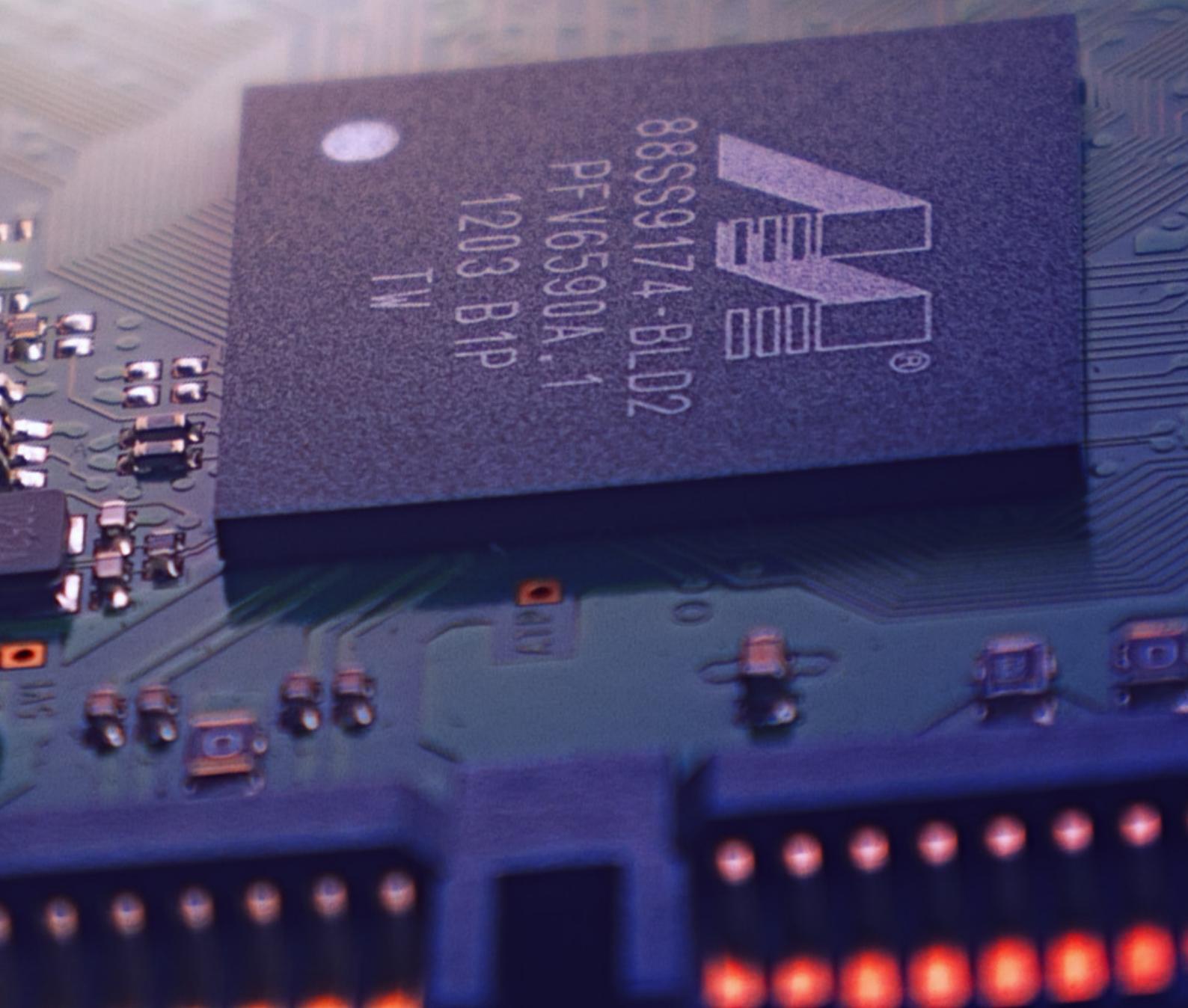


MARCH 2020 ISSUE 7



E-WAVE NEWSLETTER BY eNIX

DEPT. OF ELECTRONICS AND
COMMUNICATION ENGINEERING



MESSAGE FROM THE HoD

I congratulate the Editorial Board for their tireless efforts that have come to fruition in the form of this News Letter, E-WAVE. It is a technical platform to bring out the hidden talents of students. I express my deep sense of gratitude to Ms. Anu Susan Philp, faculty coordinator under whose guidance this technical work has been undertaken and completed within the stipulated time. I applaud the contributors for their stimulated thoughts and varied hues in articles contributed by them. It gives me immense pleasure in seeing the articles by the students on latest trends. I wish the students make use of these opportunities to express their views and to update their knowledge.



Dr. M. J. JAYASHREE

(HoD ECE DEPT)

EDITOR'S NOTE

BY GOKUL G. S. NAIR S4, EC1

“Simple molecules combine to make powerful chemicals; simple cells combine to make powerful life-forms and simple electronics combine to make powerful computers.”
- Scott Adams

Dear Readers,

The gospel of life is to live smartly and unitedly and, what better way, than to use the evolutions in electronics to connect with our environs and fellow human beings. Developments in electronics has a direct bearing on our lifestyle. Everything around us from smartphones to interactive screens to virtual reality, we are abounded to the ever growing and expanding range of gadgets and technologies. The world is filled with creativity and new innovations. Every new day, we see new technologies being invented and new discoveries being made. Life is all about changes and we should be practical enough to ready for those changes in our life. In this dynamic trend of technologies, we also need to update ourselves otherwise you will be declared as an outdated person.

Our department has always endorsed excellence in every field, be it academics, or extracurricular activities. It has always given due importance to value added education; always stressing on quality

over quantity. As always, this newsletter has always and will continue to be the platform to highlight and appreciate the various departmental activities and achievements. With a number of articles, we look forward to being able to satiate our avid readers, with the latest in the field that will enlighten and evoke the engineer within you into contributing great inventions to the society.

On behalf of the editorial team, I would like to express my sincere gratitude to our Head of Department, Dr. M. J. Jayashree, our staff coordinator, Ms. Anu Susan Philip, for their earnest support, and everyone behind the scenes who worked tirelessly to make this publication a reality.

To all the students and faculty of the department of Electronics and Communication, we give to you the latest edition of E-Wave replete with the latest in the dynamic world of Electronics.

Bonné lecture!!

Annual Report- eNIX Activities (Jan - Dec 2019)

1. ADHARVA 2019

ADHARVA'19 is the prestigious annual inter-collegiate technical fest initiated by the students of the Department of Electronics and Communication Engineering. The two day fest was held on the 27th and 28th of April, 2019 and consisted of a workshop for school level students named "Young Sparks", to enlighten them about the numerous opportunities in engineering, several technical competitions for college level students and acted as the platform for students to showcase their skills in the field of Electronics and Communication Engineering.

As a prelude to Adharva'19, a food fest named Swaad'19 was conducted on 5th of April 2019 as a fund raising event and was helmed by the final year ECE students. Different varieties of succulent and scrumptious home-made food made the event a grand success. Following this, an online contest was held where students were asked to design their own logos and the best was chosen as the logo for the fest. A pre workshop of Adharva'19 on Augmented Reality was conducted on 13th April 2019. The logo release was held at the OAT on 19th March 2019, along with the release of other department fest logos.

Young Sparks included students of classes 3 to 11 and was held on the 27th of April, 2019. The day began with the lighting of the lamp and was followed by the keynote address by the vice principal, Prof. S.Viswanatha Rao. Furthermore, a small presentation was taken to introduce the students to the world of Electronics. The highlight

of the event was the 'Grand Quiz' which was conducted for the participants and the winners were awarded exciting prizes. The quiz was followed by a project exhibition by the senior students and was based on Audio Signal Processing. The workshop concluded with the participants making greeting cards using LED.

The fest had 18 events in total, out of which, 3 were promotional events conducted online. Pet Photography, Gaming and Flash Fiction were the 3 online events that greatly helped with the promotional activities for the fest. Events such as MATLAB coding challenged the coding skills of the students in MATLAB, while Project Expo invited projects from students of engineering colleges across Kerala. Junkyard Wars focussed on turning a piece of circuit junk into a working model, while Robowar witnessed robots made by students, battle it out to see who would prevail. Meanwhile, Best Engineer spanned 2 days and comprised of 4 rounds including personal interviews by senior faculties of the ECE department to find out the most efficient engineer out of the participants. Exciting events such as Tech JAM, Hunt & Barter, Solder In, AKYS(All Kerala Young Scientist), Arduino Buzz, Technova and Line Follower, equally contributed to the success of the fest.

In a nutshell, Adharva'19 witnessed active participation from MBCET and from all colleges across Kerala. There were almost 350 registrations in total for all the events, showing a significant increase from the previous year.



2. QUAESTIO- Quiz Competition

To instil a sense of desire within the students to always expand their knowledge, the electronics association of MBCET, 'eNIX', conducted a quiz competition 'QUAESTIO' among the ECE students during November 2019. Students from various semester enthusiastically participated as a group of two during the preliminary round conducted at Shannon Hall. Out of the 30 teams that competed, 4 teams made it to the finals held at Vishwesaraya hall on 16th November 2019. The finals consisted of 4 rounds that covered a variety of topics from different fields of works and genres. **Vishnu C. Nair and Sreehari of S7 EC1 bagged the first position, closely followed by C. Harikrishna Sharma and Karthik**

Pradeep of S3 EC2 at second position and Gokul G. S. and Ashwin Sharma of S3 EC2 securing the third position. It was an exciting contest witnessed by over 130 students that enriched the students and the faculty present with exciting and informative knowledge. The event was also followed by a short session on 'Blockchain', conducted by **Mr. Abhilash Sreedharan**, who is a blockchain architect, educator and consultant. **Dr. M. J. Jayashree, Head of the Department of ECE**, awarded the prize money and the certificates to all the winners while **Dr. Jayakumari J., Professor in Department of ECE**, presented the memento to our distinguished speaker as a token of gratitude for his wonderful session.



3. Spandanam

Plastic Eradication Awareness Campaign :

Spandanam team, in association with UBA (Unnath Bharat Abhiyan) cell visited St. John's Medical Village, Pirappancode, on 2nd October 2019. The team split into groups of 4, with a faculty accompanying each. Each team took surveys on education, health sanitation, electricity, etc, and elucidated why plastic eradication is the need of the hour. Each household were gifted cloth bags that were creatively crafted by the students themselves.

Visit to Shalom Special School : The Spandanam team in association with eNIX visited Shalom Special School, situated in the village of Vembayam, Kaniyapuram Block on 23 November 2019 and spent half the day with the inmates of the school, engaging them with interactive games and entertaining them with several programs.



AT END OF THE TUNNEL

BY JOSIPHA SEBASTIAN S2, EC2

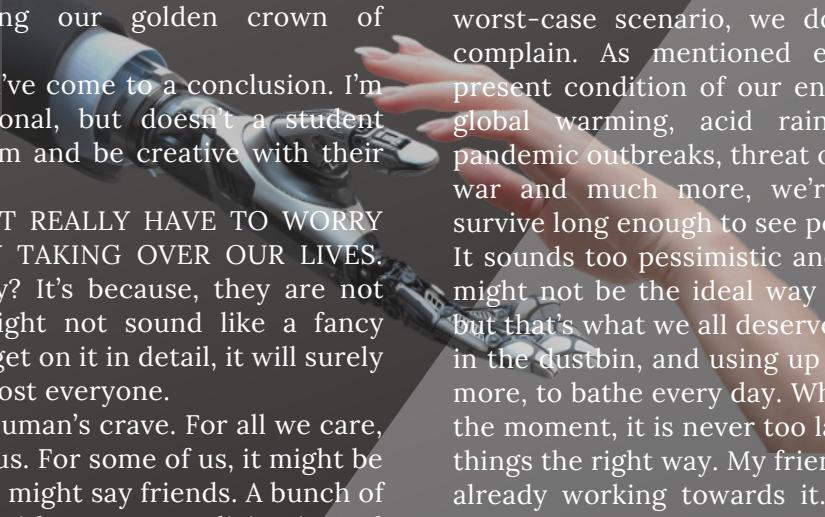
Industrial revolution is killing our habitat at an exponential rate, and it's indeed getting out of our hands now. Nothing we do is enough to reduce the risk factor. It's like a poorly written fairytale with an ambiguous yet unsatisfying ending. The rapid development in technology is a mesmerizing and sweet reality for us, the engineers. On the other hand, it is a nightmare for people outside the tech biz. Yet, most of us only have a vague idea as to why that's an actual problem.

I'm tired of hearing speakers and teachers rave about how we should develop our skills for the betterment of our careers just because we are scared about how our own inventions are going to overthrow us; stealing our golden crown of superiority.

After pondering a lot, I've come to a conclusion. I'm probably being delusional, but doesn't a student have the right to dream and be creative with their thoughts?

My point is, WE DON'T REALLY HAVE TO WORRY ABOUT TECHNOLOGY TAKING OVER OUR LIVES. And do you know why? It's because, they are not going to do so. It might not sound like a fancy thought, but when we get on it in detail, it will surely strike a chord with almost everyone.

Human touch is what human's crave. For all we care, we do what we do, for us. For some of us, it might be for our families. Others might say friends. A bunch of us do it for ourselves, without even realizing it. And if you're that much of a saint, you'd be doing it for the betterment of humanity. Without a shadow of a doubt, you're not going to allow a machine take that



place. It is as simple as that. That is why there is no reason to worry. We are not going to let robots compensate for our ideals. We are humans for a reason. Our greed, love, passion, anger and all those unidentified emotions, make us quite different from programmed robots. While the situation of technological advancements gets better and better, manual works are bound to get overridden. AI directors and algorithm-based scriptwriters are on the rise. From a broad perspective, while it is wiping out jobs, it is also creating more opportunities with much more benefits to reap.

Let's suppose things do end up being bad, and robots become the leaders of the world. In that worst-case scenario, we don't have the right to complain. As mentioned earlier, looking at the present condition of our environment, paired with global warming, acid rain, biological weapons, pandemic outbreaks, threat of an impending nuclear war and much more, we're less likely going to survive long enough to see people marrying robots. It sounds too pessimistic and cruel, and perhaps, it might not be the ideal way to conclude an article, but that's what we all deserve for not throwing trash in the dustbin, and using up 10 buckets of water, or more, to bathe every day. While time isn't our ally at the moment, it is never too late to change and to do things the right way. My friends and I, are already working towards it. Why not be the next Greta Thunberg? We might be a late entry to the fairytale, but hey, let's do this for us, and for the generations to come. It is now or never.

THE DAWN OF FLUTTER

BY ARAVIND VENUGOPAL S6, EC2

It is always super amazing to create applications for mobiles, be it Android or iOS. However, it was never the same since 'Flutter' made its grand entry into the downtown. Android developers quickly began to deploy their apps on App Store and iOS developers quickly began to deploy their apps on Playstore. Wait, isn't it supposed to be the other way around? All these happened due to one 'little' big thing - Flutter, the new tool from Google which was built directly to cater to our needs. Flutter is Google's UI toolkit for building beautiful, natively compiled applications for mobile, web, and desktop from a single codebase. Seems interesting right?

Flutter is similar to 'One size fits all'. We can build applications for iOS, Android, Web, Desktop and much more from a single codebase. That is, we don't

have to develop separately for each platform. There are many other cool features like fast development, Expressive & Flexible UI and Native Performance. A quick glance at the list of who uses Flutter reveals top unicorns and big tech companies as frequent users.

The release of Flutter as a tool for cross-platform development can also be associated with Google's goal of releasing a new operating system, which is unofficially termed as Fuchsia OS.

Flutter is the answer for the ordinary developer's dream for an easy cross platform app development framework, directly from Google. Also, getting started, as usual, is easier than you can imagine. Head over to flutter.dev to learn more. Get started right away and join others downtown.

TESLA'S CYBERTRUCK

BY NIHAL SABU GEORGE S4, EC2

With a collective gasp and puzzled looks, the world was recently introduced to Tesla's newest vehicle. The so-called Cybertruck is an angular, stainless steel, all-electric pickup truck that quickly became polarizing. Regardless, pre-orders for the Cybertruck approached 250,000 within a week. Such an explosion of interest with no advertising, and an arguably disastrous grand opening event is probably unprecedented.

On a global scale, it's clear that electric vehicles – known colloquially as EVs – have reached a new level of public acceptance. As of 2018, more than 5 million EVs were sold around the world. Canadians, although, have been somewhat slower at adopting this technology, with all-electric vehicles representing 1.2 per cent of sales in 2018, or approximately 46,000 units. With the Cybertruck, Tesla has integrated several of its technologies into one offering. The truck features the same stainless-steel alloy being used at Musk's other company SpaceX. It has lithium ion batteries, software and hardware for self-driving, and a solar roof option to help boost the Cybertruck's range.

The efficiency of most gasoline engines is between 17 and 22 per cent. For EVs, the conversion of electrical energy into power to drive the wheels is 59 to 62

percent. This gives EVs a clear performance advantage. The cost of operating EVs – including fuel and maintenance – ranges between 65 per cent to 77 per cent, less than it costs to drive and maintain gasoline-fuelled vehicles. Due to its size, Tesla's Cybertruck is likely to be somewhat less efficient than the electric passenger cars currently available. However, when compared to other non-electric trucks, the inherent efficiency advantage of electric motors and the aerodynamics of the Cybertruck are substantially better.

EVs are rapidly becoming a core part of our transportation future. The Union of Concerned Scientists issued a report in November 2015 that concluded: "Based on where EVs are being sold in the United States today, the average EV produces global warming emissions equal to a gasoline vehicle with a 68 mpg (miles per gallon) fuel economy rating." That's about 3.4 litres per 100 kilometres in Canada. And in several northwestern states in the U.S., that equivalency is 94 mpg, or about 2.5 litres per 100 kilometres. This means that even the best gasoline or diesel-powered vehicles would have to double or triple their fuel efficiency to come close to EVs. In the same report, life cycle analysis that included both the operation as well as the manufacturing of vehicles shows that a full-size EV has approximately half the

environmental footprint of a full-size, gasoline-fuelled car.

Vehicle-to-grid (V2G) technology is also being developed around the world. V2G allows EVs to use chargers bidirectionally to turn them into mobile storage solutions – meaning EVs could help balance electricity supply and demand by making the vehicle's battery system part of the overall grid infrastructure. Vehicles could be used to store energy during periods of over-supply and provide top-ups to the grid during peak demand hours. With its massive battery pack, Tesla's Cybertruck is particularly suited for V2G use. The vehicle will also come with a 120 volt/240-volt AC power outlet that may be able to power homes during blackouts or brownouts. This is something currently done with other EVs using what are known as aftermarket inverter kits. Nissan has been working on similar technology in Japan with its Leaf vehicle.

Tesla's Cybertruck and the growing number of offerings by other manufacturers of EVs likely represent the beginning of a larger transition away from internal combustion engines. The environmental advantage of electrifying transportation is significant and undeniable. EVs are also a pleasure to drive – they're quiet, clean, fast, inexpensive to operate and perform well in all weather conditions.



THE ART OF TEACHING COMPUTERS

BY ARAVIND VENUGOPAL S6, EC2

Things were never the same after Artificial Intelligence, or AI, was implemented on to a product. This technology has also played a pivotal role in uplifting automation along with it. What exactly is AI, the 'buzz word' of 2019? It can be defined in simple terms as "Teaching computers to make decisions or think similar to humans, by themselves without the intervention of Humans".

The term Artificial Intelligence is strong enough to make someone think beyond its simple definition. Machine Learning, Deep Learning, etc. are all a part of AI. In fact, DL is the subset of ML, which in turn is a subset of AI which comes under the large branch of Computer Science.

The applications of AI are limitless as of now. It can be integrated with any tasks which humans are doing by themselves. And that's the uniqueness and power of AI. Who could have imagined that Katie Bouman could come up with the image of a black

Hole or AIVA (Artificial Intelligence Virtual Artist) could create music on their own with the help of AI. Even tech giants such as Google and Facebook have started to fully incorporate AI into their products. This is with knowledge that AI is the way forward, and the sustenance of these billion dollar companies are at stake without AI. The beginning of AI dates back to 1956 when John McCarthy coined the term Artificial Intelligence. The most basic thing that can be done with the help of AI is classifying something which humans may or may not be able to do.

In order to do all these, the most important resource needed is Data. Data is the new oil. The training takes place through different methodologies depending on the prevailing conditions. Supervised Learning, Unsupervised Learning and Reinforcement Learning are all part of this. As always, the best method to understand everything and anything, is to get your hands on it, and start doing it.

GAMING MADE EASY

BY ASWIN NANDU A S4, EC2

What comes to your mind when you think of unlimited movies and a variety of shows that can be simultaneously streamed across several devices? Netflix, of course. Now think of the same, but with gaming instead of movies. That is some incredible news for all gamers out there!

Google Stadia is a cloud gaming service launched recently at Game Developers Conference (GDC) in San Francisco. It is an online based gaming and streaming service which helps you to play as well as stream in 4k 60 fps over the internet without actually buying any kind of game or console, but on any device like a PC or Smart TV (using a Chromecast) with a stable internet connect and the real gaming rig is set up at Google's servers. During the keynote, Phil Harrison - former Sony and Microsoft executive explained this service as a platform for everyone and how Google is ambitious to stream games to all types of devices.

Through Stadia, one will be able to stream games from the cloud to the Chrome browser, Chromecast, and Pixel devices - in short, all Google-powered devices. Google also demonstrated a new feature on YouTube that lets you view a game clip from a creator and then hit "play now" to instantly stream the title. At launch, games will be streamable across

laptops, desktops, TVs, tablets, and phones. Apart from Stadia, Google is also planning for a new "Stadia Controller" that will power the game streaming service. It will work with the Stadia service by connecting directly through Wi-Fi to link it to a game session in the cloud. It should also help with latency and moving a game from one device to another. Still, there is a lot of uncertainty and ambiguity regarding how different Stadia is from the gaming consoles.

1. Gaming consoles work on their own. That is, they have their own hardware which supports you to play the game of your choice while Google Stadia is a cutting-edge technology where you just play the game and forget about the hardware as it is provided by Google itself. All you need is a good stable internet connection.

2. You have to buy games for a console while Google Stadia provides you a lot of games without actually buying, downloading or updating and other stuff. You just focus on gaming; while Google watches the other works.

3. You have to pay for the console to buy it. Also, you must have a setup especially for the particular gaming console. Google Stadia gives you the freedom to choose your own gaming peripherals without worrying for the gaming experience.

Although Google has not announced the actual cost or subscription cost of the technology, it would still be a better choice for most gamers.

Google Stadia, with its wide range of features and ease of access, definitely has the potential to become the future of gaming.

5G- DON'T WORRY ABOUT IT

BY DANIEL C. S8, EC2

You might have come across all the reports of 5G networks causing brain cancer, infertility, autism and more. Should you be worried? Not really, echoes almost all reputable experts.

It looks as if we may have been the victims of widespread medical and scientific misinformation about 5G. According to the New York Times, the fear of 5G, or 5th generation broadband networks, has been fueled by RT America, a Russian television network that transmits just blocks away from the White House. RAND Corporation calls RT America a "Firehose of Falsehood". While RT America was portraying false stories about the dangers of 5G,

Russian leaders were welcoming 5G in Russia, where it is being used to treat wounds and skin cancers. You can get 5G radiation for skin regeneration in Moscow salons. Way behind the U.S. and China in technology; and sensing that 5G would only give China and the West further economic advantage, the Russians may have seized on an opportunity to spread misinformation to slow down the implementation of 5G technology. While difficult to carry out in China with its state-controlled media, Russia's misinformation campaign has proven all too easy in Western countries. Freedom of speech and anti-technology factions don't seem to tire of the theme of profiteering companies that don't give a damn about public safety. Protests have erupted like wildfires in the U.S. While

the residents have not marched down to the local Verizon and AT&T stores with lit torches brandishing pitchforks, they have been quite vocal and successful in delaying or shutting down 5G implementation. Anti-5G sentiment across the nation cites unproven or debunked pseudoscientific theories and health risks that haven't been materialized, sowing the seeds of doubt and creating hysteria. Faced with a concerned public, the local government often takes the path of least resistance, errs on the side of caution, and puts the issue off while they "study the situation".

The roots of anti-5G movement, which RT America promotes, originates from a few isolated "experts" who cling on to each other; when the rest of the scientific and medical community have already moved on, having looked for problems and found none. In 1978, investigative journalist Paul Brodeur published 'The Zapping of America'. The book set off alarms but presented no real evidence of the maliciousness of wireless communication. Dr. David Carpenter, a scientist and Harvard medical student grad, made a connection between high voltage lines and leukemia in his book, 'Currents of Death'. Bill P. Curry, a physicist with no biological or medical expertise, suggested in 2000 that radio waves at higher frequencies cause brain cancer. However, most experts on the biological effects of radiation, believe that radiation becomes safer at higher frequencies (until the X-ray band). Curry

THE FINAL RISE

BY C.HARIKRISHNA SHARMA S4, EC2

Gone are the green days
When nature was our buddy
Going by our own ways
To keep ourselves steady

All to keep ourselves satisfied
Gaining nothing beyond selfish pleasure
That everyone could be gratified
Hunting everything down for leisure

Now is the time to rise
To rejoin the broken ties
For we remain the only beings
Capable of foreseeing

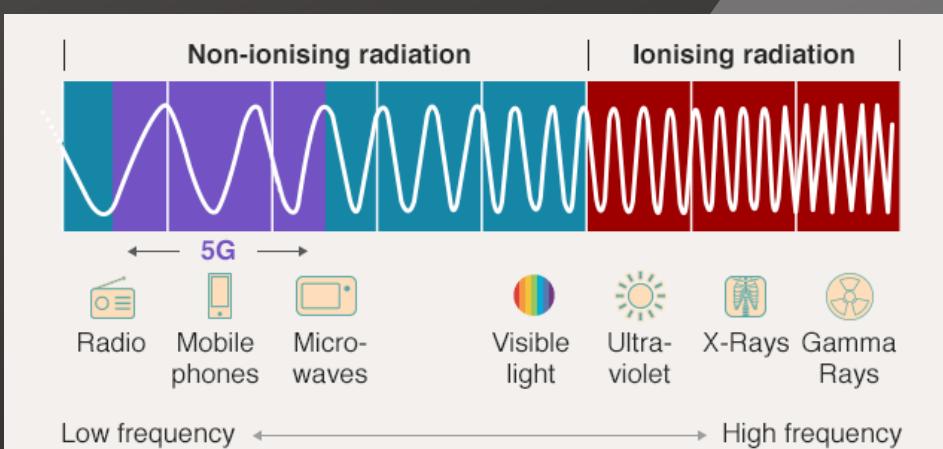
Get ready to act upon
Before we are far gone
The Universe is waiting to see
The chained nature set free

Did you know?

Printed circuit boards are almost always green because they are made from a glass-epoxy, which is naturally green.

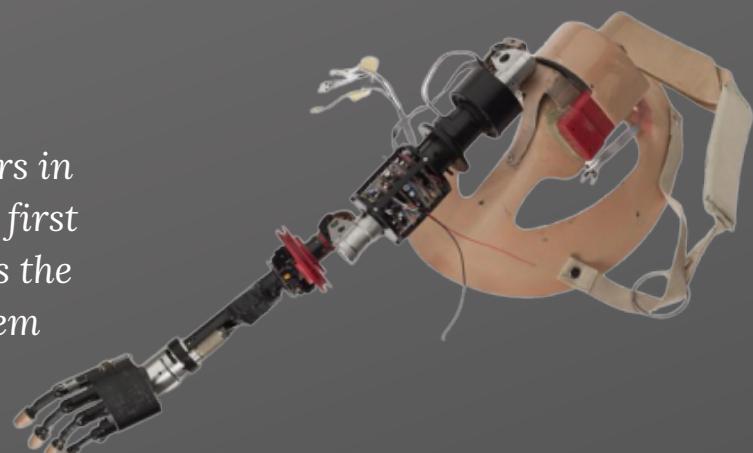
bombarded and damaged organ tissue samples with high frequency radiation. However, our organs are protected by skin and none of the radiation will reach our brains. Later on, when brain cancer rates stayed flat, even after cellphones took off, Carpenter was forced to concede that cell phone radiation may not be able to penetrate the skin and skull to reach the brain, much less damage it. Many types of radiation can cause damage with high energy, just as many substances can poison with high dosage. Consider the legend of microwaves, their cooking potential was discovered after a chocolate bar melted in the back pocket of an engineer near a device emitting radiation in the microwave range. Science has not completely exonerated 5G from any form of damage in any situation. At high enough powers and in close enough proximities, a 5G signal could melt a chocolate bar, if not worse. However, given enough distance, with power diminishing by an inverse square of

distance, a safe distance should be easily established and cordoned off, keeping the public safe. 5G signals will require more towers than those used for earlier networks because they don't travel as far as 3G or 4G signals. It's the same reason that the signals have more trouble penetrating objects such as skin; that's how it works when you have higher frequencies. For technological advancements, 5G is a highly desirable enabling technology. Its delay further postpones other emerging technologies such as autonomous vehicles, IoT, digital twins, AR/VR, and smart cities, to name a few. Vehicle-to-vehicle communication cannot be practical with 5G, for example. Wearable devices will soon saturate the existing 4G network. AR and VR headsets may take off if they could be untethered from their computers with 5G. In short, for efficient and hassle-free communication in an increasingly connected world makes adoption of 5G a technical imperative.



Did you know?

In 1993, five biomedical engineers in Edinburgh, Scotland created the first functional bionic arm, known as the Edinburgh Modular Arm System



YOURS LOVINGLY, AI

BY NEHA SABU S4, EC2

And the sci fi movies roared;
The future marvels.
Yet I laugh besides, you wonder
The legacy of my brilliance.
Concise yet you seek me,
To places I never hid.
I am not the Boston dynamics,
As the movies fooled you.
Yet you could see tinges of me
everywhere.
As my strange new discipline,
Rules the trough and crust of life,
Fearful I am, to make you lethargic.
For the intelligence I bloomed from.
As I rise higher, my kingdom bigger,
I need you beside me,
To blend into intelligent conversations
So natural you are, I admire you
For you hold the infinite power within
Your faithful companion, is all I
wanted to be,
Together, we have miles to
conquer,
Yours lovingly, AI

MEMRISTOR- A Promising element of Developing Tomorrow

BY M. S. BHAVANA S8, EC2

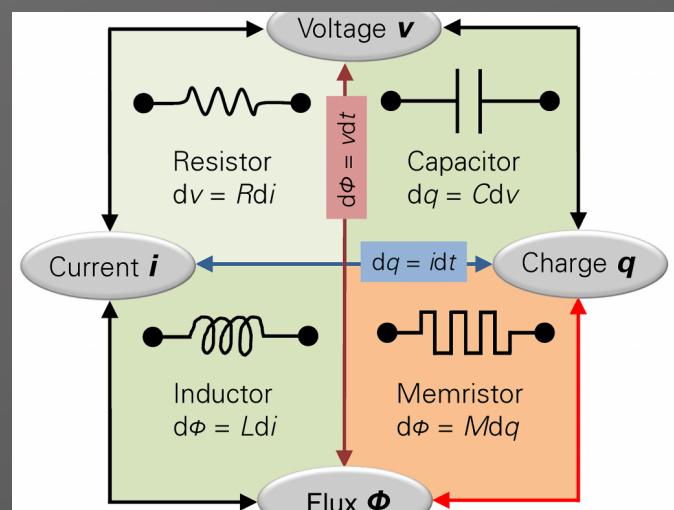
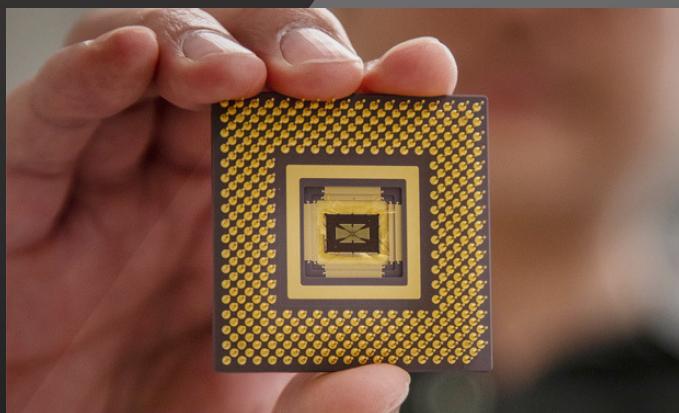
The term ‘Memristor’, is derived from the root words memory and resistor, and was first hypothesized by Leon Chua. It is the 4th passive element to join the family with resistors, capacitors and inductors. It is a potential replacement for transistors, which we could refer as the core of electronics.

The most important stepping stone in the development of modern computing was the discovery of the complementary metal oxide semiconductor (CMOS). This sparked a silicon revolution that culminated in the empirically proven concept of Moore, which states that with the advancement in transistor miniaturization, ultimately the number of transistors per chip and the processing power will double every two years. But, if this goes on, one day we would witness a situation where, the devices could end up becoming bulkier and bulkier by incorporating thousands of transistors. This eventually led to the development of a component that has the potential to take over transistors.

Even though the concept of Memristor was developed by Leon Chau in 1971, it was after 37 years, on April 30, 2008, a group at HP Labs, drove by the researcher R. Stanley Williams finally reported a disclosure of an exchanging memristor. The missing link between charge and flux lead to this discovery. The electrical resistance of the memristor is not static, but depends on the background of the current that had previously flown through the system, that is, its present resistance relies upon how much electrical charge has flown through it before and this records for its non-volatility. At this point when power supply is off, the memristor recollects its latest resistance until it is turned on once again.

Many of its applications are in the non-volatile memory devices. Memristors can retain memory states, and data, in power-off modes. Non-volatile random-access memory, or NVRAM, is pretty much the first to market memristor application we would be seeing. There are already 3nm memristors in fabrication now. Crossbar latch memory developed by Hewlett Packard is currently about one-tenth the speed of DRAM. The fab prototypes resistance is read with alternating current so that the stored value remains unaffected. Another application would be in computers that mainly uses transistors. High power consumption of transistors has been the barrier to both miniaturization and microprocessor controller development. Solid-state memristors can be combined into devices called crossbar latches, which could replace transistors in future computers, taking up a much smaller area.

One of the major areas where memristors could be used is in the biomedical field. Simple electronics circuits based on an LC network and memristors have been built, and used recently to model experiments on adaptive behaviour of unicellular organisms. The experiments show that the electronic circuit, when subjected to a train of periodic pulses, learns and anticipates the next pulse to come, similar to the behaviour of the slime mould *Physarum polycephalum* periodic timing as it is subjected to periodic changes of environment. Recently, memristor cat brain has been getting a lot of mention. These types of learning circuits find applications anywhere from pattern recognition to neural networks. The discovery of memristor is definitely a step in the right direction and in a few years, can go on to revolutionize the field of electronics.



TWISTED OPTICAL FIBRE

BY MERISH K. MATHEW S6, EC2

A 100x faster network would seem a long way from reality. Even though 5G has taken implementation, the performance goals of the promising tech, lie immature for wireless networks. But what if there's someone else holding a key to this issue?

The new member who could take this role play is Twisted Light.

Researchers at Australia's RMIT University recently discovered a new Fiber-optic cable that seamlessly shuttles multiple beams of light simultaneously and thus which could help drastically increase the speed of data transfer over the Internet.

At present the wireline network we use, are standard Fiber Optic Cables which offer us improved speed, security and bandwidth over its legacy copper predecessors. They normally use Pulses of light to transmit information, in which photons would bounce around inside the cable and travel to the other end where it's decoded by a receiver. However, users can only store data based on the color of the light and whether the light wave is horizontal or vertical. Which also indicates that, we currently have only used a small fraction of light's capacity to transmit data due to our technological limitations. But now, new efforts are making use of even UV rays, which are beyond the visible spectrum.

And in this new discovery, the RMIT researchers twisted light into a spiral and created a third dimension for light to carry information, known as the Level of Orbital Angular Momentum or spin. They compared it to the double helix spiral of standard DNA. They found that it is possible to encode more data within a single beam by using twists within the light itself. These could carry far more information than regular light if it is packed within the light's varying degree of twists. The added advantage is that these twisted light beams can even overlap with each other and still maintain its respective data stream without interfering with one another.

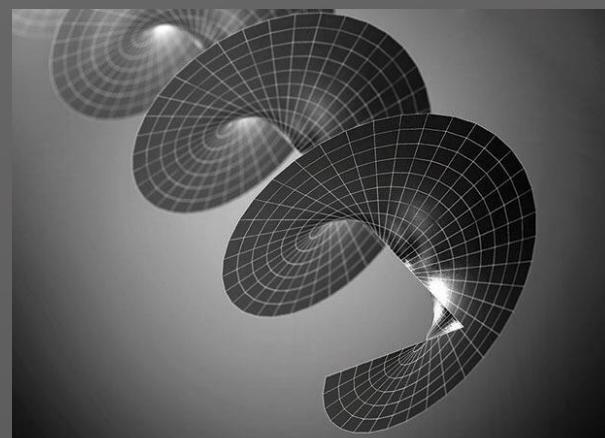
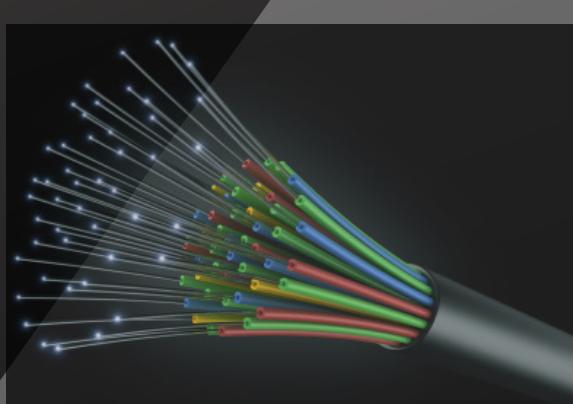
By using twisted light, it's possible that internet speeds could be improved to over a terabit per second. But the real issue was to provide a suitable Optic fiber, to carry the twisted light. These light twists are like a tornado as it moves along the beam path rather than in a straight line. Optical vortices were previously thought to be unstable in optical fiber, but researchers have now designed a fiber capable of propagating them.

The next issue was on the part where these twisted lights were to be decoded at the end, previously the teams used detectors as large as the size of a table. This was impractical and now they have succeeded on developing a new detector sized only the width of a human hair which could help detect, decode and read the information it holds.

The technology's potential applications are more practical in atmospheres having no turbulence and thus could be efficient in satellite and space communications. If developed properly, it also has wide applications in the field of medical science. In the near future, it could also help process complex data and information from quantum computing than our current computing systems.

Another interesting fact is that even as 5g develops, according to a study report, only 11% of traffic is carried by wireless networks. Rest of the 90% of internet traffic is supported and carried by the wireline network. This ultimately means that, even if the customer experience would be improved by small cell wireless access points, the quality and reliability of wireless network will depend on wireline(fiber) network carrying traffic to and from the 5g small cells.

Thus, it could be said that, twisted light definitely holds a key to a radically faster network.



TURNING POINT

**BY AKHILA B. CHANDRAN
(ON BEHALF OF TEAM NINJAS) S8, EC2**

Everyone will have something special to tell about each year; about something that they consider to be the best that they've achieved so far. In fact, 2018 was that year that changed our lives. It was the year that taught us the true meaning of our engineering lives and the one that made us realize that we are capable of contributing something resourceful to our society.

We were absolutely flabbergasted on hearing the news that we were selected for the finals of the Start-up India: Kerala Yatra, conducted by the Kerala Start-up Mission (KSUM). It is a platform that intends to create an ecosystem to produce an entrepreneur from every family of the state.

It all began when we were asked to find a problem to be solved for our Design project. Our desperate need of finding a problem led us all the way from googling to enquiring about the major unsolved problems in our homes. After several fruitless attempts, we thought about our own day-to-day lives, and as women we felt that one of the major problems faced by us at the end of each month, is the unavailability of a safe, proper and healthy disposal method of sanitary napkins in our households. Moreover, it's a social complication that needs to be untangled. Our team of 4 were equally synergetic in all aspects ranging from the brainstorming sessions to collecting and analyzing data for creating a prototype design.

Even though we enrolled ourselves into various technical events and competitions to bring our product into light, we were often sent back due to the fact that our project was still in its ideation phase. Nevertheless, their appreciation for choosing this field was our stimulus. That was the time when we came to know about the Start-up India: Kerala Yatra boot camp that was going to be held in our college in search for future entrepreneurs. Following the idea pitching session, our product was chosen for the Grand Finale of Start-up Yatra along with 12 other teams from our college as well. The Grand Finale was held at Technopark, Trivandrum on the 26th and 27th of November, 2018 where we got to see all the teams, whose ideas were shortlisted all over Kerala. On the first day, all the teams were sorted into various groups based on the field in which their ideas belonged to. Soon after, each group was given a chance to interact with an expert from their respective fields giving us a clear view on how to pitch our ideas with the

judges the next day. As expected, we were categorized in the social group where we got an opportunity to socialize with a successful entrepreneur who also turned out to be a motivational speaker. The second day started with the teams being sorted into various groups to be ready with our ideas and presentation for the final idea pitching session. A panel of 4 judges were present in a conference hall where each team was asked to present their idea in a time span of 3 minutes. Even though we were a little timorous at the beginning, we gathered up our confidence to try our best to explain the project and we were fortunate enough to answer most of their queries regarding our business model, revenue structure, prototyping and how we would establish our product successfully in a competitive environment. Little did we know what was about to happen soon after.

The selected ideas would be receiving several incentives from the State Government and support from various incubators as well. Propitiously our idea got elected for the third prize in the social sector, and our spirits were uplifted with tremendous exuberance. The joy and radiance in us were beyond limits. We felt like we've achieved something for the first time in our lives. Rather than perceiving the competition as an event, we decided to conceive it as a golden opportunity, to exhibit, express, view and share our idea with the whole community. We were also glad to make a small contribution to our developing society, nevertheless, the fact that the idea flashed across our minds as soon as we left our college washroom one day, becoming aware of the need of a proper and hygienic sanitary napkin disposal system in our own homes.

We have a diligent team of 4 (Nowrin N, Akhila B Chandran, Haleema Manzoor & Narayan Nair), guided by former faculty Mr. Priyadarshan U & Mr Arun J S, assistant professor, dept. of Electronics and Communication. They have been and still continue to be our backbone throughout this journey, who support us with strength and confidence. We couldn't have taken our idea to the next level without their constant faith and trust in us. They were ready to help us regardless of time, whether it was day or midnight. Priyadarshan sir guided us with our budget structure and also blew our minds off with his amazing sketches of our

product. More than a teacher, Arun sir was our mentor, adviser and strength booster, who encouraged us in expanding our idea and positively impelled us to take part in each and every contest that came across our way. He often used to say, "Always try your level best without any expectations. We don't have anything to lose. Realize that every platform is an opportunity to enhance your experience. Every competition that you participate will only boost your confidence. More than anything, always believe in yourself." Thank you, sir, and we promise you to make you proud.

Moreover, we thank our friends and family for their suggestive ideas that were very useful in developing our idea. Hoping for the best that someday, we would raise our own prototype as a contribution to the welfare of our women society and to a better and safe environment.



Art Attack

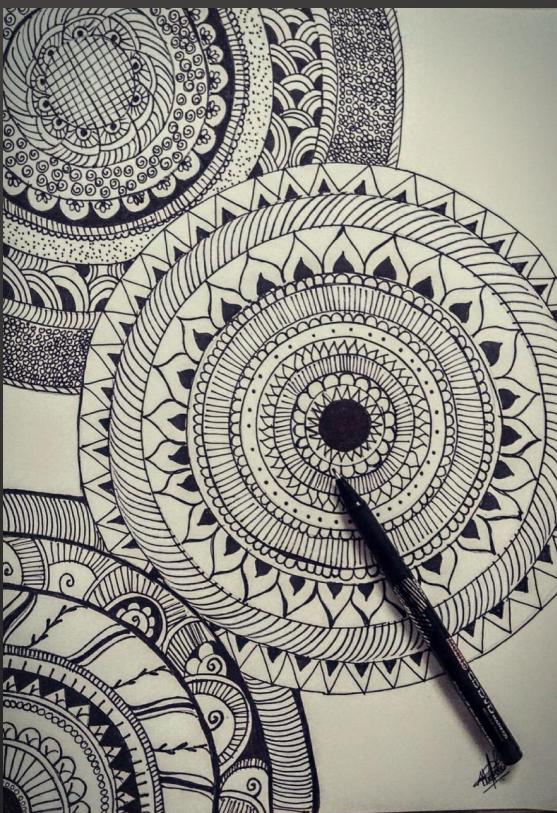


By Senthil Nath R
S8, EC 1



By Nicky Renji Abraham
S6, EC 2

By Nicky Renji Abraham
S6, EC 2



By Varsha U S
S6, EC 2

Achievements

Alumni Achievement

AiDrone Pvt. Ltd. has been selected as iDEX (Innovations for Defence Excellence) Winner for the Defence India Startup Challenge 3 titled “Portable Spoof Emitter for Radiations” in the DEFEXPO 2020, a flagship biennial event organized by the Ministry of Defence, Govt. of India held at Lucknow, Uttar Pradesh on 7 February 2020. Co-Founder Joji John Varghese received appreciation from Shri. Rajnath Singh, Hon'ble Defence Minister of India. AiDrone is a Startup owned by the alumni of MBCET – Ani Sam Varghese (2012-2016 batch of ME), Joji John Varghese (2012-2016 batch of EC) and Nibin Peter (2013-2017 batch of CS).



Nexuz'19

1. Neha Sabu(S4 EC2) : Winner of Nexuz ambassador
2. Anandhu Rajesh(S4 EC2) : Second runner up in Nexuz ambassador
3. Deepthi (S6 EC2) : Second prize in Idea Presentation
4. Vishnu P. Kumar(S4 EC2) :First prize in Project Expo
5. Athul Raj (S8 EC1) : Second prize in Idea Presentation
6. Karthik M. (S6 EC1) : First prize in Repairo

RAGAM NITC

- Gouri A. V. (S8 EC1) : Campus Ambassador Runner up
- Kailas R. J. (S8 EC1): Second in spot choreo
- Winners of Ragam ‘Fury’ -All Kerala basketball tournament
 1. Shamil Shamsudeen (S8 EC2)
 2. K. Vaibhav (S4 EC2)
 3. Edwin John Joseph (S4 EC1)
 4. Vijn R. (S2 EC1)
- M. S. Bhavana (S8 EC2) : Second runner up for Malayalam recitation

Winners of All Kerala KTU inter collegiate basketball tournament at Sahrdaya College, Thrissur & at Amritha Institute, Kollam

1. Shamil Shamsudeen (S8 EC2)
2. K. Vaibhav (S4 EC2)
3. Edwin John Joseph (S4 EC1)
4. Vijin R. (S2 EC1)

Winners of KTU All Kerala netball tournament

1. Sruthy J Kurian (S4 EC2)
2. Aneeta (S6 EC2)
3. Joshua G. Reji (S2 EC1)
4. Athira (S6 EC2)

Adharva'19

1. Devika Nair M. H. (S8 EC2) : First prize in 'Flash Fiction'
2. Athira Soman Nair & Advaid Chand Krishna (S8 EC2) : Second prize in 'Hunt & Barter'
3. Shamil Shamsudeen & Joshna Mary Jose (S8 EC2) : First prize in 'Hunt & Barter'

- Daniel C., Rohit Satheesan, Sandra Jeeva & Shamil Shamsudeen (S8 EC2) : Final year project 'Portable Brain Computer Interface for Medical Applications' got selected for funding (Rs.32,500/-) by APJAKTU



Winners of KTU A Zone and All Kerala basketball tournaments

1. Sruthy J Kurian (S4 EC2)
2. Athira (S6 EC2)
3. Shamil Shamsudeen (S8 EC2)
4. K. Vaibhav (S4 EC2)
5. Edwin John Joseph (S4 EC1)
6. Vijin R. (S2 EC1)

ISTE '19

1. Gouri A. V. (S8 EC2) : ISTE Kerala Section: Best Student Award
2. Neha Sabu (S4 EC2) : Third prize in 'Quotiferrous'
3. C. Harikrishna Sharma (S4 EC2) : Third prize in online quiz competition & second prize in Idea presentation

Baselian Fest'19

1. Sakthi Priya (S6 EC2) : Second prize in English recitation
2. Meenakshi Nair(S6 EC1) : Second prize in English Short story writing
3. Athira A. Nair(S8 EC2) :First runner up in Malayalam Versification
4. M. S. Bhavana (S8 EC2) : Second runner up in Malayalam recitation
5. First prize in Western Group Song
 - Feba Mary Abraham (S8 EC2)
 - Nirupama Sreenath (S8 EC2)
 - Sanchia Tennyson(S8 EC2)
 - Poornima U. (S8 EC2)
 - Abhijith M. Gokul(S8 EC2)

- Ajay M. R. (S8 EC1) : Trivandrum district classic powerlifting championship Silver & Bronze for junior & senior category
- Arya Ramesh (S8 EC2) : First runner up in 800m at MBCET Annual athletic meet
- Ashwin Abraham Thomas (S6 EC1): Best academic performer award from IET
- Vishnu P. Kumar (S4 EC2) : First prize in Line follower & Junkyard wars at Crossroads'19
- Karthik Pradeep P. (S4 EC2) : Third prize in KTU A Zone Badminton tournament
- Jobin J (S4 EC2) : First prize in technical quiz conducted by IEEE

Hackathons

- 1.Nandagopal Harikrishnan, Vishnu C. Nair, Athul Raj & Arun Mathew (S8 EC1) : Second position in Hash'19
- 2.Gouri A. V. (S8 EC1) : First prize with cash prize Rs.3000/-in Smart India Hackathon Preliminary Phase

- Akhilesh S. & Sherin Sara Samuel (S8 EC2) : Second prize for 'Antenna Symposium' held at Govt. Engineering College, Barton Hill
- Devika Nair M. H. (S8 EC2) : First runner up in 'Free Style – Spot Choreo' & 'Petite Tale' at National level inter collegiate fest Yagna Dhruva
- Jyothis Philip, Jayakumar C. K. & Abhijith M. Gokul (S8 EC2) : First runner up in 'CricParty' at Utbhav
- Adith M. S. (S6 EC2) : First prize for fashion show at Rajadhani College and second prize at Bishop Jerome and Marian college
- Anant Nair (S2 EC1) : Second prize in KTU A zone & third prize KTU All Kerala inter collegiate table tennis tournaments
- Akshay S. & Sooryanarayanan (S2 EC2) : Second prize in Deca Dance at TOCH, Kochi

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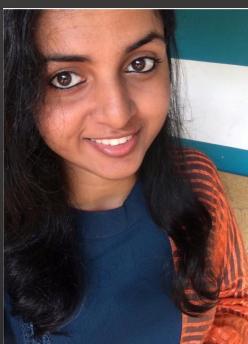
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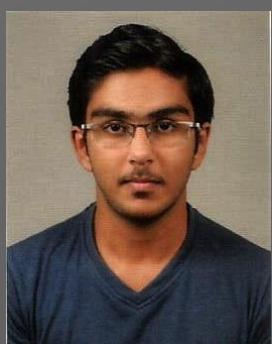
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