

# INSPIRE

Vol - 5

Issue - 1

Department of Information Science & Engineering

DEC-2019

## VISION AND MISSION OF THE INSTITUTE

### Vision

To be one of the premier Institutes of Engineering and Management Education in the country

### Mission

- To provide Engineering and Management Education that meets the needs of human resources in the country
- To develop leadership qualities, team spirit and concern for environment in students

### Objectives

- To achieve educational goals as stated in the vision through the mission statements which depicts the distinctive characteristics of the Institution
- To make teaching - learning process an enjoyable pursuit for the students and teachers

## VISION AND MISSION OF THE DEPARTMENT

### Vision

To be a premier department of learning in Information Science and Engineering in the State of Karnataka, moulding students into professional Engineers

### Mission

- Provide teaching-learning process that develops core competencies in Information Science and Engineering to meet the needs of the industry and higher education
- Create an environment for innovative thinking and self-learning to address the challenges of changing technology
- Provide an environment to build team-spirit and leadership qualities to succeed in professional career
- Empathize with the societal needs and environmental concerns in Information Science and Engineering practices

## Dr. Alex Dehgan



Dr. Alex Dehgan is the CEO and co-founder of Conservation X Labs. He holds a Ph.D and M.Sc. from The University of Chicago's Committee on Evolutionary Biology. He founded the Conservation Lab X in 2015 with a mission to end human-induced extinction. Conservation X Labs applies **technology, entrepreneurship, and open innovation** to source, develop, and scale critical solutions to the underlying drivers of human-induced extinction. The ChimpFace is a facial recognition software developed by Conservation X Labs to prevent chimpanzee trafficking which takes place on the internet. The research team of Conservation Lab X have developed an inexpensive handheld DNA Barcode Scanner which can be used by park rangers, custom officers and law enforcement departments which helps them to indicate the genetic identity of protected wood, disguised species such as ivory and rhino horns. Look inside for more details about the work in Conservation X Labs. Happy reading!



Vidyāmruthamashnutha

*B. N. M. Institute of Technology*

(Approved by AICTE, Affiliated to VTU, Accredited as grade A Institution by NAAC)

All UG branches - CSE, ECE, EEE, ISE & Mech.E Accredited by NBA for academic years 2018-19 to 2020-21 & valid upto 30.06.2021)

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## Message from the Editorial Team

Greetings from the editorial team! It gives us immense joy and satisfaction to present our department newsletter “INSPIRE”. We have tried to bring creativity from Science. Human destruction of Nature is rapidly eroding the world's capacity to provide food, water and security to billions of people, according to the most comprehensive biodiversity study in more than a decade. Keeping this in mind, we bring you this edition of the newsletter with the theme – “Technology for Nature Conservation”. We hope, as an engineer you could be the part of the change that technology can bring to this world and actively participate in the conservation of Nature. We hope you enjoy reading this issue as much as we have in presenting it.

## About the Department

The Department of Information Science and Engineering (ISE) is presently headed by Dr. Shashikala, a veteran professor. The Department was established in the year 2001 with an intake of sixty students. Since its inception, the department has forged a path of technical excellence and innovative teaching methods. The Department is comprised of highly qualified, research-oriented teaching staff, committed to instill moral values among students, in addition to providing cutting edge technical knowledge. The Department has well equipped laboratories with state of the art computational facilities.

The Department regularly organizes technical talks, workshops, industry visits to nurture the core competence of the students. The students in the Department are multifaceted, securing ranks in VTU examinations, other than excelling in technical, sports and cultural competitions. The Department is accredited by NBA in 2018 for a period of three years from the academic year 2018-19 to 2020-21. The Department is associated with professional bodies' viz. Computer Society of India (CSI), Institution of Engineers (IE), Indian Society for Technical Education and Board for IT Education Standards (BITES).

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### Talk on 'Quality of Communication = Quality of life of Entrepreneur'



On 2<sup>nd</sup> November 2019, the Department of ISE, in collaboration with ISTE Student Chapter BNMIT organized a Talk on 'Quality of Communication = Quality of life of Entrepreneur' by Mr. Pavan R.C , an young entrepreneur, a renowned TEDx Speaker, Secretary, Achieve Educational Trust, followed by distribution of mementos to the FCD holders during the program. With his high energy and enthusiasm, he motivated the FCD holders to become quality entrepreneurs and accentuated on the importance of quality communication.

### Talk on 'Preparing Engineers for Social Cause'



A talk on 'Preparing Engineers for Social Cause' by Mr.Kiran Sagar, Founder of Yuva Global Foundation Trust, Bengaluru, was organized under IE-ISE student chapter on 28<sup>th</sup> August, 2019. Mr. Kiran Sagar shared his experience about how to become a Social Entrepreneur, the pros and cons. He shared his interaction with Dr. Abdul Kalam with our students for social cause.



## Nature and Technology: Friend or Foe....?

“Technology has impacted the most on Nature in the past decade through emerging ability to achieve near constant monitoring of valuable natural assets.” Technology is being used to support conservation and sustainability projects. 'Technology for Nature' is a unique partnership today to rapidly scale up global conservation response by bringing together technologists and Nature.



Fetch Climate is a fast, free, cloud-based service that allows experts to access accurate climate change data from any geographical region around the world. Hash tagged tweets and geotagged Instagram photos have become a valuable way to share real-time updates as natural disasters unfold. Google's Person Finder, which was created to reunite relatives during 2011 Japanese Tsunami, is still being used to fetch real time data.

There is a blossoming ecosystem of software that aims to boost our appreciation of the great outdoors, from Leafsnap UK, which applies facial recognition technology to leaves in order to help users identify 156 tree species to mindfulness apps that can help us learn to reconnect with our environment.

Technology isn't going to solve all the conservation problems of today, but it can be a fantastic tool in the toolbox. Rather than lingering on the mess, we've got ourselves into, we need to focus on harnessing its potential. The technologist Kevin Kelly believes that technology is “a Force of Nature”, evolving along the same principles as any living species. Perhaps he's right or perhaps Nature, like humanity, is a sort of mysterious technology. Either way, we must stop seeing technology and Nature as sparring partners, and start concentrating on helping them to collaborate.

**Source:** <https://bbc.com/earth/story/20150703-can-nature-and-technology-be-friends>

- Rakshitha (VII Semester)

## Coral Reefs: What makes the ocean colorful?

Coral reefs only occupy 0.1% of the area of the ocean and support 25% of all marine species on the planet. Corals are a major source of emission of oxygen. Millions of people rely on coral reefs for essential nutrition, livelihoods, protection from life-threatening storms and crucial economic opportunity. Reefs can contribute in the field of medicine, and are being used in treatments for diseases like cancer and HIV.



Coral reefs ecosystem is now being threatened. The Global Coral Reef Monitoring Network (GCRMN) found that 19% of the Earth's Coral reefs are now dead. The reasons being rising sea temperatures, seawater acidification, pollution, overfishing, unsustainable coastal development, climate change, sedimentation, destructive fishing practices, to name a few.

With the coral reefs disappearing, every second the scientists are turning to technology for their conservation. Here are a few ways technology is being used in the protection of the Coral reefs.

Open-source technologies like GitHub has allowed the WCS scientists to 'code and cloud' their findings and analysis of the coral bleaching events in various parts of the world. The scientists then wrote code to automatically clean, combine, and collaboratively analyse the impacts and causes of coral reef bleaching. This has helped the scientists to understand new mechanisms of how temperature can affect coral bleaching and to identify locations that may have the best conditions for future coral survival

3D Mapping and Bathymetry to monitor Reefs: Until recently measuring the growth or decline of the reefs was a task undertaken by scuba divers with primitive tools. However, 3d Mapping has allowed scientists to observe the reefs more closely. Sky Lee, a marine scientist and the founder of the The Hydrous, has invented a system that uses 3D mapping to track changes to the size of Corals, colour and the surface area.

NASA Coral Project: The three-year Coral Reef Airborne Laboratory (CORAL) mission will survey a

portion of the world's Coral reefs to assess the of these threatened ecosystem. CORAL uses advanced airborne instruments, like the Portable Remote Imaging Spectrometer (PRISM), and in-water measurements.

**3D Printing Coral Reefs:** The technology allows researchers to mimic the complex natural shape of coral which provides a structure for the coral to grow. The major benefit of 3D printing coral reefs is the flexibility with design. In the given rapid development of bio-printing, it is also possible that soon reefs could be 3D printed from live coral.

In the wake of the global climate crisis, many aspects of the natural world are affected unimaginably. Some of the most drastically affected ones are the marine ecosystems which are disturbed, even with the slightest change in the temperature. It is the time for us to step up our game and take measures to protect these delicate ecosystems before they disappear from this world.

**Source:** <https://github.com/coralproject/reef>

- Sanjana N Shreenivas (V Semester)

### Digital Technology for the Ecological Conservation



Man is always curious in understanding Earth's species and ecosystems, which is monumentally challenging scientific pursuit. In order to unlock Nature's secrets, ecologists turn to a variety of scientific instruments and tools. There are many more high-tech options becoming available for studying the natural world. In fact, ecology is on the cusp of a revolution, with emerging technologies opening up new possibilities for insights into Nature and applications for conserving biodiversity.

Some of the advances in Digital Technology for Ecological Conservation are as follows:

- **Tiny Tracking Sensors:** Electronically recording the movement of animals was first made possible by VHF radio telemetry in the 1960s. Since then, even more species, especially long-distance migratory animals such as caribou, shearwaters, and sea turtles, have been tracked with the help of GPS and

other satellite data. While VR is more immersive, AR provides more freedom to the user and more possibilities to marketers because it does not need to be a head-mounted display. Many types of miniature sensors have now been developed, including accelerometers, gyroscopes, magnetometers, micro cameras, and barometers. Together, these devices make it possible to track the movements of animals with unprecedented precision.

- **Autonomous Vehicles:** Remotely piloted vehicles, including drones, are now a common feature of our skies, land, and water. Beyond their more typical recreational uses, ecologists are deploying autonomous vehicles to measure environments, observe species, and assess changes through time, all with a degree of detail that was never possible earlier. Coupling autonomous vehicles with sensors (such as thermal imaging) now makes it easier to observe rare, hidden, or nocturnal species. It also potentially allows to catch poachers red-handed, which could help to protect animals like rhinoceros, elephants, and pangolins.

- **3D Printing:** Despite 3D printing pioneered in the 1980s, its potential uses are being realized lately for ecological researches. For instance, it can be used to make cheap, lightweight tracking devices that can either be fitted onto animals or can be used to create complex and accurate models of plants, animals, or other organisms for use in behavioural studies.

- **Bio-Batteries:** Keeping electronic equipment running in the field can be a challenge. Conventional batteries have limited life spans and can contain toxic chemicals. Solar power can help with some of these problems, but not in dimly lit areas, such as deep in the heart of rainforests. 'Bio-batteries' may help to overcome this challenge. They convert naturally occurring sources of chemical energy, such as starch, into electricity using enzymes. 'Plugging-in' to trees may allow sensors and other field equipment to be powered cheaply for a long time in places without sun or access to mains electricity.

All the technologies described above sit on a continuum from previous technological solutions to new and innovative ones now being trailed. Emerging technologies are exciting by themselves, but when combined with one another, they can revolutionize ecological researches.

**Source:**

<https://link.springer.com/article/10.1007/s13280-015-0705-1>

- Tejas S (VII Semester)



## Drones for Environment Conservation

Technology is fundamentally changing the way we live, work, relate to one another and to the external world. From the high seas to the depths of the world's most dense forests, technology can transform how we identify, measure, track and protect many resources, Nature provides us. AI and Drones are now being used for conservation efforts around the world.



Professionals such as environmental engineers, researchers and conservationists are turning to drones in place of slower terrestrial surveying equipment, lower-resolution satellite imagery and manned aircraft services, as the ability of drones to capture data without physically entering the area of interest limits the cost of field campaigns and reduces human impact on the system. They can be used to collect data on endangered species, erosion, deforestation, monitoring active volcanoes and for assessing or surveying potentially dangerous or inaccessible areas. Drones are revolutionizing the way scientists observe measure and monitor the natural environment. Drones automated cameras and other sensors collect huge amount of data and hence, researchers are increasingly turning to the tools of artificial intelligence to sort through it all.

Some of the means already deployed towards the goal of conserving the environment are The Blockchain Project by WWF Australia, Fiji and New Zealand, Silviaterra to monitor forests and Protection Assistant for Wildlife Security or PAWS by University of South California researchers, in collaboration with the National Science Foundation and the Army Research Office and the Elephant Listening Project.

There is no doubt that drones will be sticking around for the foreseeable future, and that novel applications for their use will continue to pop up. The benefits they have had, and continue to offer, in ecological research in such a short period is promising and so helping researchers to understand their environment better with extremely high quality data.

**Source:**

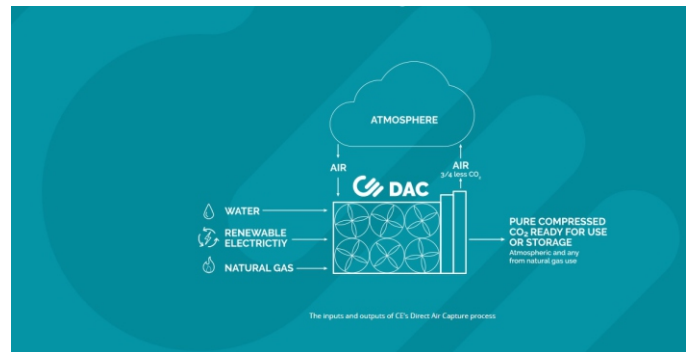
<https://www.geospatialworld.net/blogs/using-drone-technology-to-serve-the-environment/>

- Ashok Aravind (III Semester)

## Carbon Engineering

One of the major causes of global warming is the increase of carbon dioxide in the atmosphere. Global warming is the phenomenon of the increase in the temperature of the Earth. Many companies and organizations are working to reduce the amount of greenhouse gases; one among them is Carbon Engineering.

Carbon Engineering is a Canadian-based company that is working on reducing the carbon foot print of transportation. The company has developed two technologies to reduce carbon footprint, Direct Air Capture, and Air to Fuels.



Direct Air Capture (DAC) – It captures carbon dioxide from the atmosphere and stores it in compressed form. This compressed form of gas can then be used for numerous applications.

Air to Fuel – This technology helps in the production of synthetic fuel, using carbon dioxide. Water is electrolyzed to obtain hydrogen, and then carbon dioxide is made to react thermo-catalytically to produce hydrocarbon fuels such as petrol and diesel. The carbon dioxide required for production of these hydrocarbon fuels are obtained, using their DAC technology.

These technologies help us in reducing the carbon footprint. Implementation of these technologies saves the environment and is also economically feasible as the hydrocarbon fuels produced can be commercialized for profits.

**Source:** <https://carbonengineering.com/>

- Divyesh PK (III Semester)

### Did you know?

One google search produces about 0.2g of CO<sub>2</sub>. But since you hardly get an answer from one search, a typical search session produces about the same amount of CO<sub>2</sub> as does boiling a kettle. Google handles about 1 billion search queries per day, releasing some 200 tons of CO<sub>2</sub> per day.

## Fighting Fire with Machine Learning

Two-Indian origin high school students in the US came up with a novel AI-based device that could detect wildfire at an early stage and help the authorities to tame it before its vast outbreak. California-based high schoolers, Aditya Shah and Sanjana Shah developed Smart Wild Fire Sensor using Tensor flow, Google's open-source software library to achieve this. The Bay Area teens built the product as a part of the Google challenge that requires the participant to use Artificial Intelligence for social good. In recent times, wildfire outbreak has been rampant in California and in other parts of the US, requiring the authorities to evacuate people to avoid large scale calamity. The high school seniors were inspired to build the device after their own experiences of being evacuated at the nick of time.



The Smart Wild Fire Sensor, built on TensorFlow was developed by the students after feeding the software library with information such as images and weather parameters for dataflow programming. They baked AI into the product to understand and compile the environmental landscape of a vast area as it is humanly impossible to physically scan vast areas, "This is where the role of the machine and artificial intelligence comes in," Aditya exclaimed while speaking to a local daily in Pune. In order to achieve the exact precision, they partnered with Google to analyse whether images from drones and satellites could aid the device in preventing wildfire.

The device also takes into consideration other crucial inputs such as moisture content in the leaves, dryness in the air, its direction, the temperature in the area and density of the foliage to arrive at the conclusion. "During the experimental stages, the device was installed on with the camera facing down. It would then capture images of the foliage surrounding the trees in the forest," Aditya said. However, it wasn't easy for the students to train the device to predict the occurrence of a wildfire due to the quantity of data which was fed into the system, speaking about some of the challenges that

they faced, Sanjana said, "The main challenges were to get the right set of images and making the bunch of sensors to work with one another and co-ordinate to provide the right results. We had to collect at least 500 good images for the database to achieve 89 % accuracy."

**Source:**

<https://www.sciencedaily.com/releases/2019/09/190917133052.htm>

- S. Jatin Rajpal (V Semester)

## How Green are Electric Cars?

'Earth's Environment' is facing a threat due to human activities like industrialization and deforestation. In order to protect the environment, a number of technological developments are being made on a daily basis. One such example is the advancements in the automobile industry, where electric vehicles are becoming more popular day-by-day. But, a huge part of the society also has a misconception that these vehicles actually do more harm to our environment than good.



The 'Long Tailpipe Argument' is one of the most important and popular misconceptions. It's the idea that once you take into account the environmental costs of manufacturing, electric vehicles are just as polluting over their lifetime as vehicles using fossil fuels. This is true to some extent manufacturing an average petrol car equivalent to 5.6 tonnes of CO2 emission, the same for an electric car that goes up to 8.8 tonnes. But, this is just one side of a much bigger picture. Once you add the manufacturing aspect with years of driving and electric vehicles produce less than half the global warming emissions, compared to their fossil-fuelled counterparts.

Like any other battery, those used in an electric vehicle also loses power over time, in simpler term even its efficiency reduces. Batteries in smaller electric vehicles need replacing after every 8-10 year, and those in buses and vans need new ones after every 4-5 year. This is also an important aspect on as how they affect our environment because batteries take a lot of resources to produce and their chemicals can be toxic.



Fortunately, these batteries can be reused and even recycled. Most electric vehicles use lithium-ion batteries, like the ones used in laptops and cameras and smart phones. Presently only 5% of the old li-ion batteries are recycled. This isn't because they can't be recycled, but because of the simple fact that the technology is so new that the right infrastructure is not there yet. These old batteries can even be reused to provide backup power for streetlights, elevators and data centres.

Overall, though an electric car emits more greenhouse gases during its manufacturing stage, it is much greener when you see the bigger picture. The technology involved not only reduces the carbon footprint and helps the environment, but also opens the door towards a number of other advancements that will improve the existing technology and make human life better and easier.

**Source:** <https://www.sciencefocus.com/future-technology/how-environmentally-friendly-are-electric-cars/>

- **Jinendra Anchalia (III Semester)**

## Technologies for Ocean Conservation

### 1. Sea Robots

For years, scientists have been using robot-like machines to explore the depths of the ocean, where humans cannot go. Now, they can control robots above the water, and send robots with lights, sensors, and tools to bring back samples, take photos, and explore the seabed and the creatures that live deep.



Another, newer example is the Wave Glider SV3, an autonomous, solar-powered robot made by start-up Liquid Robotics. The SV3 is the updated version of the original SV2, which uses the ocean's endless supply of energy as propulsion to collect data during missions that can last up to a year. Both have Wi-Fi capabilities on-board, as well as large amount of data storage. The SV3 can explore more than 90% of the world's oceans, where even robots couldn't go before.

### 2. High-tech Tagging

Research in animal tagging has exploded in the last couple of decades, and a recent report in the journal Science showed just how important that growth has been for marine life.



Electronic tags are tiny and may weigh less than a penny now. They transmit data about movements, migration patterns, and interactions between wildlife to satellites and receiver stations for more than 10-year, and they can be attached to almost any type of creature, no matter how small.

**Source:** <https://news.itu.int/technology-saving-oceans/>

- **Malavika Shreedhar (VII Semester)**

## Clean Technology – For a Better Future

With the Nature degrading every day, working toward cleaner technology is a very important factor determining the fate of the planet. Development and conservation should happen at the same time to ensure that there is no more deterioration of the Nature. Keeping this in mind, a lot of companies and businesses are working towards Clean Technology. Here are a few companies around the world trying to make a difference.

### Proterra

Proterra designs and makes zero emissions, fully electric buses to provide sustainable public transport.

### Kebony

Oslo based Kebony develops sustainable hardwood through materials science. The company offers a substitute for endangered hardwoods by changing the biological makeup of softwood alternatives.

### Stem

Stem combines big data, predictive analytics and energy storage to reduce energy costs for businesses. Through 'the world's smartest energy storage network', Stem manages energy around the clock for organisations that may not have the infrastructure or staff to do so.

## **Sonnen**

Sonnen is a German company that provides energy storage solutions for homes and businesses. It's flagship product, Sonnen Battery, connects to solar panels and the grid to give users more utility over their utilities. The intelligent storage system automatically adjusts energy usage levels and saves excess energy for backup power.

## **AeroFarms**

With a mission to transform agriculture and build healthier communities, AeroFarms use vertical, indoor farming to grow produce. Aeroponic systems enable faster growing cycles and less environmental impact. Smart lighting and nutrition are applied to meet the needs of specific plants.

## **Apana**

Just like energy, space, and raw materials, water is a vital resource that needs careful conservation. Apana is a water management and analytics company that shows users how much water they are using – and wasting. It 'manages water like inventory', preventing shortages by detecting system faults, tracking water use, and offering ways to reduce it.

## **Clean Tech**

Aptly named, UK based Clean Tech operates the largest bottle reprocessing plant in the country. All the products manufactured at the plant are made using, post-consumer waste. The plant handles more than 100,000 tonnes of PET (Polyethylene Terephthalate) plastic packaging each year, turning it into recycled packaging that can be reused to pack food and other products.

## **Goldwind**

Wind Turbine Company Goldwind is one of China's leading Cleantech businesses. Goldwind is not only promoting new energy development in China but also operating across six continents to advance renewable options. The energy giant builds smart wind farms powered by cloud computing, big data, and machine learning technologies.

**Source:** <https://www.sciencefocus.com/future-technology/exciting-new-green-technology-of-the-future/>

- Sagarika P (V Semester)

## **Big Data and Nature**

Animals in the wild are very difficult to track and the only way that people do this is through a rudimentary tracking system with a small sample making assumptions for the wider community. Big Data and the complexities of data analysis could not be further from this, with the collection of massive data sets combined with complex predictive models and algorithms creating insights. The idea that enough data could even

be collected to make a useful analysis is hard to imagine. However, this has changed recently as HP has teamed up with Conservation International (CI) to create Earth Insights. This programme has been designed to give an early warning system for animals which are endangered across the world.

The use of cameras and climate sensors has helped the system to collect data from around thousands of these devices and use them to collate information on population numbers. This information is then fed into the HP Vertica platform, allowing for quick and accurate readings that can help to target specific areas or species that need to have time or money invested in them.

The huge number of images that are collected were almost unmanageable. The scientists at CI would spend weeks or sometimes months, analyzing the data and drawing collations and conclusions from it. This kind of work is time sensitive, if a declining population is found too late, it could spell the end for that species.

The collaboration with HP, has improved processing speed by 90%, which has given them an effective early warning system and has essentially allowed 90% more time to be spent on actively working with the species to increase their numbers. The system is in its early stage but early signs have been positive, by using the new technology and HP platform the team had recognized that from all species being monitored, 22% have experienced a drop in population numbers and this identification was on time.

The system until now has created over 3 terabytes of analyzable data and has 1.4 million photos from the cameras placed to track the populations and in addition to these photos the climate monitoring equipment also measures the environment in the area allowing scientists to monitor what factors are causing the decrease in population of certain species. This kind of work shows the wider environmental benefits that Big Data can have on the world. This programme has the potential to be successful which might lead many other charities to adopt this system.

**Source:** <https://www.nature.com/articles/498255a>

- Sri Krishna (V Semester)

## **Conservation X Labs**

This edition of Inspire is dedicated to Alex Dehgan, an evolutionary biologist who has worked in deep forests. Conservation Lab X is a technology and innovation



company that works in the field of conservation. They spur innovative solutions to stop the extinction crisis. Conservation Lab X announces certain challenges related to conservation of environment and attaches a grand prize to the challenge which can be won by anyone who is providing the most innovative and impactful solution to it. In this way, researchers, innovators, engineers and entrepreneurs had to work more in the field of environment conservation. They have run several challenges like The cooling challenge focused on developing cooling solutions without warming the planet, The O'HIA challenge where they find ways to stop the rapid spread of a pathogen is called Rapid O'Hia of Death which has killed Hawaiian forest and The Blue Economy Challenge which sought solutions for alternative protein, fish feed and new ocean products like salinity sensors, ultra-low cost aqua-phonic system for farmers. In this way they have been awarded around 3.3 Million Dollars as cash prizes for the challenges.

The Digital Makerspace (DMS) is another great innovation of Conservation Lab X which provides collaboration platform which matches the conservationists with technical talent to achieve solutions for environment through technology. The DMS is a digital engineering workshop, collaboration space and project pipeline where ideas for tech-enabled solutions to conservation problems can be borne tested, and developed. The DMS supports all Conservation X Labs programs and activities across the entire innovation pipeline, from idea to scaled solution.

The research team of Conservation Lab X had developed an inexpensive handheld DNA Barcode Scanner which can be used to indicate the genetic identity of protected wood, oft-disguised species such as ivory and rhino horns, and there are many more challenges in their pipeline like the Artisanal Challenge for water and biodiversity conservation. These technological innovations are making the world a better place due to the efforts of Alex Dehgan and his foundation. You too can join the community of innovators and take part in co-creating the future of conservation and end human-induced extinction!!

**Source:** <https://conservationlabs.com/>

- Vinay S (V Semester)

### Energy Efficient Data Centers

Data Centers make our digital lives possible. Each year, they consume more than two percent of all power generated and cost an estimated \$1.4 billion to keep them cool. Data centers exist to store and manage data. So, any power used by the facility for other purposes is

considered 'overhead'. Most Data Centers are air cooled. Air cooling works moderately well, but not as well as water cooling. Water cooling is more efficient and better means in less costs. The most important aspect of underwater data center would be its short deployment time of about 3-month.



Locating underwater data centers alongside offshore sources of power would allow engineers to simplify things. Firstly, by generating power at voltage closer to what the servers require, some of the voltage conversions can be eliminated. Secondly, by powering the computers with a collection of independent wind or marine turbines, redundancy could be built automatically. This would reduce both electrical losses and the capital cost (and complexity) associated with the usual data-center architecture, which is designed to protect against failure of the local power grid.

**Source:** <https://azure.microsoft.com/en-in/global-infrastructure/>

- Shesha Sai Balaji (III Semester)

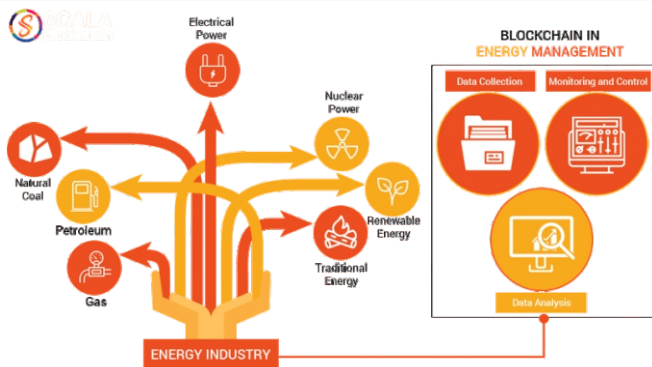
### Blockchain and Energy Management

A blockchain, is a growing list of records, called blocks which are linked using, cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. It is a way to record and verify transactions without requiring a central entity to monitor it. It is widely used in recording peer-to-peer transactions of various cryptocurrencies.

One of the major uses of blockchains is in the energy sector. They can be used to cope with increasingly complex electric power systems. The most intuitive application of block chain is to turn the electricity grid into a peer-to-peer network for customers to trade electricity with each other.

#### Did you know?

The first country to build Drones was Israel, with Israel Aerospace Industries heading the charge in terms of export numbers.



The second most effective application of blockchains to the energy sector is energy financing. Blockchains can facilitate efficient operation of the power systems and grid by reducing costs, improving reliability, reducing emissions to be tested and implemented.

**Source:** <https://www.mdpi.com/1424-8220/18/1/162>

- Pratheek Joshi (III Semester)

### Technology used for Cleaning the Ganga

The Ganges (popularly called as Ganga in India) is the largest river of India. Ganges flows through India and Bangladesh. It is 2525km long River which originates from Western Himalayas in India and flows into the Bay of Bengal through the Gangetic Plains of India and Bangladesh. The Ganges provides water to over more than 40% of India's population across 11 states, serving an estimated population of 500 million people which is more than any other river in the world. Today, it is the most polluted river in the entire world. There are many projects that are assigned to clean Ganges like Namami Ganges Project, Ganga Manthan, Ganga Mahasabha and so on.

The National Mission for Clean Ganges (NMCG) uses Geographic Information System (GIS) mapping for assistance in cleaning the river. National Remote Sensing Center (NRSC), a part of the Indian Space Research Organisation (ISRO), is supporting the NMCG to use geospatial technology in water quality and hydrological monitoring and evaluation. The support is aimed at mapping water pollution in Ganga.

The trash such as chemical effluents and floating waste on the surface of water are detected, collected and eliminated by a unmanned water surface vehicle 'Ro-Boat' which is a device equipped with camera, fog lights, solar panels and twin propeller engine. This device can submerge into the river and pull out the pollutants settled on the riverbed.

The Guided Ultrasonic Monitoring of Pipe System (GUMPS) is a system that is used to detect the oil leakages from oil pipelines that run in the river bed of the Ganges. This system has helped in detecting many

oil leakages and in reducing the pollution and saving a lot of marine life. It is also the first continuous real-time pipe monitoring system.

**Source:** <https://study.com/academy/lesson/nature-inspired-technology-definition-examples.html>

- Sourav N R (III Semester)

### Robots for putting out Forest Fires

Forests are vital to the eco-system as they help trap the carbon in the air and even act as oxygen producers. But, there are several instances when these vital eco-systems are on fire and become extremely difficult to deal with them. The ideal example for this is when the "Lungs of Earth", the Amazon Forest was on fire. It even puts the lives of several fire fighters at risk.



Forest fires must be detected and put out within 15 minutes. Robots are being used to detect and to put out fires in time. It uses Stereoscopic Thermal Imaging and LIDAR (Light Detection and Ranging) sensors for navigation. A robot can detect a tree to be on fire from as far as 12-kilometre. It is not affected by weather because it's thermal cameras can see through things like mist that a human eye can't. It is capable of pumping around 1500 LPM of water. It is fully automatic and can work 24/7 without any fault. The disadvantage is that it is connected by a hose and so needs constant water supply.

It has been implemented in USA, UK and also in China where more than 2500 fires were detected and put out. As a result, using robots for putting off fires has a lot of advantages and can be used to put out fires in buildings too. Technology can indeed be a great boon to mankind and these robots are one of the best examples. Not only does it help save lives, but also helps to preserve natural beauty of Nature by averting disasters.

The robot mentioned in this article is 'Thermite Robot' designed by Howe and Howe Technologies. The 'Thermite Robot' weighs about 1,640 lbs and it costs \$96k USD.

**Source:** <https://firesafety.tips/fire-fighting-robots/>

- Pratheek G Aithal (III Semester)



## Workshop on 'Circuit Prototyping'



A workshop on circuit prototyping was conducted under CSI-BNMIT student branch on 25<sup>th</sup> and 26<sup>th</sup> October 2019. Mr. Kotresh, Director of Indian Tech-Keys, Bengaluru gave an introduction to the working of Analog Circuits, PCB Technology, Schematic Design Practice, Foot Print Design, Foot Print Transfer and Etching. He also gave a practical demonstration of PCB Drilling, Info Layer, Component Placement, Soldering, Unit Testing, Circuit Integration and Product Testing.

## Workshop on 'Machine Learning and Tensor Flow Applications'



On 11<sup>th</sup> and 12<sup>th</sup> October 2019, Department of ISE in collaboration with IE conducted two days' workshop on 'Machine Learning and Tensor Flow applications'. On Day – 1, the workshop was conducted by Prof. Manjunath, Manipal Institute of Technology. The aim was to introduce the concepts of Machine Learning and the basics of Neural Networks. On the next day, the workshop was conducted by Mr. Akshay Pai, Data Science Lead at ThoughtClan Technologies Pvt Ltd, to make students understand the working of TensorFlow and its applications like Image Classification, Object Recognition, Text Classification and Audio Classification.

## Workshop on 'Application Development using Microservices Architecture'



On 20<sup>th</sup> and 21<sup>st</sup> September, 2019, a workshop on Application Development, using Microservices Architecture was conducted under CSI-BNMIT student chapter. Mr. Prashanth Raghu, Senior Backend Engineer, Signeasy Technologies Pvt. Ltd gave an introduction to Microservices and conducted hands-on sessions on API Development using REST framework. He also gave a practical demonstration of authentication in Microservices, development of File Management and File Sharing Microservices.

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## Staff Achievements

- Dr. Saritha Chakrasali, Professor, Dept. of ISE has received a funding of Rs. 20-lakh from VGST for the project titled, 'GPGPU Computing for Computationally Complex Problems' for a period of 2-year from 2019-20 to 2020-21.
- Dr. Kiran Y.C, Professor, Dept. of ISE is a consultant at Aspire Solution.
- Dr. Vimuktha E Salis, Associate Professor, Dept of ISE has delivered a Talk at Technocrat Meet 2019 on 'Machine Intelligence for Whatsoever' at Ampersand Profiles, Bangalore. She has pitched a proposal on Virtual Eye – Know Your Environment at ATAL Incubation Centre, NMIMS, Mumbai and she is working as a Consultant at Soundworks, Bangalore.
- Mrs. Harini S, Assistant Professor, Dept. Of ISE delivered a talk on 'Machine Learning' at Siddaganga Polytechnic on 24<sup>th</sup> August 2019.

## Students' Achievements

### Inter Collegiate Technical Achievements

- Bhumika S, Prakruthi S, Yashaswini C P, Tadiparthi Srinadh of V Semester participated in the DST sponsored National Conference on 'Blockchain and Smart Contract Technologies' held at National Institute of Technology, Tiruchirappalli in November 2019. Monica A.R and Tejas. S of VII Semester are the winners of Ethical Hacking organized by IEEE Student Branch - SSIT in association with IEEE Bangalore Section and Indian Cyber Army on 12<sup>th</sup> and 13<sup>th</sup> September 2019.
- Aishwarya S, Brahma S P, Disha Maru, Varshini V of V Semester won the special prize for the Best Business Model at HACKSRM-2019, held at SRM University, AP.
- Abilesh M, Akilesh M, Mahesh Kumar S of V Semester won the 3<sup>rd</sup> prize in HACK-IT-ON 3.0 organized by CMR Institute of Technology, held in September 2019

### Intra Collegiate Technical Achievements

- Akilesh M, Chinmai L have won the Best Project Award at Department Level in the IPL Summer Competition 2019 for 'Smart Water Meter' Project.
- Bhumika S, Mansi M, Tadiparthi Srinadh of V Semester won the Best Project Award for the Project 'Personal Voice Assistant' at Department Level in the IPL Summer Competition 2019, held at BNMIT.
- Adithya M, Jatin Rajpal, Koushal Kumar have won the Best Project Award at Department Level in the IPL Summer Competition 2019 for 'B & M' (Bot & Mines) Project.

### Sports Achievements

- Likhitha B, Manasa Deshpande and Nayana Bhat of VII Semester have won 3<sup>rd</sup> place in Throw Ball Match held at BMS College on 2<sup>nd</sup> October 2019.
- Rachna R of III Semester was a Runner up in Table Tennis in Kreedotsav held at BMSCE on 1st October 2019.
- Likhitha B, Manasa Deshpande and Nayana Bhat of VII semester and Sahana S of III Semester have won in the '40<sup>th</sup> Y.N Rao Manay Memorial Throw Ball Tournament' held on 20<sup>th</sup> and 21<sup>st</sup> September 2019.

### Cultural Achievements

- Hiranmayee of VII Semester and Anirudh U.N of I Semester ISE have won a gold medal in group song at VTU Youth festival held at Dharwad from 6<sup>th</sup> November 2019 to 9<sup>th</sup> November 2019.
- Sushmita Hedge of I Semester has participated and won 3<sup>rd</sup> place in Skit in VTU Youth Festival held at Dharwad from 6<sup>th</sup> November 2019 to 9<sup>th</sup> November 2019.



### Editorial Team

#### Students

<b>Divyesh. P.K</b>	III Sem
<b>Nivedita</b>	III Sem
<b>Shesha Sai Balaji</b>	III Sem
<b>Bhumika S</b>	V Sem
<b>Jayanth Joshi</b>	V Sem
<b>Vinay S</b>	V Sem
<b>Sanjana N Shreenivas</b>	V Sem
<b>Tadiparthi Srinadh</b>	V Sem

#### Facts by:

**Sourav N. R.** III Sem

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