ECE Department of HITK presents

AMPERE

where performance meets innovation

MARCH, 2020

Vision

The degree holders of the department will carry the image of the institute and the department in India and the world through their commitment and success. They will prove themselves to be good, sincere and successful professionals and teachers. They will prove themselves as good, caring and responsible citizens.

Mission

Students with degrees from Electronics and Communication Engineering (ECE) will:-

➤ acquire specialized knowledge in the desired domains

➤ be able to analyze any problem and solve it in a cost-effective way

➤ have confidence and knowledge to start new business activities and show entrepreneurship skills

➤ develop passion for more studies and R & D

➤ inherit leadership qualities for society and workplace

From the HOD's desk:

First, let me congratulate our entire department for achieving NBA ACCREDITATION in tier-I category. The AMPERE played an important role during the evaluation. I would request the editorial board and others of the team to keep the flag of AMPERE and Department ECE flying.

Once again, congratulations on your efforts and wishing you best of luck.

Prof. Prabir Banerjee,
Head, ECE Department.

Mentors' Message

Message from Prof. Siladitya Sen:

The word "Delight" comes to my mind seeing the sustained effort of our students towards publication of the 3rd edition of "Ampere". One will find the magic of creative mind of youngsters who have spared no efforts and brought out this excellent piece of work. I hope all of you will enjoy going through this along with me.

Message from Prof. Sayantani Datta:

I would like to appreciate the sincere efforts of the editors for having brought out the March '20 issue of the Ampere. It is indeed heartening to note that the entire magazine has been designed and framed by them only. My special accolades also go to all contributors of Ampere.

Message from Editorial Board

"Enthusiasm is the electric current that keeps the engine of life going at top speed"
-B C Forbes

We are overwhelmed by the enthusiasm and the responses received from the previous two editions of Ampere. We have strived to present "Ampere" as a platform for students to present their views. The third edition incorporates diverse matters happening in India and around the world today that call for awareness and discussion.

It includes the category of electronics, science and technology, creative writing, contemporary and sports. Transitions between these categories are informational facts regarding the rich Indian dance forms, ancient yoga, beauty of Bengal and beautiful sketches which are a treat to the eyes. This magazine brings out the creative best and the spirit of ECE department.

We thank our mentors Prof. Prabir Banerjee(HOD ECE Dept.), Prof. Siladitya Sen and Prof. Sayantani Datta for encouraging us throughout. We also thank the contributors and students of ECE department who have made this magazine possible. We hope this edition can match up to your expectations.

Welcome to Ampere 3rd edition.

-Editorial Team

Members Of Editorial Board

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2. Supriya Maji(3rd Year)

3. Pramita Banerjee(3rd Year)

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Flip to explore:

CONNECTING WITH ELECTRONICS

DIY CLASS D AUDIO AMPLIFIER

A Class-D audio amplifier might look like a little complex over other existent amplifiers like class A, B and AB but it is way more interesting and efficient than those. An amplifier as we all know that is a circuit that boosts up the voltage and current of the input signal. A class AB audio amplifier is a well-known circuit but its main problem is power loss which occurs in the BJT push pull section due to significant voltage drop across the collector-emitter junction, thus providing a low efficiency of about 50-60%.To efficiently amplify the audio signals effectively and provide enough power we use a class-D audio amplifier. It provides an efficiency of about 90-95 % due to low drain to source voltage drop.
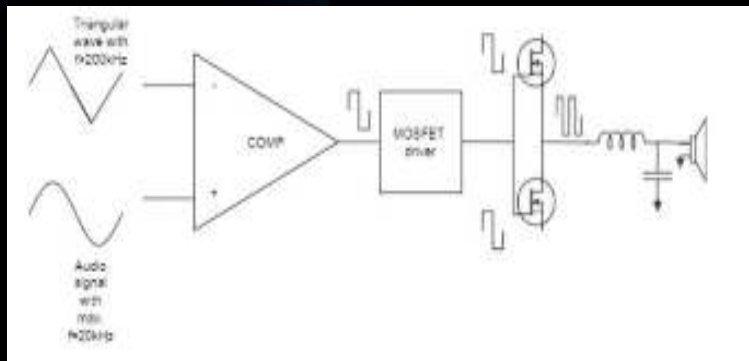

MATERIALS REQUIRED: 10kΩ pot, LM393 comparator, NE-555 timer, 74HC04 inverter, IR2113 MOSFET driver, IRLZ44N MOSFET, 7805 voltage regulator, capacitors, resistors, diodes and inductor.

WORKING PRINCIPLE:

We can start understanding the working by having a look at this block diagram. The audio signal is fed into the non-inverting terminal of the comparator and a triangular signal is fed into the inverting terminal. These two signals are compared and a high frequency square wave (>200 kHz) is produced. A pot is used to give some DC offset to the audio signal so that it is completely submerged in the triangular wave.

This square wave is used to drive a MOSFET driver and MOSFETS produce a powerful and amplified signal. This signal is again passed through a LPF which converts the square waveform to smooth sinusoidal waveform which is our required amplified audio signal. This project costs about 120 INR which is way cheaper than audio amplifiers available in the market. Some components can also be found in old DVD players etc. Make this project and have a lots of fun!!

CIRCUIT DIAGRAM
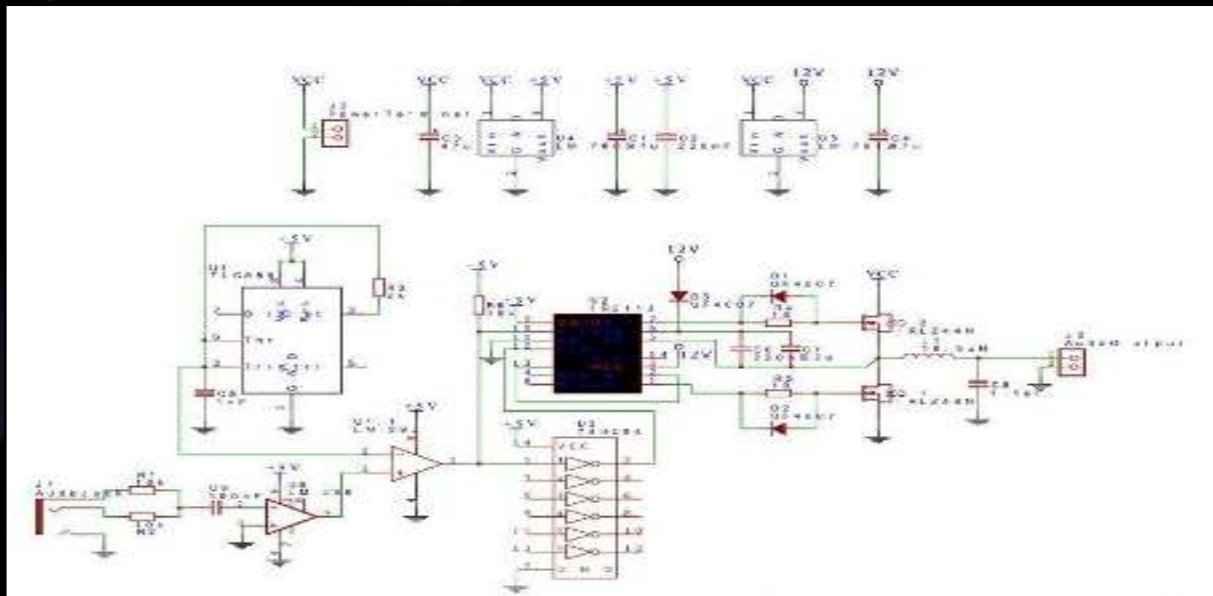
Sudip Bandyopadhyay

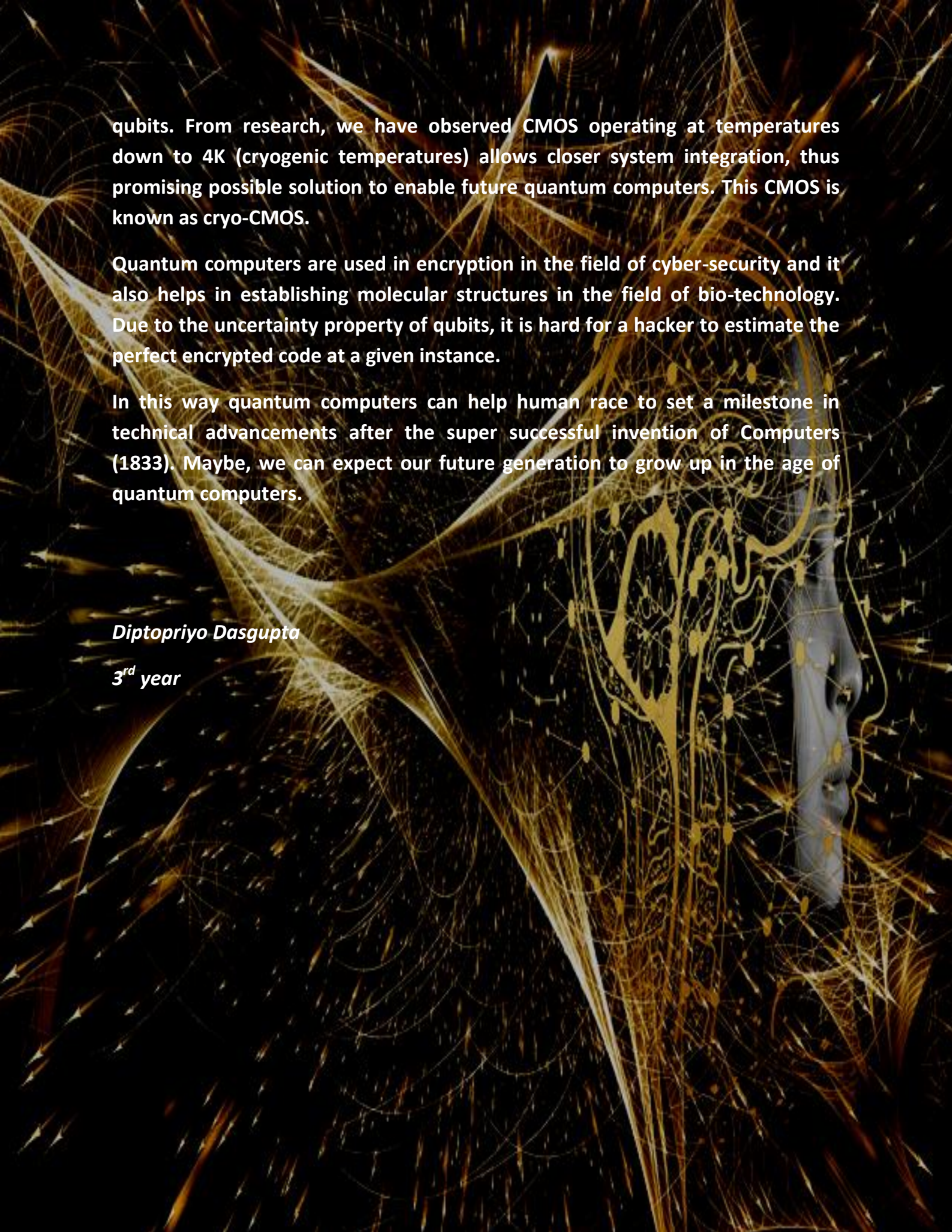*3rd Year*

Quantum Computing

The word *Quantum* in modern understanding refers to the smallest possible discrete unit of any physical property. Just by hearing the word quantum, we tend to think of electrons, protons, Higgs boson and what not. But today's technological advancement has brought us to apply such words in a highly technical machine, invented in 1960s, named 'computer'.

The basic concept of how a computer functions and executes all its tasks is known by all. The whole world of computer is dependent on a binary system comprising of 2 numbers - '1' and '0'. We combine these 1s and 0s to fabricate any information we need and then that information is processed by our computers.

But in case of 'Quantum computer', the processing of information is quite different. Here, we don't use bits - 1 and 0, rather we use superposition of the states of 1 and 0. By that I mean that at an instance, there can be 80% state of 1 and 20% state of 0 or 60% state of 1 and 40% state of 0 or vice versa. With the help of this property of superposition, we can get innumerable combinations of 1s and 0s at an instance. These are technically called quantum bits or qubits.

For example, a combination of 4 bits gives a total of sixteen combinations of information among which we can use only one, while qubits in superposition can be in all of those sixteen combinations and that number grows exponentially with each addition of qubits. This is the exact reason why quantum computers can execute data so fast and efficiently.

A faultless quantum computer requires million of qubits that requires massive and precise control electronics for manipulation and readout of individual

qubits. From research, we have observed CMOS operating at temperatures down to 4K (cryogenic temperatures) allows closer system integration, thus promising possible solution to enable future quantum computers. This CMOS is known as cryo-CMOS.

Quantum computers are used in encryption in the field of cyber-security and it also helps in establishing molecular structures in the field of bio-technology. Due to the uncertainty property of qubits, it is hard for a hacker to estimate the perfect encrypted code at a given instance.

In this way quantum computers can help human race to set a milestone in technical advancements after the super successful invention of Computers (1833). Maybe, we can expect our future generation to grow up in the age of quantum computers.

Diptopriyo Dasgupta

3rd year

VYOM MITRA: The Humanoid Robot

ISRO (Indian Space Research Organisation) in collaboration with scientists at IISC (Indian institute of science) has recently launched its new innovation, a realistic machine learning tool, the first female space-faring half humanoid robot "Vyom Mitra". She is able to perform ELSS (Environment Control and Life Support Systems) functions. It is programmed to behave or react to situations the way humans would. This human look-alike robot has got no legs and is able to move in sideways and forward only. It is expected to go on two un-crewed spaceflights 'Test Flight 1' and 'Test Flight 2' scheduled for December 2020 and July2021 prior to the crewed vehicle for Gaganyaan mission which is planned to be launched on ISRO GSLV MK III in December 2021. This humanoid knows two languages - Hindi and English and can mimic various human activities, recognize and respond to them. It can perform multiple tasks like it can monitor biological parameters, attain launch and orbital postures, respond to the environmental changes, generate warning, replace carbon dioxide canisters, monitor crew module and much more. This humanoid will simulate the human functions required for space before astronauts take off for Gaganyaan mission. It will provide better idea of what weightlessness and radiations do to the human body during long durations in the zero gravity conditions.

Mimansha

1st year

Interfacing AI with IoT Sensors

IoT sensor solutions today are mostly only responsible for data acquisition. The raw-data needs to be extracted from the sensor and transmitted to another, more computationally capable device within the network. Depending on the use-case, this device could be either an embedded system, or a server within the cloud. The receiving end collects the raw-data and performs pre-processing in order to present relevant results. Frequently the raw-data of the IoT device needs to be processed using artificial intelligence, as in speech recognition for example.

However, the growing amount of connected IoT devices, which rely on cloud solutions to compute meaningful results, leads to various problems in several areas. The first issue is the latency. Servers need to handle more number of requests of IoT devices and thus could be overwhelmed in the future.

A major advantage of neural networks is their ability to extract and store the essential knowledge of a large set of data in a fixed, typically much smaller set of weights.

By definition, IoT nodes are connected to a network, and very likely to the Internet. However, it can be very desirable to have a local intelligence. Then, processing of raw data can happen on the sensor or in the IoT node instead of requiring communication with the network. The most important reason for such a strategy is the reduction of energy consumption of network communication traffic.

Major companies such as embedded microprocessor manufacturers already realized, that cloud-based services have to be adopted. One of the consequences is the introduction of new embedded microprocessor cores capable of machine learning tasks. In future, the trend of processing data within the cloud will be further shifted back to local on-device processing. This allows more complex sensor solutions, which involve sensor fusion or pattern

recognition. For these applications, local intelligence of the IoT device is needed. Sensor solutions will become truly smart, as they already deliver finalized meaningful data.
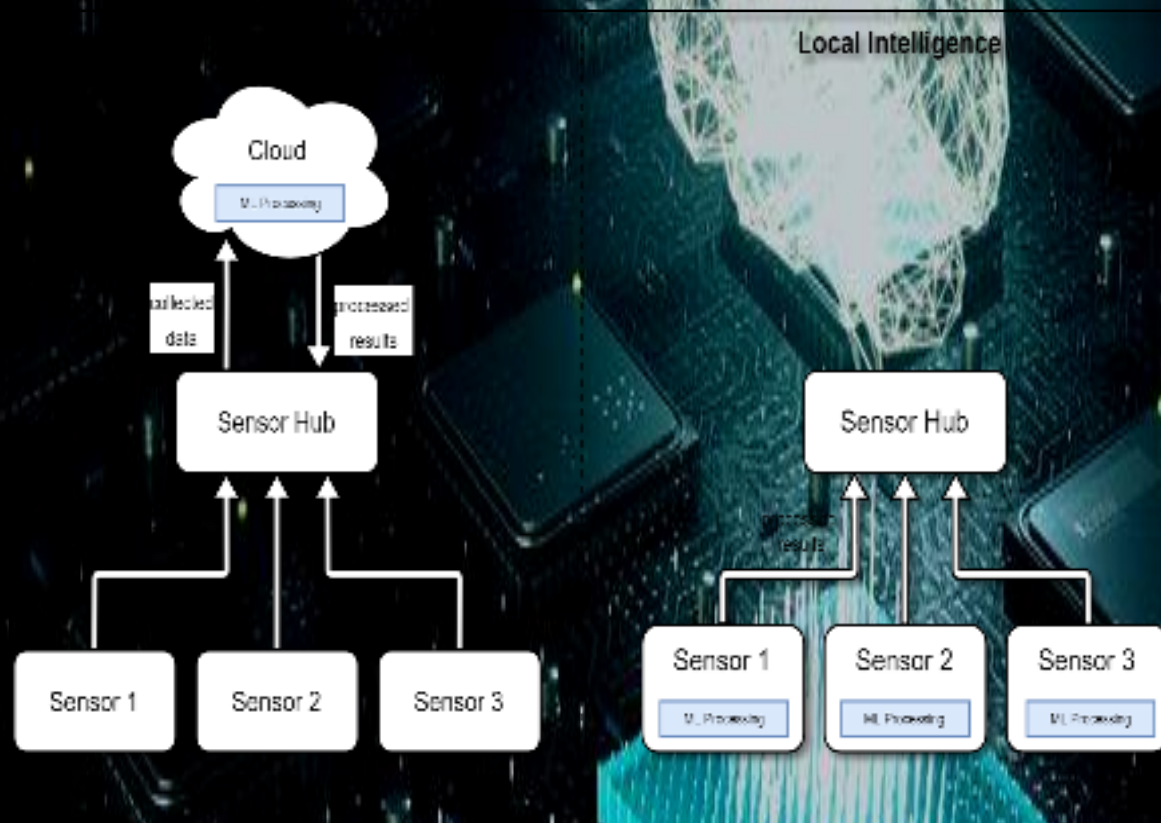
However, computing elaborates AI solutions within an IoT device and requires new solutions which meet power, speed and size constraints. In order to archive this, the trend is shifting to integrated circuits optimized for machine learning. This type of processing is commonly referred to as edge AI.

Rajatabha Chakraborty

2nd Year

E-waste: A Rising Problem

As the use of Technology has increased, electronic goods keep on increasing in our daily life. But on the flipside, comes along with it is the e-waste or electronic waste. Basically any backdated electronic devices like TV, computer, printer, CD, phones, toaster can be considered as electronic waste.

We're leaving in such an era where technology is growing very fast. Many electronic devices like phones, laptops are getting obsolete quickly. Due to the more affordability of the electronic gadgets, people are purchasing new products and old gadgets are getting trashed.

Disposal of this waste is very challenging but necessary as they contain lead, beryllium, cadmium and other toxic chemicals which can seep into the ground to contaminate the ground water, used in our households.

In India, volume of e-waste is increasing 21% annually, among which 82% are personal devices like mobiles, laptops etc. We need proper eco-friendly disposal of this garbage.

- **Recycling**
  Only 1.5% of generated e-waste is recycled in India .The safest way is to give our electronic waste to a e-waste recycler, certified by Basel Action Network (BAN). The recyclers can also refurbish it to make a new product.
- **Sell/Donate**
  We all know, "Your junk can be treasure for another one" . In Indian context, it makes great sense to sell backdated devices instead of trashing them. You can also donate it to any NGO. Any old computer system can run softwares which are used for teaching-learning process. So, we can donate or sell old electronic devices to school, small colleges which is really helpful.

- **Exchange Products**

  While buying a new product, exchange your previous gadget and a you can get discount on your new device.

Today electronics is an important part of our lives. We keep on updating our devices in search of new features and the old devices become a trash. Globally India is the 5th largest producer of e-waste today. So, proper disposal is necessary. Also make sure to format devices before disposing of them in proper manner and remove your personal informations.

Debankur Kundu
1st year

Beauty of Bengal

Bengal is one of the states with most varied features. From the mountains in the north to the sea in the south, there is so many different places to see and many different experiences to be had. Rich in culture and nature both, each part of Bengal is a sight to behold.

SCIENCE
AND
TECHNOLOGY

Big Data, Analytics And We

Data is omnipresent today. IBM projects that every day we generate 2.5 quintillion bytes of data. In relative terms, 90% of this data available in the world has been created in the last two years. Though it is indicative data, they point towards ubiquity of big data and the need for analytical skills and resources because as the data piles up, managing and analyzing the data resources in the most optimal way become more critical.

Analytics is now strongly embedded in to our daily lives. Let us have a look at the real world happenings. As I log on to my Facebook page, the social ads appearing on the screen are based on analyzed information like posts, my friends, pictures etc.

My Twitter posts are analyzed by the analytics to understand both the subjects and sentiment associated with them.

When I pay with my credit card, the card provider checks whether it is a legitimate transaction using some fraud detection model.

Now, let us have a look at the job profiles required for this emerging domain. Analytics is essentially a multidisciplinary exercise in which many different job profiles need to collaborate. Here, I have discussed some of the most important profiles applicable for our students.

The database or data warehouse administrator (DBA) has to be aware of all data available in the firm. Then comes the business experts. They must have extensive business experience and business common sense. They help to build the reliable model. The data scientist, data miner or data analyst does the actual analytics.

This person must have a thorough knowledge about various models and techniques. They have to develop the correct software. A good data scientist must also possess good communication and presentation skills. The scientists should be capable of extracting useful business patterns or mathematical decision models.

Different underlying techniques can be used and they stem from the different disciplines as indicated:
• Statistics (e.g. linear and logistics regression)
• Machine Learning (e.g. decision trees)
• Biology (e.g. neural networks, genetic algorithms, swarm intelligence)
• Kernel Methods (e.g. support vector machines)

It is too cryptic an article to give the readers details about the topics but I hope it will give an idea about the big picture as to what big data and analytics involve.

*Prof. Prabir Banerjee*
Head, ECE Department

Know About International Space Station (ISS)

The International Space Station (ISS) program's greatest accomplishment is as much a human achievement as it is a technological one. An international partnership of space agencies provides and operates the element of the ISS. The International Space Station Program brings together international flight crews, multiple launch vehicles, globally distributed launch operations, training, engineering and development facilities ; communication, networks and the international scientific research community.

Construction , assembly and operation of the International Space Station require the support of facilities on the Earth managed by all of the international partner agencies and countries involved in the program. These include construction facilities , launch support and processing facilities, mission operations support facilities, research and technology development facilities and communication facilities.

The International Space Station (ISS) is a working laboratory orbiting 240 miles above the Earth and is home to an international crew. The station has more than 15,000 cubic feet of honorable volume, which includes more room than a conventional three - bedroom house .

The station provides a laboratory Complex where gravity , a fundamental force on Earth ,is Virtually eliminated for extended periods. The ability to control the variable of gravity in experiments creates unimaginable research possibilities.
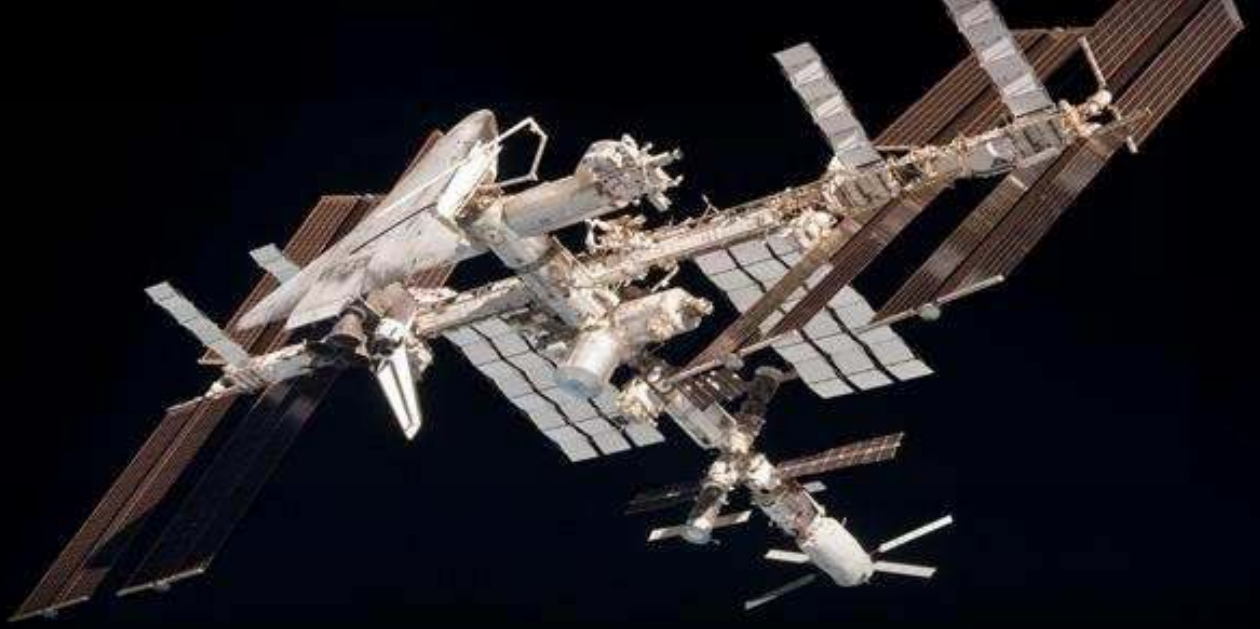
The Station is vital to human exploration. It is where we are learning how to combat the physiological effects of being in space for long periods. The Space Station is our test bed for technologies and our decision - making processes when things go as planned and when they don't . It is important to learn and test these things upto 240 miles. up rather than encountering them 240,000 miles away while on the way to Mars or beyond.

The International Space Station marked its 19th anniversary of continuous human occupation on Nov 2, 2019. Since Expedition 1, which was launched on the Oct 31, 2000 and docked Nov 2, the space station has been visited by 2014 individuals. A total of 168 spacewalks have been conducted in support of space station assembly totaling more than 1,061 hours, or more than 44 days. The space station, including its large solar arrays, spans the area of a U.S. football field, including the end zones, and weighs 9,24, 739 pounds.

Gaurav Kumar
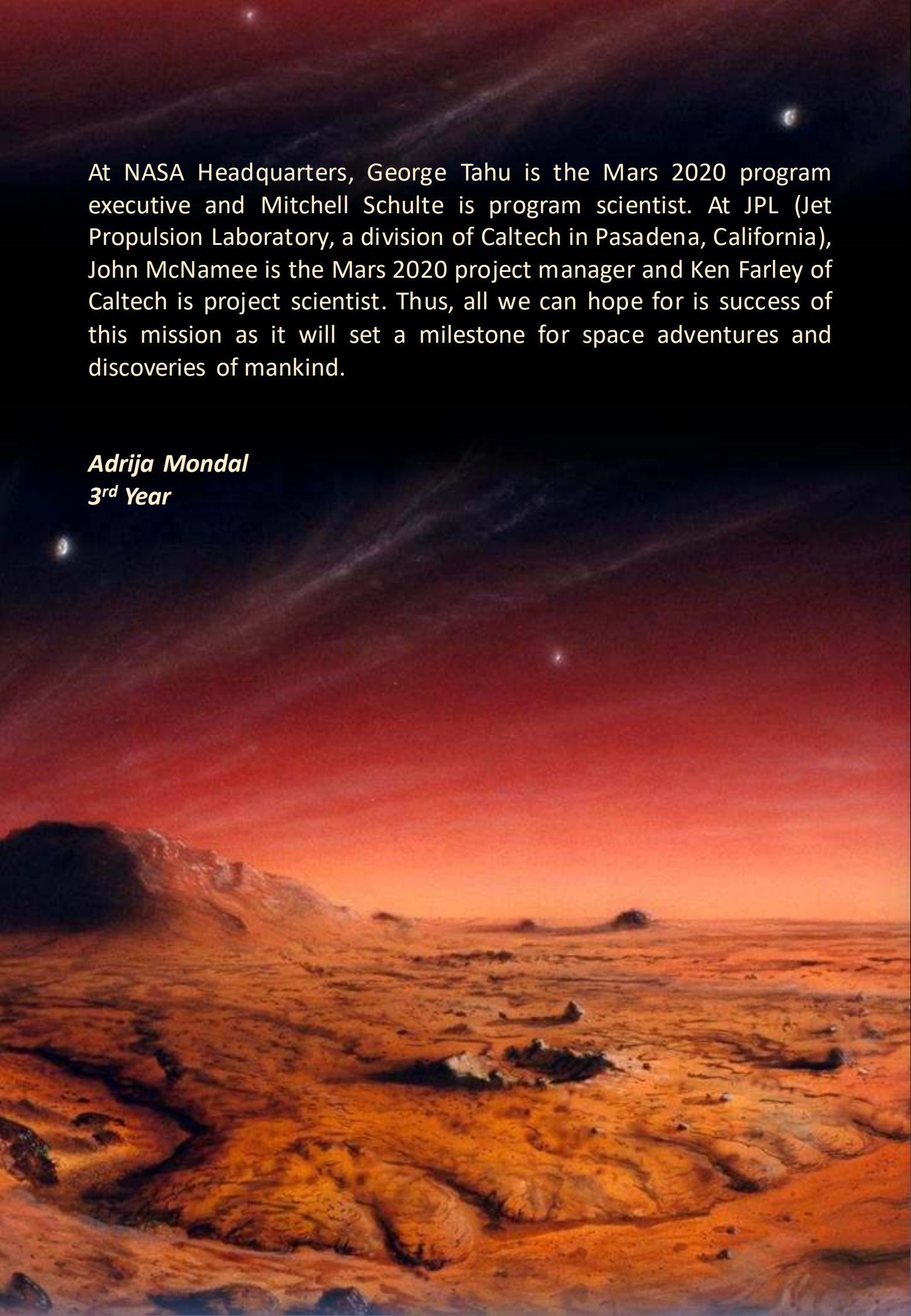*2nd Year*

NASA Mars Mission 2020

Just when you feel 2020 is filled to the brim with negativities like Corona virus outbreak, massive political upheaval in India, predictions of ensuing World War 3 or Australian Bushfire, there is one silver lining on making this new decade worthwhile as NASA has announced its upcoming Mars mission 2020. Maybe we should get ready for a whole set of new information about this Red Planet which mankind has been eyeing for a long time now! Who knows we may find a real E.T or at least trace of any living being that ever existed there!

The key objectives of this mission are (according to NASA headquarters) :
• Understand the geology of Mars and thus interpreting the change it has gone through for the past billions of years
• Assess ancient habitability and seek for trace of ancient life
• Gather rock and soil samples for future study purpose
• Demonstrate technology for future robotic and human exploration

The rover name is *Perseverance* and it is scheduled to launch around **July 17 to Aug 5,2020**. The launch station is Cape Canaveral Air Force Station, Florida. The landing has been roughly calculated to be **Feb 18,2021**. The Rover will land at *Jezero Crater*, Mars. Thus, the mission duration will be 1 Mars Year (around 687 Earth Days).

Multiple amazing, new technologies are being used in this rover that can attract all the tech buffs out there. For eg. Mastcam-Z (an advanced camera system with panoramic and stereoscopic imaging and zooming capability), Supercam, Planetary Instrument for X-ray Lithochemistry (PIXL), Scanning Habitable Environments with Raman & Luminescence for Organics and Chemicals (SHERLOC), Mars Oxygen In-Situ Resource Utilization Experiment (MOXIE), etc.

At NASA Headquarters, George Tahu is the Mars 2020 program executive and Mitchell Schulte is program scientist. At JPL (Jet Propulsion Laboratory, a division of Caltech in Pasadena, California), John McNamee is the Mars 2020 project manager and Ken Farley of Caltech is project scientist. Thus, all we can hope for is success of this mission as it will set a milestone for space adventures and discoveries of mankind.

Adrija Mondal
3rd Year

Emerging Technology In Sports

As technological developments have increased, several new inventions have been made in the field of sports. Different devices have been produced with the emerging technology in the last few years, which has created a great impact in the sports field. Such tools are so reliable that they not only eradicate human errors but also aid in fair game play and avoid any uncertain circumstances that may happen in the middle of the match.

Instant replay is an example of the groundbreaking technology which is used today in sports. Officials can get a straightforward review of the game from any point of view they choose, and make a final decision. Sensors are often used for evaluating whether or not a goal is real. It is often used in situations where the naked eye can't really tell whether or not a ball has gone past the goal line.

Cricket's Hawk-eye technology analyzes sound to figure out whether there was any contact between the bat and the ball before the ball was caught. Hawk-eye is also used in other sports like tennis, badminton, rugby, volleyball to calculate and track the complete trajectory of the ball.

In earlier days, stopwatch was used mainly by the officials manually. The starting of the clock to stopping it, completely depended on the official's reflexes. But nowadays the clock timer automatically starts with the firing of the gun and stops when the player reaches the end point. This is achieved by using different sensors and provides a more accurate result than the hand held stopwatches. This technique was established to eliminate insignificant errors.

The hawk-eye technology was first used at Lord's Cricket Ground on May 21, 2001 by Channel 4 during a test match between England and Pakistan. Majority of the television networks use it mainly to chart the trajectory of balls in flight. In the 2008/2009 winter season, the ICC trialled a referral system where Hawk-Eye was used to refer decisions to the third umpire, if a team disagreed with the judgment of the LBW. The third umpire could see what the ball actually did when it hit the batsman but was unable to look at the trajectory predicted of the ball after it hit the batsman.

The primary use in cricket broadcasting is to evaluate the leg before wicket decisions, where the ball's possible course can be projected forward, through the legs of the batsman and see if it would hit the stumps. Consultation of the third umpire is officially approved in international cricket for traditional slow motion or Hawk-Eye, on the leg before wicket decisions, even though questions remain about its accuracy.

Batsmen often benefit from Hawk-Eye's analysis, as a record of the deliveries a batsman scored from can be taken up. They are often seen as a 2-D silhouetted image of a batsman, and the balls faced by the batsman are colour-coded dots. In post-match analysis, details such as the exact spot where the ball pits or the ball speed from the bowler's hand (to gauge batsman's reaction time) may also help.
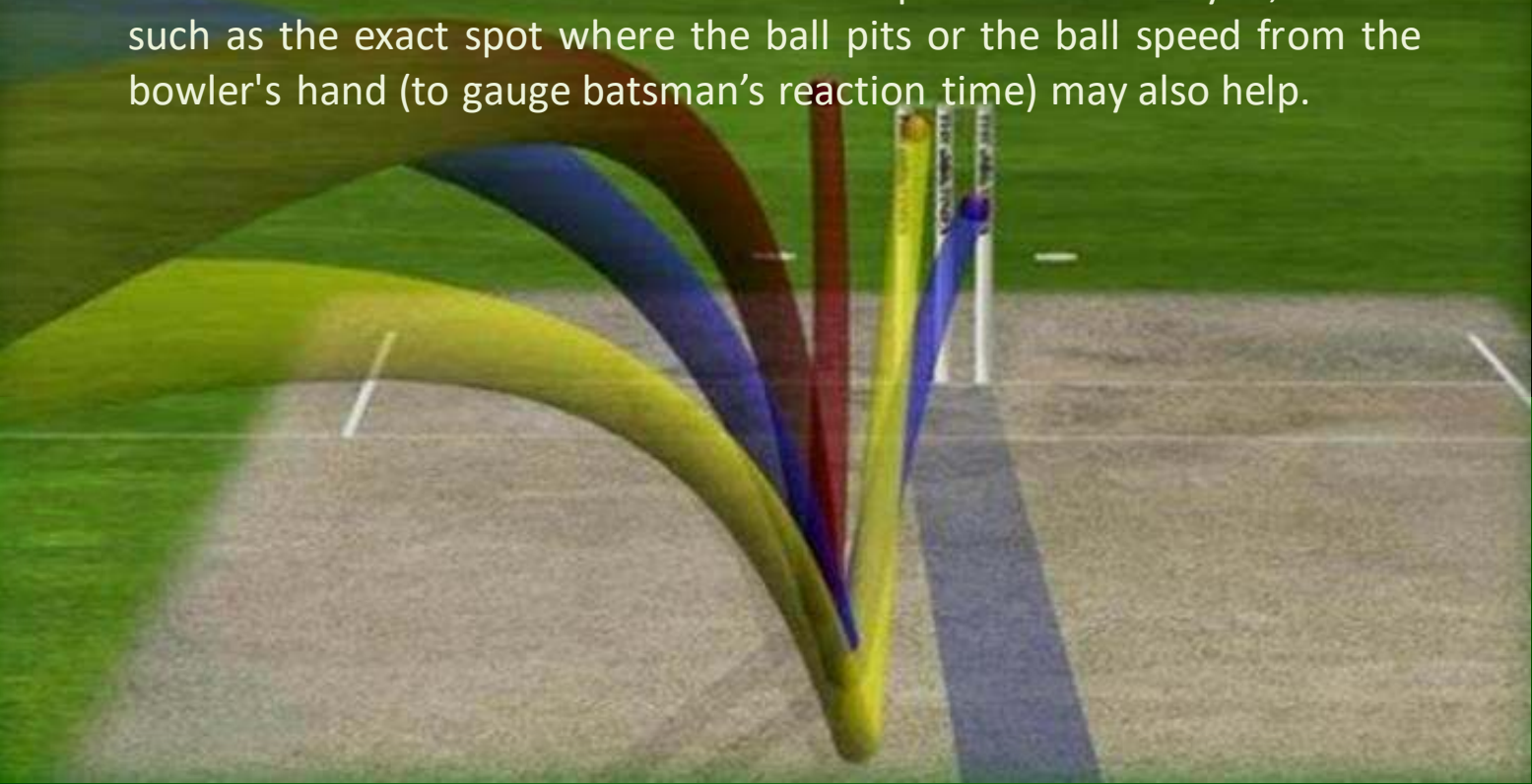
Another important application of science in the field of sports is the Goal-line technology(GLT), in association football, that uses technological aid to determine whether a goal has been scored or not. The objective of GLT is not to replace the role of the officials, but rather, to support them in their decision-making. The GLT provides an indication whether the ball has crossed the line in full and this helps the referee in making his final decision.

The International Football Association Board (IFAB) officially approved, in July 2012, the use of goal line technology, amending the Game Laws to allow (but not require) its use. However, at present, GLT is only used at the highest level of the game because of its cost. Goal-line technology is widely used in the top domestic leagues in Europe and in major international tournaments such as the Men's and Women's FIFA World Cups since 2014.

The Virtual Assistant Referee (VAR) is another form of technology that is supposed to help referees make near-accurate decisions. VAR was first introduced into the FA Cup in 2017. It was immediately criticized by the players and managers alike for soiling "the beautiful game." But while VAR attracts tremendous coverage, we should not forget that it is only the most visible example of digitalisation of football, where data and technology is used to improve performance and decision making.

Subhopriyo Sadhukhan
1st Year

Indian Classical Dance Forms

Bharatanatyam

Originated in the state of Tamil Nadu, it is a major Indian dance form that expresses South Indian religious and spiritual ideas, particularly of Shaivism and Vaishnavism.

Kathakali

A dance from Kerala, it involves a story telling and is distinguished by elaborately coloured makeup, costumes and facemasks that the traditionally male dancers wear.

Kathak

Originally from Rajasthan, the dancers tell various stories from epics and mythologies through their footwork and hand movement and mostly, their facial expressions.

Odissi

Originated from the Hindu temples of Odisha, Odissi is predominantly performed by women and expresses the religious stories and spiritual ideas of Vaishnavism.

Kuchipudi

It originated from a village named Kuchipudi in Andhra Pradesh and incorporates a dance-drama performance with its roots in ancient Hindu text of Natya Shastra.

Manipuri

From Manipur, it is particularly known for its Vaishnavism themes and exquisite performances of love inspired dance drama of Radha-Krishna called Raslila.

DISCOVERING THE WRITER IN YOU

PROSE

My First Six Months In College

Coming out of school, and getting into college has been the biggest transition in my life. Throughout my life, I've heard that college life is very different from the school life we grow up in. No more discipline, no more rules. Somewhat exciting, yet somewhat tiring. There are so many things to expect – friendships, hardships, failure, excitement, but most importantly, good memories

The first two days of orientation at my college was as nerve wracking as it sounds like. Starting from making few preliminary friends, Moses sir running through all the rules and regulations to watching our seniors talk about how they have accomplished in certain projects, it was a package deal of memories and inspirations.

With the blink of an eye from first day in college, here I am writing this article on my experience of first six months in college. It has been nothing but the most memorable time of my life. From my first performance on teacher's day, my first internal assessment, my first Ghunghroo auditions to winning doubles badminton for girls in Fresher's; it was one roller coaster journey of emotions and great memories.

I had an amazing time being a part of the Heritage Family for the past six months, and I would like to thank all my professors, seniors and most importantly my five best friends, without whom I have no idea how college life would feel like. My best friends are the best thing college has ever gifted me and I cherish all the memorable moments we have spent together in college till date.

You can make life dance to your tunes inside the college gates, but at the other side of the gate, life sets its tunes and makes you dance. So, live each moment of your college life.

Shreyashee Roy
1st year

Earphones

These days earphones can be found all around us, be it at a bus, the college campus, a metro station, the footpath, everywhere. They look so stylish when they hang around our neck, firmly engaging our ears and most of our mind into music, voice-chats etc. Soon, we get carried away into a world of our own and before we know it, we find ourselves in deep trouble.

So you may ask, why exactly am I saying all these things... why earphones, all of a sudden? Well, let me give you a story. One evening I was on my way home. It was time for most of the offices to close for the day and the streets were flooded with cars. All of a sudden, a man with earphones plugged on, decided to cross the road. He didn't notice that the pedestrian signal was still red. He also didn't notice a fully loaded truck speeding towards him. Fortunately, the driver somehow stopped the vehicle, just in time to save our 'Hero'. But our 'Hero', instead of showing gratitude, started to curse the truck-driver with some of the worst swear words.

Every time I board a bus, I find myself in the midst of zombies, unable to interact, unable to hear or see, stuck almost helplessly inside their phones. These dandy colourful earphones or more precisely, wired earplugs can even make us deaf. Listening to high volume music can also give us headaches, Noise-Induced-Hearing-Loss (NIHL) and can make us dizzy sometimes.

Some of us utilise earphones to avoid conversations. Some use them just for the sake of style and fashion. But even if the mode of use is different, the consequences are still the same. Very few people are foolish enough to use earphones even while driving.

It's perhaps best if the use of earphones is banned on the roads.

Sagnik Mukherjee

1st year

Durga Puja Celebration in a Foreign Land: A Travel Experience in Greece

(Ruins of Acropolis, Athens)

August 2019, and it was time for us to plan a Durga Puja holiday trip in October 2019. Exotic destinations, affordable price, lots of natural beauty to enjoy and finally a good travel agent to take care of us during the trip had been our main criteria to choose from many options available through the net.

I had one destination in mind which was Greece.

In 2018, we could not make it and had to be satisfied with a trip to Spain only as Greece tour was not operational at that point of time.

The desire was very strong this time and we could finally locate one tour operator from Mumbai offering a group tour to Greece covering 3 locations namely Athens, Mykonos and Santorini.

A little bit hesitant initially with a rather unknown tour operator, we finally recovered from the "fear of the unknown" and went ahead with the booking.

Situated on the southern tip of the Balkan Peninsula, Greece is located at the crossroads of Europe, Asia, and Africa. Greece is famous for its scenic beauty and beaches including black sand beach in Santorini created by volcanic eruptions years back.

Excited as always while on a trip abroad, me and my wife boarded an Indigo flight to Mumbai on 1st October late evening and landed there midnight. After spending about an hour with my elder son, his wife and my younger son who was in Mumbai on a holiday at a coffee shop, we were dropped off to the international terminal to take an Etihad Airlines flight to Athens via Abu Dhabi.

It was 2nd October 2019 early morning when we boarded the aircraft. Our travel group members were mostly from Gujarat and Mumbai Pune area. So, after reaching the Hotel in Athens on 2nd October evening and meeting and talking to them for the first time, we suddenly realized that Navratri is also celebrated all over India during Durga Puja till Dussehra Most of them were missing the celebrations back home.

Next morning, after a hectic air travel, we had a leisurely breakfast and went for the city tour of Athens and visited all the historic monuments and architecture.

Next morning, on the 4th of October, we were told to get up at 4 am to leave for an island tour to explore the islands in the beautiful Saronic Gulf in the Mediterranean Sea. It turned out to be a wonderful cruise through the gulf waters with lot of entertainment on board.

As the sun slowly rose in the horizon, we suddenly realized that it was the "Sashthi" tithi and the beginning of Durga Puja. Far away from the celebrations in Kolkata, we were in Greece sailing through the Gulf waters.

As per the itinerary, we landed at the Hydra island where the only mode of internal transportation are mules. From there, we set sail to Aegina island, a slightly bigger area and we boarded a tourist bus for sightseeing after landing there.

The beautiful country roads led us to the opening of a church compound with a typical Greek architecture.

The Church and the candle bed

As we entered the prayer hall, there was a statue of virgin Mary. "Is she the eternal mother?" I asked to myself. "If so, then let me worship Goddess Durga in this form". As I lit a votive candle and offered prayers as my anjali (offerings) on" Sashthi tithi" to Mother Mary in a Greek church, her blessings went for all my near and dear ones across all continents.

(p.s : Seeing this photo on my FB, one person asked "was there no temple in Greece?" . I believe that one person will always be there.)

 Prof. Siladitya Sen

Associate Professor (ECE)

Adieu

Where did four years just rush by? How is the day of Orientation still clearly carved into my mind? Why do I still remember gazing in awe at every passing building and every passing student? When did we become the most senior batch from dewy-eyed freshers? Looking back upon these golden years, I realized HITK has given me way more than I had bargained for at the end of my school life. The bonds formed would be pretty difficult to tear away from (at least for a significant number of years I hope). We have learned a whole lot of things which might be academically related or not. To be honest, I fell in love. I fell in love with those big buildings, the beautifully mowed lawns, the corner of the tree where we formed circles of friendship, the fresh scent of laboratories in the morning and the people. College has unexpectedly kept us so active throughout that we never had time to actually enjoy the aspects or how our education progressed along with our maturity. Yes, this was a part of my life worth reminiscing upon.

Now standing on the brink of an entirely different chapter of my life, I cannot help but feel scared. There was always a plan before, now it is like I am unsure as to how the next saga will initiate. Nervous? Of course, I am. We all are. However, we all have to let go of all good things at some point of time. Spreading wings and flying into the land of the unknown, I really do not want this to end. We are in anticipation of how our lives are going to turn out right after this, because trust me, each one of us is terribly afraid to leave this comfort zone. So, thank you dear HITK for everything. We hope we can live up to your name.

Saheli Mukherjee
 4th year

My First Try At Cooking

I've always been a fan of Chinese cuisine, especially noodles. Being a bit interested in cooking, one day I decided to try my hands at preparing a dish I love so much. After some googling, videos and tips from my mother, I settled for a fairly basic version of gravy noodles. First vegetables had to be prepared and I chose carrots, bell peppers and cabbage. Chopping those vegetables was a fairly new experience for me and after finishing, looking at those thinly sliced carrots, I felt a sense of accomplishment.

Now the actual cooking process started and for such a tasteful dish, it was quite simple. First, I set some vegetable bits to boil in order to prepare the vegetable stock, while boiling the noodles alongside. After the stock was ready, I strained out the bits and mixed corn flour with it. Keeping it aside, I took out a wok, put some oil in it and then put the veggies, carrots first, cabbage last. Sautéing them for 2-3 mins, I put the noodles in and started stirring. Things were looking great at this point, so I decided to add the stock in order to prepare the gravy. Putting the stock in and after almost forgetting to add salt and sugar, I started stirring while on low flame, my mind filled with both anticipation and a bit of worry of how it'll finally turn out. After about ten mins on low flame, I turned off the gas, poured myself a portion to taste the dish.

Taking my first bite, I was surprised with how well it tasted and more so that such a dish was so simple to make. It was also received well by my family. Being one of my first cooking attempts, the success increased my interests in cooking and spurred me on to try making more dishes in the future.

Soumyadeep Bhattacharya
2nd Year

POETRY

Freedom

Which renaissance are we waiting for?
Which reformation do we await?
Which era will we wait till?
To get the message straight.

Some died for Arts' sake,
Some for Reality sake,
I ask! who gave them the right,
To put future at stake!

Confined us to artefacts,
Constrained us to showcases,
Conceded us to four walls,
Compressed were we to fit places.

Sustaining the identity.....
seemed a far cry
Shhh ! was the word,
That mommy made me try.

I tried it for you!
I tried it for few!
I tried it in innocence!
Who knew, one has to pay to due.

That on onomatopoeia of my life,
Was the biggest sacrifice,
It echoes in my heart...

That rests within a cage.
The cage that streams blood,
The cage which suppress the thud.

For once in life,
My life seems a curse,
For once in life,
I want to submerge.

Submerge in vitality,
No living in futility,
Done away with atrocity,
Come, let's move on to ferocity.

Gaurav Kumar
2nd year

Inner Love

There was that crammed place,

She crawled around looking for her favorite face.

Suddenly she smiled and took a pause,

There her mother was.

From numbers to alphabets,

And colours to shapes,

Her mother taught her all those days

Standing by her in every phase.

School was over and was time to move on,

Away from her mother she was now gone.

Her mother had taught her to be strong;

But how could she live without her for so long.

There were those days when life got a little messed,

Moments when she needed some rest.

A call from her mother seemed to make everything clear

 "Life is hard but there is no need to fear."

After living away from her mom,

She understood what she did wrong.

Everything was changed that day,

Realising her mother's presence that none can pay.

Riya Kundu
1st year

Oh! My Calcutta

Not just the city of Joy,
But a city with a soul, a heart
and a bit of laziness.
A city that is more relaxed
than the never sleeping Bombay,
A city that has it's own colonial history,
A city with a rich cultural and literary tradition,
A city with a love of literature,
fried street food and mostly Sweets,
A city where Mishti Doi and Rasgulla is a must in any occasion,
A city that remains incomplete
without the poems, novels and short stories of Tagore.

From the interesting artefacts, historical relics, paintings
and prints in Victoria Memorial
To the stunning architecture of
Writer's Building, St.Paul's Cathedral, Indian Museum and many more
it shows how strongly it was
associated with the British rule and East India Company.
From the Bengali wedding rituals and various art forms
To the strong educational institutions
it is no less than others.

The smell of old books
in the nostalgic College Street,
The adda of college students
in the Indian Coffee House,
The spirituality of the Dakhineswar Kali Temple
and the purest Belur Math,
The peaceful, calm and smiling faces
in Maidan and Princep-Ghat,
The Khidirpur Tram Depot
and the iconic Howrah Bridge and many more.
My Old Calcutta still remains unexplored
That's the identity of my city,
my birthplace very close to me and my heart.

Come,
Let's walk the streets of Calcutta together,
Let's explore the unexplored beauty of this city,
Let's feel the essence of this city,
As, it is not just the city of Joy
Not just the city of Joy.

Shreeparna Debnath

3rd year

Shogun Banik (1st Year)

Akash Roy (2019 pass out)

Art

Photography

Rahit Saha (3rd Year)

Shreeparna Debnath (3rd Year)

Akash Roy (2019 pass out)

CONTEMPLATIVE CONTEMPORARY

NOBLE 2019: India Shines Again

Eight Indians have won the Noble prize so far - Rabindranath Tagore (1913), C.V.Raman (1930), Har Gobind Khorana (1968), Mother Teresa (1979), Subrahmanyan Chandrasekhar (1983), Amartya Sen (1998), Venki Ramakrishnan (2009) and Kailash Satyarthi (2014). On 10th December 2019, the Nobel Prize in Economics has been awarded to three laureates - Indian-origin Abhijit Banerjee, his wife Esther Duflo, and Michael Kremer for their "experiment based approach to alleviating global poverty" which revolved around taking major poverty related issues and then breaking them down into smaller, more manageable questions, which can be addressed properly. Dr. Abhijit Banerjee is the second Indian to win the Noble Prize in economics, after Amartya Sen.

This was a proud moment for India as Dr. Banerjee had studied at the University of Calcutta, Jawaharlal Nehru University, and Harvard University, where he got his PhD in 1988. Currently, he is Ford Foundation International professor of Economics at the MIT. He, along with Esther Duflo, founded the "Abdul Latif Jameel Poverty Action Lab (J-PAL)"- a research centre to reduce poverty by ensuring policy is formed by scientific evidence. According to the Swedish Academy, "In just two decades, their new experiment-based approach has transformed development economics, which is now a flourishing field of research".

Pradeepto Addya
3rd Year

CORONAVIRUS : Rumours & Reality

Are you going vegetarian these days in fear of getting affected by Coronavirus? Are you shutting all your windows thinking that Corona is in the air? Mute all the fake updates available on social media and let yourself get the real facts about the most popular topic all over the world in recent days.

What is Coronavirus?

As per the definition given by WHO, Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). A novel Coronavirus (nCoV) is a new strain that has not been previously identified in humans.

How Coronavirus is spread & What are the symptoms?

The virus is thought to spread mainly from person-to-person through respiratory droplets produced when an infected person coughs or sneezes. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. It may be possible that a person can get this virus by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes, but this is not thought to be the main way the virus spreads.

The symptoms usually start from a sore throat. The virus then blends into a nasal fluid that enters the trachea and then the lungs, causing pneumonia. This takes about 5-6 days further. With pneumonia comes high fever and difficulty in breathing.

Myths & facts

1. Mass population is running panic-stricken nowadays thinking that they will die if they're diagnosed with Coronavirus. But the reality is that Coronavirus kills only a small percentage of the people affected by this virus (specially old aged people with low immunity are killed due to Coronavirus).

2. Coronavirus cannot sustain heat. Chicken won't give you corona if it's properly cooked.

3. You don't need to stress out if N95 mask goes out of stock at your nearby pharmacy. Washing hands properly is the best preventive measure.

4. Locking yourself inside a closed room won't help to prevent corona infections rather going out will do. Recent studies says if the air of a room is replaced by fresh air at least ten times per hour then probability of getting affected by a airborne disease is almost negligible. For this, you need open space or rooms with proper air circulation.

Do's & Don'ts

You can prevent Coronavirus and many other contagious diseases by maintaining a proper hygiene. Few good practices can gift you a healthy life in every aspect.

1. Wash your hands properly with soap and water at intervals. Hand sanitizer with more than 60% alcohol content will also do.

2. Cover your mouth with your elbow instead of palm while sneezing. Your palm comes in contact with other objects and people way more than your elbow do. Sneezing into your palm may spread any virus much rapidly.

3. Avoid unnecessary contact with metal surfaces as this virus can survive on metals for 12 hours.

4. Maintain at least 3 feet distance from anyone coughing or sneezing to avoid contracting droplets that may carry the virus. This virus cannot travel far, so you will be safe if you maintain distance with people having a common cold.

5. Avoid touching eyes, nose and mouth without washing.

How to detect and cure Coronavirus?

The incubation period ranges from 1-14 days, commonly 5 days. People showing symptoms like dry cough, fever and shortness in breathing should immediately see a doctor. There are no vaccines or no specific medicines to treat Coronavirus. However, hospitalization and care is very important for recovery. But we all know that precaution is better than cure. So stay protected. Spread awareness among your friends and family. Please verify before forwarding any message about Coronavirus over social media and ensure that it doesn't contain any misinformation. Keep in mind that our united effort can prevent this virus to spread much. Stay safe, stay healthy.

Debadrita Das
3rd Year

Redefining Beauty

The associativity of beauty with ornaments or skin pigment is a bogus, and a myth which is descending down the discourse of societal belief.

The ritual of society and civilizations have kept the parameters of beauty very much constrained to the blueness of eye, the fairness of skin, the silkiness of long hair and what not! And while we keep concentrating on the superficial aspects, beauty keeps getting unfathomable.

Jamaica's Toni – Ann Singh, Miss World 2019 and South Africa's Zozibini Tunzi, Miss Universe 2019 are perfect examples which portray that beauty is eternal and the skin color is just not worthy enough to act as a beauty measuring parameter. Elizabeth Barrett Browning says,

"If thou must love me, let it be for nought

Except for love's sake only. Do not say,

"I love her for her smile ... her look ... her way

Of speaking gently, for a trick of thought

That falls in well with mine, and certes brought

A sense of pleasant ease on such a day"—

For these things in themselves, Beloved, may

Be changed, or change for thee—and love, so wrought."

One very significant mistake that we do is using the term 'black-beauty'. Do we ever hear terms like 'white-beauty'? No, because white gets automatically accepted in our subconscious while black needs some force of philosophy and consent to be widely accepted. And if we keep using such terms, we are making a right more in the wrong way.

Beauty lies in character and the eloquence of soul. The weight of beauty is not so feathery that it would die at some part of time like pretty faces grow wrinkles with age. Beauty lies within the grip of pen, it lies in the potential of tongue and behind the whatsoever colored eyes.

Beauty hides itself under any shade of skin color, because skin color is a geographical factor while beauty is universally attractive.

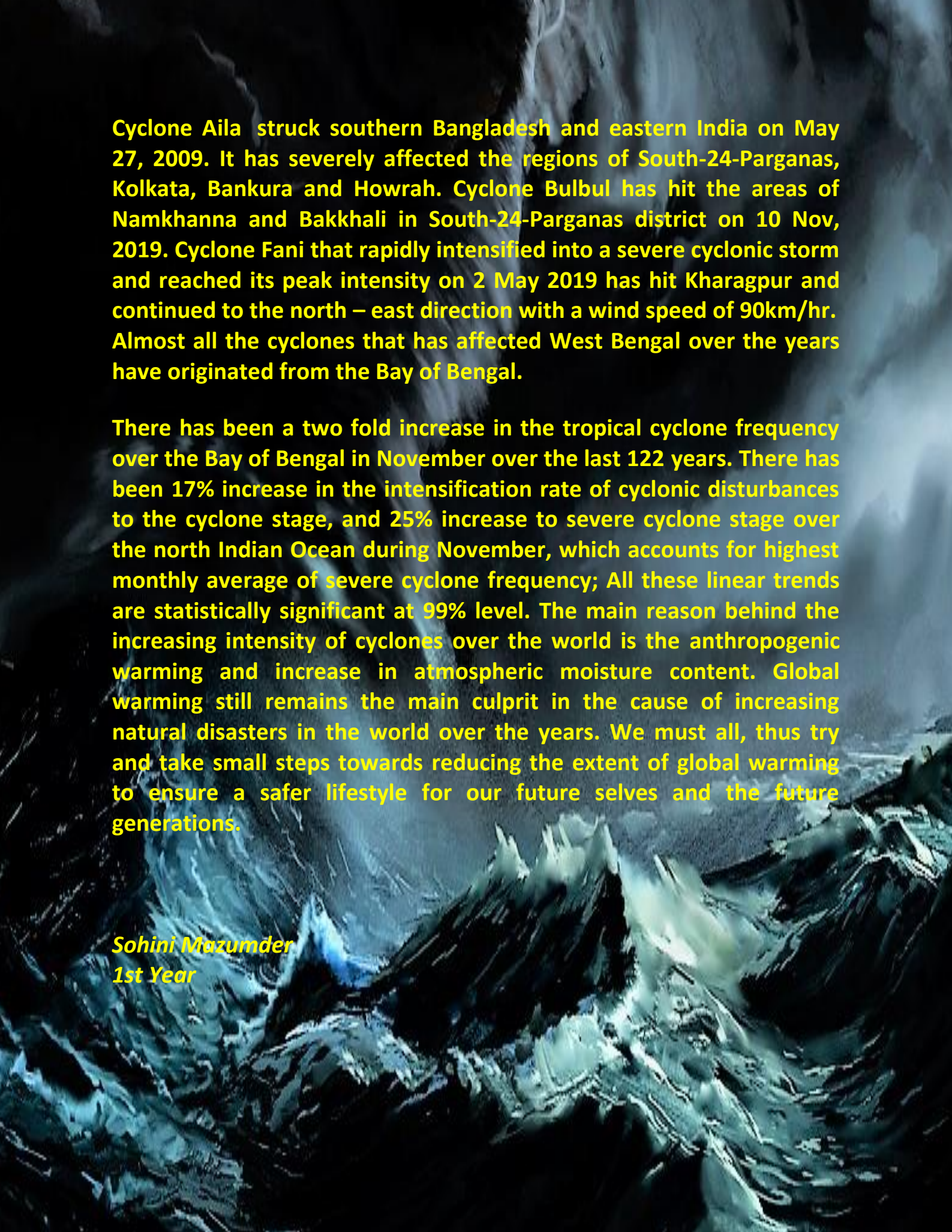Pretty faces die, beauty doesn't.

Toni-Ann Singh, Miss World 2019

Zozibini Tunzi, Miss Universe 2019

Md. Ashhar Uddin
2nd Year

Trends Of Cyclone in West Bengal

The trends of cyclone in West Bengal has never been a constant over few recent years. Normally, Norwesters arise in the Bengali month of Baisakh, amidst hot summer. They are accompanied by thunderstorm and heavy rain, although it is not a cyclone. Norwesters are useful for pre-Kharif crops. A cyclone is an intense vortex or a whirl in the atmosphere, characterized by high winds rotating about a calm center of low atmospheric pressure in anticlockwise direction in northern hemisphere and in clockwise direction in southern hemisphere. This center moves onwards and pressure increases outwards. On an average, about 5–6 tropical cyclones (maximum sustained wind of 34 knots or more) form in the Bay of Bengal every year, of which 2–3 reach severe stage (maximum sustained wind of 48 knots or more). Over the years, the patterns of cyclones in the Bay of Bengal show that the intensity of cyclones is on the rise.

From 1970-2000, 6 tropical cyclones have hit West Bengal while from 2001-2019 only, the number has risen to 10. The coastal stretch of West Bengal is highly vulnerable to cyclone, the districts of 24-Paraganas has suffered most severely. West Bengal has two Cyclone seasons – pre-monsoon and post-monsoon cyclone during April-May and Nov-Dec respectively. Pashim Medinipur, Purba Medinipur, South 24 Parganas, North 24 Parganas, Howrah, Hooghly, part of Nadia, Burdwan and Bankura are located in very high damage risk zone (v=50m/s) with respect to Cyclone; whereas a major part of Nadia, Burdwan, Bankura, Murshidabad, Malda, Uttar and Dakshin Dinajpur, Jalpaiguri, Coch Behar, Darjeeling, part of Purulia encounter with high damage risk zone(v=47m/s). Major portion of Purulia falls under moderate damage risk zone(v=29m/s) with respect to cyclone. Number of cyclones crossing West Bengal during 1891-2000 in 24-Parganas(North & South) is 35 and Midnapur(East & West) is 34.

Cyclone Aila struck southern Bangladesh and eastern India on May 27, 2009. It has severely affected the regions of South-24-Parganas, Kolkata, Bankura and Howrah. Cyclone Bulbul has hit the areas of Namkhanna and Bakkhali in South-24-Parganas district on 10 Nov, 2019. Cyclone Fani that rapidly intensified into a severe cyclonic storm and reached its peak intensity on 2 May 2019 has hit Kharagpur and continued to the north – east direction with a wind speed of 90km/hr. Almost all the cyclones that has affected West Bengal over the years have originated from the Bay of Bengal.

There has been a two fold increase in the tropical cyclone frequency over the Bay of Bengal in November over the last 122 years. There has been 17% increase in the intensification rate of cyclonic disturbances to the cyclone stage, and 25% increase to severe cyclone stage over the north Indian Ocean during November, which accounts for highest monthly average of severe cyclone frequency; All these linear trends are statistically significant at 99% level. The main reason behind the increasing intensity of cyclones over the world is the anthropogenic warming and increase in atmospheric moisture content. Global warming still remains the main culprit in the cause of increasing natural disasters in the world over the years. We must all, thus try and take small steps towards reducing the extent of global warming to ensure a safer lifestyle for our future selves and the future generations.

Sohini Mazumder
1st Year

Bhujangasana

Dhanurasana

Virabhadrasana

Yoga

Vriksasana

Padmasana

Chakrasana

SPORTI-FY

The Renaissance Man Takes Over

A small Bengali boy took the field on a cold January morning in 1992. When he walked in, few would have known that this boy would start the Renaissance movement in Indian Cricket. But now it is all known what the small boy achieved. Sourav Ganguly aka **The God of Offside** started a revolution when he became the captain of the Indian ODI team. The aggressive style of captaincy and the in-your-face attitude he had was highly contagious. These qualities handed India the major change they needed and now he comes back to the Indian Cricket as the BCCI president.

Sourav Ganguly was unanimously elected as the President of the Board of Control for Cricket in India (BCCI). He became the 32nd man to head BCCI. Mr. Ganguly was the only candidate who filed his nomination for the President's post.

Along with Mr. Ganguly as President, the following were elected as the office bearers of the BCCI.

1.Jay Shah: Secretary

2.Arun Singh Dhumal: Treasurer

3.Mahim Verma : Vice-President

4.Jayesh George: Joint Secretary

As soon as he became the BCCI head, he brought a change in India's thoughts. He allowed India to host its first Day Night Test and even focused primarily on away tours.

What we currently see is that he already has begun a new revolution as BCCI head and what we hope is that his Midas touch as a captain would even work when he is the BCCI president and if it does many exciting things are in store for us in near future.

Uditanshu Bhattacharya

3rd Year

Bayern And Hoffenhiem Protests

If you turned on your television sets for the last 10 minutes of the Bundesliga game between Bayern Munich and Hoffenhiem on 29th February 2020, you might have been dumbfounded seeing players of both the teams passing to each other and playing keepy-uppies in the center circle for the rest of the game. And you would be well within your rights to be, as you would be oblivious to everything that happened for the 20 minutes prior to that.

It all started when after the 75th minute, with Bayern Munich being 6-0 up, a vociferous section of Bayern fans started unfurling banners and chants disrespecting the principal investor in Hoffenhiem, Dietmar Hopp. This led to the referee taking both teams off the pitch, in compliance with the rules relating to fan disturbances. This led to Bayern sporting director Hasan Salihamidzic, board member Oliver Kahn and some players going over to their own fans and angrily asking them to take the banners off. In the tunnel, a lot of talk was going on between the players and staff and board members of both clubs. And what the talks were about would soon be revealed to the public as when the match started, the players, in a show of solidarity to Hopp, showed no intent of playing competitively.

The Bundesliga clubs have a 50+1 rule of ownership, i.e. fans of the club will have to own 50% of and one other share of the club. However, Hopp owns 96% of the club, circumventing the rules. Fans of other clubs do not like this and thus chant against Hopp and the German football board during matches. The reaction to these chantings in the Bayern game was the first retaliatory step taken by the powers to be against that.

Debatra Chatterjee
3rd Year

India's Chance In Tokyo Olympics 2020

Every edition of the Olympic games sees increased expectation and participation by India. Tokyo 2020 looks set to continue that trend going upwards. After the debacle of 2016 Rio Olympics, it is expected that India will bounce back sharply. If the Tokyo Olympics goes well for India, India can win 9 medals which will be the best by far for India. Out of 15-20 events, India has high chances of winning medals in shooting, wrestling, badminton, boxing, hockey and table tennis.

Neeraj Chopra stands a strong chance of winning a medal in javelin.He is a former world junior javelin and was the first Indian to win a gold at Asian Games 2018. From wrestling there is always a high expectations. Bajrang Punia and Vinesh Phogat are strong contenders in their respective categories and there is a chance that both will win a medal. Sakshi Malik holds a hope of success if she qualifies for Olympics. Sports like archery can spring surprise. Manika Batra holds the key to India's success in table tennis at Olympics if she qualifies in the Olympic Qualifiers.

Shooting is one sport that is strength of India. Likes of Saurabh Chaudhary, Manu Bhaker, Apurvi Chandela being firm favourites to bag medals. There's a high chance India can have 2-5 medals from this sport.And from rest events like badminton(PV Sindhu, Saina Nehwal, K Srikanth), boxing(Mary Kom), tennis, hockey, we can expect a combined 0-2 medals from these events. So let's keep our fingers crossed for the Tokyo Olympics from 24th July 2020 to 9th August 2020.

Vinayak Gupta
1st Year

Doping In Sports

Steroids do not guarantee you're going to have success. I think a lot of people think that they will, but they don't.

- Tony Gwynn

Unfortunately, the world of sports is very often related with the word "doping", since respectful and famous athletes have been tested positive for banned pills and substances. The use of natural or synthetic sources allows you to achieve better results but consuming drugs cause a temporary increase in endocrine and nervous system activity that can even lead to the death of a person.

Historically, the term "doping" is etymologically derived from the Dutch word *dop*, that describes strong alcoholic drink. Due to advancement of technology, many athletes use forbidden substances, which in turn provide extra energy to the player. That extra energy boosts strength beyond the normal body strength. Doping can also affect the mental power resulting in aggression, thirst for victory and an increased appetite to achieve goals.

Undoubtedly, any competition brings out inevitable hunger to win. Thus, the competitors always try to outdo each other and win. Winning at all cost attitude often leads players to dope.

According to the recent history of sports, drugs used for doping contains testosterone. It increases physical strength, muscle volume and endurance, strength and burns fat and also help to improve oxygen consumption in the blood. The most common

types of stimulants are caffeine, ephedrine etc. Caffeine can also cause slight nausea, dizziness, increase headache or stomach ache. Ephedrine tablets can damage respiratory tract. It also increases breathing problems due to asthma and body weight that cannot be controlled.

In this century, a new doping method has been introduced whose name is gene doping. Gene doping is an attempt to modify the elements of the gene artificially. Here the performance of athletes is enhanced by inserting a particular gene or component of a gene into the body or by stimulating a particular gene in the body through drugs. However, there has been no reported cases of gene doping as of now.

The New York Times said that 1 in 5 athletes in India have been dope tested positive since 2009. India features among the top 10 nations with regards to doping. The World Anti-Doping Agency (WADA) banned Russia from major sporting events for four years in December 2019. The global issue of doping in sports should be solved by applying various methods including effective government cooperation and medical support. Besides these, Drug Pricing Regulator NPPA and National Anti-Doping Agency (NADA) have launched an app 'Pharma Jan Samadhan' to help athletes understand medicines that could contain prohibited substances in sports. Strict rules, increased period of suspension and better awareness about the ethics of sports might help reduce doping. Above all sports should be played in the spirit of sports.

Subhadip Dandapat
3rd Year

DEPARTMENTAL ACTIVITIES

IEEE EDS Center Of Excellence

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Industrial Tours

Poster Presentation Session

Services Towards Society

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