a radio transmitter is swallowed by a patient, and as it passes through the human body, the internal conditions of the body are examined and transmitted wirelessly at around 400 kHz.
For any instrument to transmit wirelessly, sensors are very important.

The radio pill has four microelectronic sensors. First, the Temperature sensor, made up entirely of a silicon diode, is attached to the substrate of the capsule. The second sensor is the Ion sensitive Field-effective transistor(ISFET) as many diseases occur due to abnormal levels of pH in the body. The next element is the Direct Contact Gold Electrode since gold has relatively good conductivity and provides an accurate value.
The last sensor is the Three Electrode Electrochemical cell, which is to calculate the rate of dissolved oxygen and identify the activity of bacteria in the digestive tract.

There are various kinds of radio pills, namely Radio altimeter, Radio compass, ORBUS and Amateur radio, among others. Radio pills have found major applications in environmental and industrial purposes for the detection of water quality, application of imaging technologies such as ultrasound and radiation treatment of cancer and inflammations. In other words, radio pills have changed the dynamics of biomedical measurements in research and diagnosis and also largely contributed to early abnormality detection of diseases in the human body.

CHELSEA AURELIA
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7BTEC

STUDENT CONNECT

Poem

These Hands

These hands have a purpose.
These hands have a reason for existence.
Though they are jaded by the weight of carrying their bluesy worlds,
They must go on, for this greyscale world awaits their colourful souls.

They can certainly back out if they wish to.
But if they do so, who will fill their shoes?
Who will be brave enough to take their place and run their race?
Who will muster the courage to rise and perform on their stage?
And most importantly, who will add the fragrance that only they can add?
Backing out will only cause the future to become as unapproachable as the past.
So long as there's life in these hands, they must resiliently go on.

Even when our world meets still, our blood continues to flow.
And as long as our blood flows, we can still have hope.
The hardest of battles, the coldest of winters, the toughest of challenges,
Nothing, I repeat, NOTHING has the power to break these hands into anything less!
What blood is to these hands, hope is to the soul.
What blood is to these hands, hope is to your soul.

Jason David S
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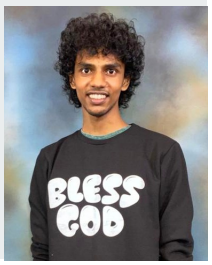
5BTEC



STUDENT CONNECT

Student participation in FAITH international competition

ExMachina - Participation : Electrical Engineering Scientific competition and Industrial Engineering Scientific competition .

Prem Kumar

Erol John D'Silva

VIRUS - Won the Instagram poster making competition

Somashekar Reddy

Sai Anish

Jayanth Eshwar Reddy

Humor

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Kindly share your thoughts and research experiences via e-mail to our team, and be featured in next month's issue!