Impulse

Department of ECE, Half-Yearly Newsletter

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Editor's Note

Hello Readers,

On behalf of the Department of ECE, we are proud to present the 8th edition of IMPULSE Magazine!

This magazine brings out the achievements of our students, staff and alumni in curricular, co-curricular and extra-curricular activities. It is a repository of knowledge and provides an open forum for the exchange of ideas. A variety of impactful articles and write-ups written by the students have been published in the latter half of the magazine. We hope that the magazine gives you a good perspective on how our department thinks, performs and moves forward!

It was both exciting and an exigent point being the editors of the IMPULSE magazine. We had the opportunity to interact with various informative and creative minds. This magazine is the culmination of incredible ideas and information from each of its contributors. We would like to express our gratitude to the faculty coordinators and the faculty in-charge, who have been an integral part of the magazine, by guiding us every step of the way. We would also like to thank each and every member from the content and the design teams for their dedication and arduous work to ensure that this magazine is a success.

Live as if you were to die tomorrow. Learn as if you were to live forever.
– Gandhi

Andrew Martin IV A
Chinmayi Udaybhaskar IV A

Meet the Team

FACULTY CO-ORDINATORS :

1. Dr. S. Radha
   Prof. & HOD, ECE
2. Dr. K.T. Selvan
   Professor, ECE

FACULTY INCHARGE :

1. Dr. M. Gulam Nabi Alsath
   Associate Professor, ECE

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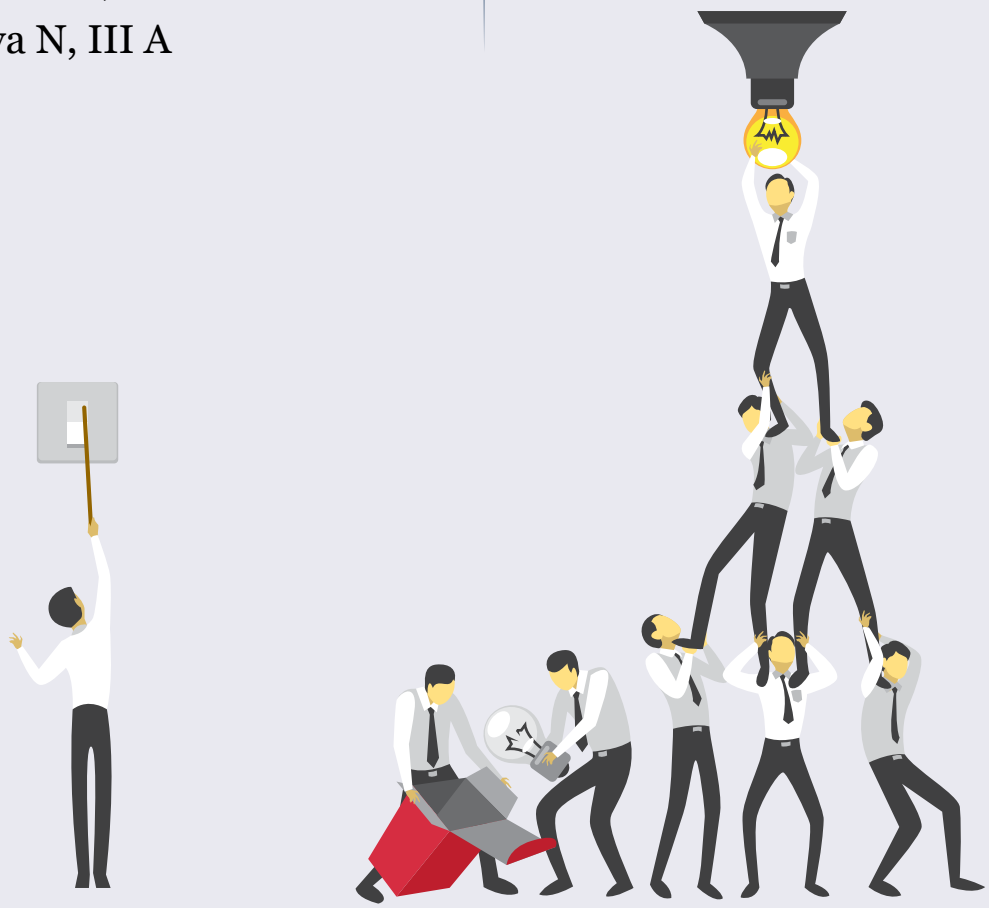

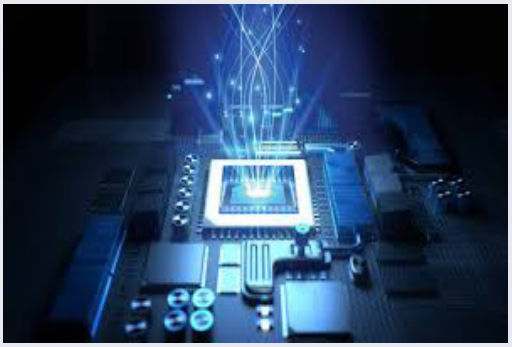

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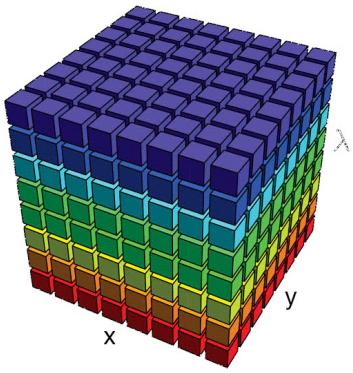
INVITED ARTICLE

Hyperspectral Imaging

Dr. Hemalatha R
Associate Professor

Hyperspectral imaging (HSI) is the technique of capturing and processing an image at a very large number of wavelengths. It breaks the image down into tens or hundreds of colors, while multispectral imaging might evaluate an image in three or four colors. Hyperspectral sensors collect information as a set of 'images', which form a three-dimensional (x,y,λ) hyperspectral data cube, where x and y represent two spatial dimensions of the scene, and λ represents the spectral dimension (comprising a range of wavelengths) as shown below. Each pixel will have a complete spectrum (from UV to near IR region), having varying intensities over different wavelengths called a spectral signature. The collected full spectral information is used for analysis, detection, and identification of various materials and compounds present in the region of interest [1].



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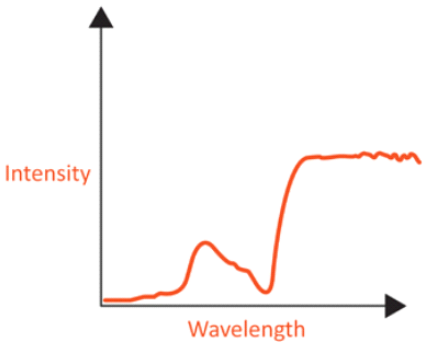

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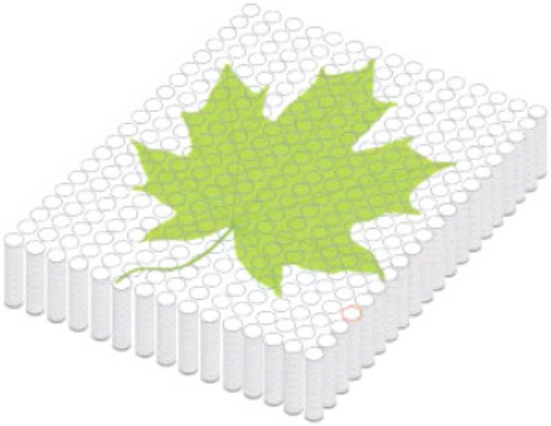


d)

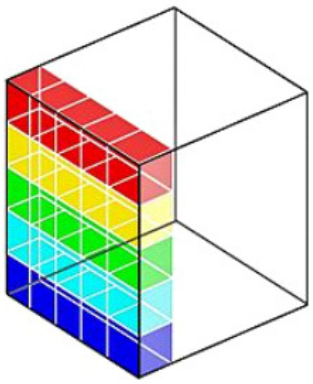
a) Hyperspectral cube b) Spectral signature of a pixel c) Sample target d) Hyperspectral image of the sample target

How to acquire?

There are four basic techniques for acquiring the three-dimensional (x,y,λ) dataset of a hyperspectral cube [2].

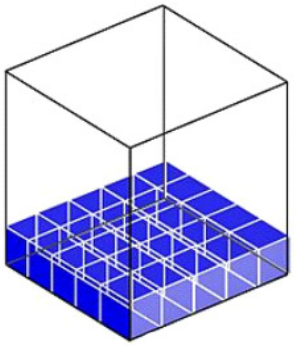
i) Spatial scanning:

In spatial scanning, each two-dimensional (2-D) sensor output represents a full slit spectrum (x,λ). HSI devices for spatial scanning obtain the slit spectra by projecting a strip of the scene onto a slit and dispersing the slit image with a prism or a grating. The spatial dimension is collected through the platform movement or scanning. This requires stabilized mounts or accurate pointing information to 'reconstruct' the image.
Disadvantages: Line based analysis. Mechanical parts and their instability.



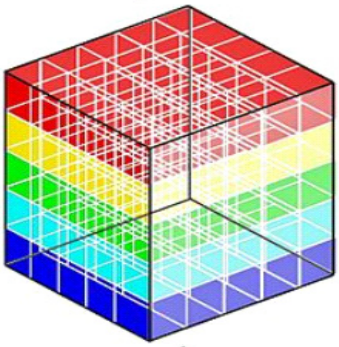
ii) Spectral scanning:

Each 2-D sensor output represents a monochromatic, spatial (x,y) map of the scene. HSI devices for spectral scanning are typically based on optical band-pass filters and a stationary platform.
Advantage: ability to choose the spectral bands
Disadvantage: spectral smearing



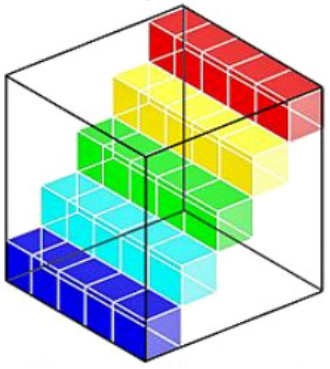
iii) Non-scanning:

A single 2-D sensor output contains all spatial (x,y) and spectral (λ) data. HSI devices for non-scanning yield the full data cube at once, without any scanning.
Advantage: Snapshot and shorter acquisition time.
Disadvantage: High computational effort and manufacturing costs.



iv) Spatio-spectral scanning:

Each 2-D sensor output represents a wavelength-coded ('rainbow-colored', λ=λ(y)), spatial (x,y) map of the scene. Advanced spatio-spectral scanning systems can be obtained by placing a dispersive element before a spatial scanning system. Scanning can be achieved by moving the whole system relative to the scene, by moving the camera alone, or by moving the slit alone.
The choice of the acquisition technique depends on the specific application and the context-dependence.



Real-time Acquisition:

Hyperspectral Sensors (also known as Imaging Spectrometers) typically collect 200 or more bands enabling the construction of an almost continuous reflectance spectrum for every pixel in the scene. They can be air borne, satellite borne or ground based. However, HSI is usually implemented on satellite and airborne platforms for remote sensing applications. During last two decades, it has also been applied to numerous applications including agricultural and water resources control, military defence, medical diagnosis, forensic medicine, food quality control and mineralogical mapping of earth surface.

The major purpose of HSI is to identify the required object and to obtain the spectral of each pixel in the image. The Hyperspectral image is obtained from the solar radiation that is scattered from the Earth's surface, which after interaction with the atmosphere reaches the sensor.

Satellite Borne Sensors:

The spectral range of Hyperspectral sensors on the satellites is 400-14400 nm. Few Hyperspectral sensors that provide above 100 spectral bands for the satellite data are listed below.

Sensor	Organization /Country	Optical Subsystem	Spectral Bands	Spectral Range (μm)	Spectral Resolution	Spatial Coverage
Hyperion	NASA, US.	VNIR-SWIR	242	0.40-2.500	30	Regional
AVIRIS	NASA, US.	VNIR	224	0.40-2.500	4-20	Local
HyMap	Integrated Spectronics Pty Ltd, Australia.	VNIR-SWIR	128	0.45-2.480	2-10	Local
ROSIS	DLR, Germany.	VNIR	115	0.42-0.873	2	Local
AISA	SPECIM, Finland.	VNIR	286	0.45-0.9	2.9	Local
CASI	Itres Research, Canada.	VNIR	288	0.43-0.87	2	Local

As an example, the Hyperspectral image obtained from EO-I (Earth Orbiting) satellite is through the Hyperion sensor. It provides high resolution Hyperspectral images capable of resolving 242 spectral bands and resolution of 30m. The Instrument covers an area upto 7.5 km by 100 km land per image [3]. This provides a precise spectral mapping over 220 channels with very high radiometric accuracy.

Aircraft Borne Sensors:

The spectral range of Hyperspectral sensors on aircraft work is 380-12700 nm. The number and width of bands varies from one system to another in the range of 1-288 and widths ranging from 2-2000 nm. The hyperspectral sensors in aircrafts are provided below.

Types of sensors	Producer	Number of bands	Spectral range (μm)
HYDICE	Earth Search Science Inc.	210	0.40-2.50
PROBE-I	Earth Search Science Inc.	128	0.40-2.50
HyMap	Integrated Spectronics	100-200	Visible to thermal infrared
DAIS 7915 (Digital Airborne Imaging Spectrometer)	GER Corporation	VIS/NIR (32), SWIR1(8), SWIR2(32), MIR(1), TIR(12)	VIS/NIR (0.43-1.05), SWIR1(1.50-1.80), SWIR2(2.00-2.50), MIR(3.00-5.00), TIR(8.70-12.30)
DAIS 21115 (Digital Airborne Imaging Spectrometer)	GER Corporation	VIS/NIR (76), SWIR1(64), SWIR2(64), MIR(1), TIR(6)	VIS/NIR (0.40-1.00), SWIR1(1.00-1.80), SWIR2(2.00-2.50), MIR(3.00-5.00), TIR(8-12.00)
EPS-H (Environmental Protection System)	GER Corporation	VIS/NIR (76), SWIR1(32), SWIR2(32), TIR(12)	VIS/NIR (0.43-1.05), SWIR1(1.50-1.80), SWIR2(2.00-2.50), TIR(8-12.50)

Applications:

The images obtained from the sensors can be used for several applications as mentioned ahead. However, they are predominantly used in mineral exploration and agriculture.

Mineral Exploration

Hyperspectral remote sensing of minerals is well developed. Many minerals can be identified from airborne images, and their relation to the presence of valuable minerals, such as gold and diamonds, is also establised.

Geological samples, such as drill cores, can be rapidly mapped for nearly all minerals of commercial interest with Hyperspectral imaging. Fusion of SWIR and LWIR spectral imaging is standard for the detection of minerals in the feldspar, silica, calcite, garnet, and olivine groups, as these minerals have their most distinctive and strongest spectral signature in the LWIR regions. [4]

How to do?

Interpretation of Hyperspectral data has been developed by Analytical Imaging and Geophysics (AIG). These approaches are implemented in the "Environmental for visualizing Images". AIG scientists developed ENVI system software. The presence of requisite minerals can be identified through the Hyperspectral anatomization methodology which includes the following steps [5],

- Data pre-processing.
- Atmospheric correction to find the apparent reflectance of the data.
- Linear transformation of the reflectance data to reduce noise and determine data dimensionality.
- Location of the most spectrally pure pixels.
- Extraction and automated identification of end member spectra.
- Spatial mapping and abundance estimates for specific image end members.

Agriculture:

Although the cost of acquiring Hyperspectral images is typically high, for specific crops and in specific climates, Hyperspectral remote sensing use is increasing for,

- Monitoring the development and health of crops.
- Developing early warning system for disease outbreaks.
- Detecting the chemical composition of plants, to track its nutrient and water status
- Monitoring the application of pesticides to individual seeds
- Detecting the animal proteins in compound feeds

Now-a-days Hyperspectral cameras are also included in drones to enable the ease of accessing and implementation. E.g. Hyperspectral camera embedded on OnyxStar HYDRA-12 UAV from AltiGator [6].

Pros and Cons:

Accurate segmentation and classification without prior knowledge of the sample is the major advantage. But the limitation is its cost and complexity. (Fast computers, sensitive detectors, and large data storage capacities)

With the proper choice of the HSI based on the spectral bands, area and element of study requisite object and its constituent elements can be identified and quantified easily. Moreover, the entire operation can be executed as a snapshot and shall reduce the labour cost involved in exploration. Most of the satellite data are readily accessible. CNN based machine learning method for HSI classification is a new trend adopted in this field. Hence, HSI could be mainly used for remote sensing applications, such as target detection, land cover classification and anomaly detection.

References:

- **[1]** https://www.specim.fi/what-hyperspectral-imaging-provides/
- **[2]** https://en.wikipedia.org/wiki/Hyperspectral_imaging
- **[3]** S.Roopa, K. Sathya Narayanan, Sibi Sarvanan, M.Jhanane and J.Aravinth, "Detection of COPPER in Southern India using HYPERION Imagery" in the proceedings of the 2017 International Conference on Advances in Computing, Communications and Informatics, ICACCI IEEE Conference, September 2017 at Udupi, India.
- **[4]** Holma, H., (May 2011), Thermische Hyperspektralbildgebung im langwelligen Infrarot Archived July 26, 2011, at the Wayback Machine, Photonik1.
- **[5]** http://www.dronelife.com/cms/company/Altigator
- **[6]** Fred A. Kruse, Joseph W. Boardman, and Jonathan F. Huntington, "Comparison of Airborne Hyperspectral Data and EO-1 Hyperion for Mineral Mapping" in IEEE Transactions On Geoscience And Remote Sensing, Vol. 41, No. 6, June 2003.

VISITS AND INTERACTIONS

1. Dr. S. Sakthivel Murugan, Asso. Prof. interacted with Prof. Dr. Rajendar Bhal, Center for Applied Research in Electronics (CARE) at IIT Delhi and visited the Underwater and Air Acoustic (UWAA) Lab on 10th Jul. 2019.

2. Dr. S. Radha, Prof & Head had a discussion with Dr. Samudra, Associate Professor, NUS regarding the curriculum on 23rd Jul. 2019

3. Mr. R. Sathish and his team from Arobot visited underwater acoustic research lab and interacted with Dr. S. Sakthivel Murugan, Asso. Prof. regarding cloudonomous and its features for localization of ROV during Sep. & Oct. 2019. The team from SSN also visited Arobot on 22nd Oct. 2019 and interacted with Mr. Sathish Ramachandran and his team on various sensors, ROV body fixture materials, electrical power system, thrust design, etc.

4. Dr. M. Gulam Nabi Alsath, Asso. Prof. & Dr. S. Kirubaveni, Asso. Prof. visited IIT Madras and held discussion with Dr. Parasuraman

Swaminathan, Asso. Prof., Department of Material Science and Metallurgy for possible research collaboration on 27th Sep. 2019.

5. On 10th Oct. 2019, Dr. S. Radha, Prof. & Head and Dr. N. Prabagarane, Asso. Prof. had Skype meeting with Prof. Mehmet Can Vuran, Susan J. Rosowski Professor, Department of Computer Science and Engineering, The University of Nebraska-Lincoln for possible Indo-US collaboration.

6. Dr. S. Radha, Prof. & Head and Dr. N. Prabagarane, Asso. Prof. had Skype meeting with Prof. Michael Segal, School of Electrical and Computer Engineering, Communication Systems Engineering Department, Ben-Gurion University of the Negev, Beer-Sheva, Israel, from SSN for possible Indo-Israel collaboration on 14th Oct. 2019. Subsequently the proposal was finalized by Dr. N. Prabagarane through Skype on 24th Oct. 2019.

7. On 14th Oct. 2019, Mr. Gurukeswar Sree and Mr. Illamaran from AMET University visited Underwater acoustic research

lab and interacted with Dr. S. Sakthivel Murugan, Asso. Prof. for a consultancy work on underwater battery using sea water.

8. Dr. S. Radha, Prof & Head , Dr. R. Hemalatha, Asso. Prof. visited NRCB, Trichy for data collection for the DST sponsored project under SSTP and had a discussion with Dr. R Selvaraj, Principal Scientist & PI of the project and their team on 25th Oct. 2019.

9. Dr. Sumathi, Head-EEE, Mahendra Engineering College with her team of four faculty members visited underwater acoustic research lab and interacted with Dr. S. Sakthivel Murugan, Asso. Prof. on 30th Oct. 2019 regarding consultancy work, joint projects and project proposals.

10. Dr. K. T. Selvan, Prof. organized a meeting of Mr. Rana Narayana, Engineering Manager, RF Design Group, Honeywell, with colleagues Dr. S. Radha, Prof. & Head, Dr. Premanand Chandramani, Prof., Dr. S. Ramprabhu, Asso. Prof., Dr. K. K. Nagarajan, Asso. Prof., and Mr. S. Karthie, Asst. Prof. to discuss possible avenues for collaboration.

11. On 14th Nov. 2019, Dr. S. Radha, Prof. & Head, Dr. N. Prabagarane & Dr. R. Kishore, Asso. Prof., had Skype meeting with Prof. Ian Akyildiz, Ken Byers Chair Professor, School of Electrical and Computer Engineering at Georgia Institute of Technology, the Director of the Broadband Wireless Networking Laboratory and Chair of the Telecommunications Group at the School of ECE at Georgia Tech and Distinguished visiting faculty, ECE/SSN at SSN and discussed about research areas to work with.

12. On 22nd Nov. 2019, Dr. N. Prabagarane & Dr. S. Sakthivel Murugan, Asso. Prof. had Skype meeting with Prof. Ian Akyildiz, Ken Byers Chair Professor, School of Electrical and Computer Engineering at Georgia Institute of Technology, the Director of the Broadband Wireless Networking Laboratory and Chair of the Telecommunications Group at the School of ECE at Georgia Tech and Distinguished visiting faculty, ECE/SSN at SSN. Dr. S. Sakthivel Murugan discussed about the research carried out at his lab with Prof. Ian.

EXPERT LECTURES

GUEST LECTURES IN THE DEPARTMENT

1. "Learning opportunities in group projects" by Dr. K. T. Selvan, Prof. on 27th Jun. 2019.

2. "Creativity and Curiosity" by Dr. Sudhir Varadarajan, Dean (Design, Innovation & Incubation), IIITDM, Kancheepuram on 1st Aug. 2019.

FACULTY LECTURES OUTSIDE SSN

1. Dr. K. T. Selvan, Prof., delivered a talk entitled "Fundamentals of signal integrity in high-speed digital circuits" at the IEEE AP-S Seminar on '5G Communications: Need and Challenges' held at SASTRA University, Thanjavur on 13th Jul. 2019.

2. Dr. S. Radha, Prof. & Head delivered a guest lecture on the topic "Outcome based Education: System & Process for TIER I" at Kamarajar College of Engineering & Technology, Virudhunagar on 22nd Jul. 2019.

3. Dr. M. Gulam Nabi Alsath, Asso. Prof. delivered a guest lecture titled "Antennas for Special Applications" at Muthayammal Engineering College, Rasipuram during the 15 day AICTE sponsored FDP on "Adaptive Antennas for Mobile Communications" on the 21st Aug. 2019.

4. Dr. S. Sakthivel Murugan, Asso. Prof. delivered an invited talk on "Spread Spectrum and Multiple Access Techniques" at Velammal Engineering College, Chennai on 22nd Aug. 2019.

5. Dr. P. Vijayalakshmi, Prof. delivered an IEEE SPS guest lecture titled "Machine learning - from features to modeling - a signal processing view" at VIT University, Chennai on 27th Aug. 2019.

6. Dr. M. Gulam Nabi Alsath, Asso. Prof. gave an invited talk on "Microstrip Patch Antennas" during the one day IEEE APS seminar organized by St. Joseph's Institute of Technology, Chennai on 18th Sep. 2019.

7. Dr. S. Esther Florence, Asso. Prof. delivered a lecture on "Role of Textile Antennas and Sensors for Industry 4.0" at National Workshop on Recent Trends in Electromagnetic (EM) Simulation for Industry 4.0 at Sri Venkateswara College of Engineering, Chennai on 19th Sep. 2019.

8. Dr. K. T. Selvan, Prof. delivered the talks on the topics "Electromagnetic fundamentals for signal integrity in high-speed digital circuits" & "Perspectives on professional development" at the IEEE AP-S Seminar on "Advances in Antennas" held at Kongu Engineering College, Erode on 20th and 21st Sep. 2019.

9. Dr. S. Ramprabhu, Asso. Prof. delivered a talk on the "Applications of Frequency Selective Surfaces" at the IEEE AP-S Seminar on "Advances in Antennas" held at Kongu Engineering College, Erode on 21st Sep. 2019.

10. Dr. P. Kaythry, Asso. Prof. delivered a lecture on "Foldscope as research tool" Foldscope workshop sponsored by DBT, Govt. of India at Vels Institute of Science and Technology, Pallavaram on 27th Sep. 2019.

.**11.** Dr. M. Gulam Nabi Alsath, Asso. Prof. delivered an expert lecture on "Optically Transparent Antennas: Design and Development" during the 5 day FDP on Flexible and RF Printed Electronic" at SRM Institute of Science and Technology, Kattankulathur on 10th Oct. 2019.

12. Dr. S. Esther Florence , Asso. Prof. delivered a talk on "Design of Textile Antennas and Sensors" at the 5 day FDP on Flexible and RF Printed Electronics at SRM Institute of Science and Technology, Kattankulathur on 11th Oct. 2019.

13. Dr. S. Ramprabhu, Asso. Prof. delivered a lecture on "Conformal Frequency Selective Surfaces and its applications" at the 5 day FDP on Flexible and RF Printed Electronics at SRM Institute of Science and Technology, Kattankulathur on 12th Oct. 2019.

14. Dr. P. Vijayalakshmi, Prof. delivered a talk titled "Speech Input Speech Output Communication Aid - an AASC for dysarthric speakers" at Empower India Conference on assistive technologies-2019 held at IIT Delhi on 15th Oct. 2019.

15. Dr. P. Vijayalakshmi, Prof. delivered a talk titled "Challenges in building Speech-input speech-output systems" at IEEE SPS FDP on Speech and vision enabled intelligent systems on 19th Nov. 2019 at SSNCE.

16. Dr. N. Venkateswaran, Prof. presented a lecture on "Soft Computing techniques for Regression, Classification and Optimization" at the AICTE sponsored FDP on "Soft Computing and its Applications" on 22nd Nov. 2019 at Anand Institute of Higher Technology, Chennai.

17. Dr. V. Vaithianathan, Asso. Prof. delivered a talk titled "Building Blocks of Analog IC Design" in the Anna University-Chennai sponsored Faculty Development Training Program "EC8003 CMOS Analog IC Design" at Sairam Engineering College, Chennai on 26th Nov. 2019.

18. Dr. K. T. Selvan, Prof. delivered an invited talk titled "Understanding periodic structures in electromagnetics" at Sri Venkateswara College of Engineering, Chennai on 28th Nov. 2019.

19. Dr. N. Venkateswaran, Prof. presented a lecture on "Spread Spectrum and RAKE Receiver" at the Anna University to organised FDTP in Wireless Communication on 5th Dec. 2019 at Sri Venkateswara College of Engineering, Sriperumbudur.

19. Dr. N. Venkateswaran, Prof. presented a lecture on "Spread Spectrum and RAKE Receiver" at the Anna University to organised FDTP in Wireless Communication on 5th Dec. 2019 at Sri Venkateswara College of Engineering, Sriperumbudur.

EVENTS ORGANIZED

"Teacher Development Programme on Electromagnetics"

Date: 18th Oct. 2019
Coordinator: Dr. K. T. Selvan, Prof., Dr. S. Joseph Gladwin, Asso. Prof., Dr. K. K. Nagarajan, Asso. Prof. and Dr. S. Ramprabhu, Asso. Prof.
Sponsors: IEEE APS and SSN CE
Speakers: Dr. T.V. Somanathan, Additional Chief Secretary, Government of Tamil Nadu; Dr. S.C. Sahasrabudhe, Former Deputy Director, IIT Bombay; Dr. R. K. Shevgaonkar, Vice Chancellor, Bennett University, Noida; Dr. S. V. Kulkarni, Professor, IIT Bombay; Dr. K. T. Selvan, Professor, **SSNCE;** Dr. Basudeb Ghosh, Professor, IIST Trivandrum; Dr. Uday Khankoje, Professor, IIT Madras.
Participants: 30 (Research Scholars - 23 and Faculty - 7)

6-day Faculty Development Programme on "Signal Integrity for High-Speed Digital Links"

Date: 4th Nov. 2019 - 9th Nov. 2019
Coordinator: Dr. K. T. Selvan, Prof., Dr. Premanand V Chandramani, Prof., Dr. K. K. Nagarajan, Asso. Prof.
Sponsors: SSN CE and IEEE MTTS
Speakers: Dr. M. K. Gunasekaran, Retired Professor, IISc Bengaluru; Dr. M. Ganesh Madhan, Professor, MIT Chromepet, Chennai; Dr. K. T. Selvan, Professor, SSNCE; Dr. Premanand V Chandramani, Professor, SSNCE; Dr. R. Srinivasan, Professor, SSNCE; Dr. Saurabh Saxena, Associate Professor, IIT Madras.
Participants: 11 (Academia - 8 and Industry - 3)

ABOUT THE FDP

A six day FDP on "Signal Integrity for High-Speed Digital Links" was organized from 4th November 2019 - 9th November 2019 by Department of ECE, SSN College of Engineering and IEEE MTTS Chapter, Madras Section. The course aims to provide

- a platform for learning the fundamental principles of Signal Integrity (SI);
- an understanding of SI design issues including cross talk, electromagnetic interference and grounding;
- an introduction to simulation and testing for signal integrity of high speed digital links through eye diagrams, board dielectric characterization, and jitter aggregation.

The course started with the introductory talk by Prof. Premanand V Chandramani and Prof. K T. Selvan. Dr. S. Radha, Prof and Head, Department of ECE, SSN CE welcomed the participants. The FDP has seven talks by experts from academia like IITm< IISc, MIT, SSN CE and four talks by industry experts from Honeywell, Entuple.

Techhnologies, Elmack Engg. Services and Tektronix and one tutorial session on electromagnetic concepts for SI. The workshop started with a fundamental session on electromagnetic concepts for SI by Prof. K T Selvan. The talks cover varied depths and breadths of SI domain like Board level interconnect crosstalk estimation, Transmission line effects and characteristic impedances in high speed data links, Power distribution issues in high speed digital circuits, Shielded cable as seen in analog circuit and as seen in high speed digital circuit, Substrate noise in mixed signal chips, Data acquisition techniques for high-speed circuits, Anatomy of eye diagrams, Signal Integrity using Cadence, Dielectric measurement techniques for PCBs and Impact of SI on RF product design.

The workshop has attracted participants from faculty, full time research scholars and industry. Three people from HCL attended the FDP and interacted well. Overall the feedback from the participants was good.

6-day Faculty Development Programme on "Speech and Vision Enabled Intelligent Systems"

Date: 18th Nov. 2019 – 23rd Nov. 2019
Coordinator: Dr. P. Vijayalakshmi, Prof., Dr. M. Anbuselvi, Asso. Prof., Dr. W. Jino Hans, Asso. Prof. & Ms. S. Hanis, Asst. Prof.
Sponsors: SSN CE and IEEE SPS
Speakers: Dr. Arulalan, Faculty, Proficience programme, IISc; Dr. Madhavan Mukund, Deputy Director and Dean of Studies, CMI, Chennai; Dr. T. Nagarajan, Prof. & Head, IT, Dr. P. Vijayalakshmi, Prof., Dr. T. T. Mirnalinee, Prof./CSE; Dr. S. S. Suganthi, Technical lead, Tata-Elxsi; Dr. Jino Hans, Asso. Prof.; Dr. Noor Mahammad, IIITDM, Chennai; Dr. M. Anbuselvi, Asso. Prof.; Gayatri Kanthimathi Sukumar, Technical Project Manager/Product Owner, Agriculture division, Trimble; Skanda Prasad Ganapathy, Software Architect, Trimble; Dr. C. Aravindan, Prof./CSE; Dr. B. Bharathi, Asso. Prof./CSE & Dr. C. Chandrasekhar, Prof. & Head / CSE, IIT Madras
Participants: 23 from Academia

EVENTS ATTENDED

1. Dr. S. Sakthivel Murugan, Asso. Prof. participated in the Spirent Global Navigation Satellite System meet 2019 held at Chennai on 11th Jun. 2019.

2. Dr. G. Durga, Asso. Prof. attended faculty training program on "Effective Mentoring" held at SSN CE on 11th Jun. 2019.

3. Mr. S. Karthie & Ms. S. Hanis, Asst Prof(s)., attended faculty training program on "Effective Mentoring" held at SSNCE on 11th Jun. 2019.

4. Dr. S. Sakthivel Murugan, Asso. Prof., Dr. M. Anbuselvi, Asso. Prof., Dr. K. Muthumeenakshi, Asso. Prof., Dr. R. Hemalatha, Asso. Prof. attended the five-day workshop on "Artificial Intelligence for ALL" held at IIITDM, Kancheepuram from 17th to 22nd Jun. 2019.

5. Dr. V. Vaithianathan, Asso. Prof. attended AICTE Sponsored One Week STTP on "From Idea to Implementation: Exploring the Potentials of FPGA in Smart Environment" held at PSG College of Technology, Coimbatore from 17th to 22nd Jun. 2019.

6. Dr. R. Amutha, Prof. attended the workshop on Accreditation held at SSNCE on 22nd Jul. 2019.

7. Dr. S. Joseph Gladwin, Asso. Prof. attended 2019 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting at Atlanta, Georgia, USA from 8th to 12th Jul. 2019.

8. Dr. B. Ramani, Asso. Prof. attended the 6-day FDP on 'Speech and Vision Enabled Intelligent Systems' organized by the Department of ECE, SSN from 18th to 23rd Nov. 2019.

9. Dr. S. Sakthivel Murugan, Asso. Prof. and his research team members Mr. Vimalraj, RS, Ms. S. Swathi, RS, Ms. Noor Mubeena (PG Student) attended the "Ansys Academia - Industry International Conference Meet" held at Velachery on 6th Sep. 2019.

10. Dr. R. Jayaparvathy & Dr. R. Amutha, Prof(s). attended the five days ATAL Workshop on IoT at Anna University from 29th Oct. 2019 to 2nd Nov. 2019.

11. Dr. R. Jayaparvathy, Prof. attended the workshop on Accreditation held at SSNCE on 22nd Jul. 2019.

12. On 29th Nov. 2019, Dr. N. Edna Elizabeth, Prof. attended Computer Security Day talk organized by Society for Electronic Transactions and Security, ACM Chennai Professional Chapter and IEEE Computer Society Madras Chapter held at SETS, Taramani, Chennai.

13. Dr. N. Venkateswaran, Prof. attended the Annual RESPOND Review at SAC, ISRO from 26th Nov. 2019 – 29th Nov. 2019.

TEACHER DEVELOPMENT PROGRAM

ABSTRACT :

On Friday, October 18, 2019, a Teacher Development Programme on Inspired Teaching of Electromagnetics was organized by IEEE Antennas and Propagation Society, Madras Chapter in association with the Department of Electronics and Communication Engineering at SSN College of Engineering, Chennai. A prominent list of speakers from various institutions around India delivered talks related to electromagnetics teaching, highlighting parts of the undergraduate course in electromagnetics that are capable of stimulating interest in students to learn and understand the subject. This report serves to capture the proceedings of this programme and also discuss a few anecdotes which were well-received by the attendees.

INTRODUCTION :

The programme began at 9:05 AM with Dr. Salivahanan, Principal of SSN College of Engineering, welcoming the speakers and the audience. The audience consisted of around thirty participants from various institutions. This was followed by an introductory talk by Dr. Krishnasamy T. Selvan, wherein he outlined the programmes objectives. **Dr. T. V. Somanathan**, who is the Additional Chief Secretary, Special Initiatives and Commissioner of Commercial Taxes, Tamil Nadu was invited to present an inaugural talk. After setting a cordial atmosphere with the audience by sharing a quick story about Tenali Raman, he proceeded to highlight a few important points about the responsibility that teachers hold. Some of the takeaways are

Dr. Somanathan presenting a short story about Tenali Raman

1. A limited curriculum taught well is better than an extensive curriculum taught poorly.
2. In some cases, bad teaching can lead to students disliking the subject as a whole. Such a situation is unfortunate for both the students and the teacher involved and must be avoided
3. Teachers who prepare for their lectures are better for a classroom full of students than those who extemporize

He shared a few examples to emphasize that an active teacher who can incorporate some humour in their lectures are more likely to retain the attention of students.

FORENOON SESSION:

Dr. S. C. Sahasrabudhe, Former Deputy of IIT-Bombay commenced the morning session by presenting his talk on the Role of electromagnetics in a classroom. He started with a quote by Albert Einstein - “Education is what remains after one has forgotten what one has learned in school”.

He proceeded to describe the topics that attracted him to the field and offer an extensive learning experience:

- Action at a distance
- Potential
- Fields - E, M
- Retarded potential
- EM waves
- Vector potential
- The laws of electromagnetism
- Maxwell’s equations

Dr. Sahasrabudhe summarizes what a typical engineering course offers

Following Dr. Sahasrabudhe was **Dr. R. K. Shevgaonkar**, Vice Chancellor of Bennett University, Noida who presented a talk titled Excitement in Electromagnetics. He made a few particularly interesting correlations to about electromagnetic concepts, with regard to satellite and wireless communication. His talk inspired students to re-think how they view electromagnetics and the power of seemingly small concepts. He presented several examples like fiber channels, RADARS and the Giant Meter-Wave Telescope to support the fact that electromagnetics is omnipresent in daily life applications that it’s possible to view a large array of applications in the present context

Dr. Shevgaonkar giving insightful takeaways from electromagnetic applications

He proceeded to justify that inspired teaching is possible only by

- Having a thorough understanding of the fundamentals
- Defining the objective of a course clearly
- Reading without bias
- Using resources that have been written with an intention to inspire students (He cited Feynman’s lecture series as an example).

Next in the line of speakers was **Dr. S. V. Kulkarni**, Professor in the Department of Electrical Engineering at IIT-Bombay who talked about Insights into Maxwell's equations. He spoke in-depth about Maxwell's equations, Faraday's law, Displacement current, Lorentz force, Motion of a charged particle, Theory of Eddy currents and the limits of Maxwell's equations. He argued that the magnetic vector potential should be referred to as the kinetic momentum vector instead, due to its precise nomenclature. Dr. Kulkarni also commended the speakers before him and agreed with their ideas and suggestions strongly.

Dr. Kulkarni receives a memento from Dr. Joseph Gladwin

Dr. Selvan explains the concept of displacement current

Then, **Dr. Krishnasamy T. Selvan**, Founder of the IEEE Antennas and Propagation Society, Madras Chapter and Professor in the Department of ECE at SSN College of Engineering, explained the evolution of the idea of Maxwell's displacement current. He supported the statements made by his colleagues and proceeded to explain how Maxwell formulated the explanation of displacement current in the second edition of A treatise on Electricity and Magnetism, released in 1881. He also emphasised that students and teachers must have understanding regarding the nature and purpose of research, citing Maxwell's philosophical values.

AFTERNOON SESSION:

The afternoon session of the programme began with a talk titled An insight into electromagnetic polarization by **Dr. Basudeb Ghosh**, who is part of the faculty of avionics at IIST Trivandrum. By incorporating the method of teaching via visualization referenced by the previous speakers, Dr. Ghosh explained the topics of linear, circular and elliptical polarization and the corresponding relations with the field equations.

Dr. Basudeb visualizing and explaining Poincare Sphere in 3D

Dr. Uday listening to a question posed by Dr. Sahasrabudhe about the poster presentations

The final speaker was **Dr. Uday Khankoje** from the Department of Electrical Engineering, IIT-Madras who conducted various Experiments in electromagnetics teaching and talked about his experience with the same. He believes that certain concepts in electromagnetics can help connect the dots in many fields of engineering and exemplified his claim by referencing several concepts that students would encounter in their Bachelor's degree. At IIT-Madras, he conducts a poster day in which students have to form groups, pick a theme and make a report in the standard A1-size paper. He includes this as a part of the subject's curriculum to further motivate students to come up with unique ideas. He also conducts a small feedback session after every lecture wherein he urges his class to write one thing they understood and one thing they did not, about the lecture. This helps him identify parts of the subject that most students tend to find difficult and he then focuses on clarifying those concepts in the following lectures.

CONCLUSION:

Dr. Joseph Gladwin, Secretary of IEEE Antennas and Propagation Society, Madras Chapter and Associate Professor in the Department of ECE at SSN College of Engineering, gave a few concluding remarks about the programme. This was followed by a feedback session that saw participants describing their experience. The participants expressed that the event had exceeded their expectations, and that another edition of the programme the following year would be appreciated. On this positive note, the programme came to an end.

The speakers, the attendees and the volunteers of the event

Shilpa J R
Sundar Sripada V S
IV,B

PROFESSIONAL ROLES

1. Dr. N. Venkateswaran, Prof. was appointed as examiner and examined the Ph.D. thesis for Periyar Maniammai Institute of Science and Technology, Thanjavur and Sathyabama Institute of Science and Technology, Chennai in two different occasions.

2. Dr. M. Gulam Nabi Alsath, Asso. Prof. conducted DC meeting for his research scholar Ms. V. Aruna, Mr. V. Yokesh, Ms. Devi Sowjanya and Ms. N. Kavitha during Jun. & Jul. 2019. As DC member, he also attended DC meetings conducted at SRM University and Sri Venkateswara College of Engineering during Jun. and Aug. 2019.

3. Dr. R. Amutha, Prof. conducted an interview for the JRF post for the project "Design of game-based communication platform for children with cerebral palsy" on 8th Jun. 2019. She also acted as an interview panel member for Ph.D. scholar selection under NDF scheme.

4. Dr. S. Ramprabhu, Asso. Prof. conducted the DC meeting for his research scholar Mr. M. Lingeshwaran on 25th Jul. 2019 and attended the DC meeting of Mr. N. Kanniyappan as a DC member at Valliammai Engineering College, Kattankulathur on 01/08/2019.

5. Dr. K. J. Jegadish Kumar, Asso. Prof. acted as External examiner for the viva-voce of a research scholar at Gujarat Technological University, Gujarat on 15th Jun. 2019.

6. Dr. R. Amutha, Prof. as DC members attended the synopsis meeting at SRM University and Sathyabama University during Jun. & Jul. 2019. She also convened DC meeting for her scholars Ms. Ponuma, Ms. Hanis, Asst. Prof. & Ms. K. Ashwini.

7. Dr. B. Ramani, Asso. Prof. reviewed a paper for the 5th International Conference on Fuzzy Systems and Data Mining (FSDM 2019) to be held in Kitakyushu City, Japan during October 18-21, 2019. She also reviewed an article submitted to International Archives of Otorhinolaryngology.

8. Ms. S. Hanis, Asst. Prof. reviewed a paper for Springer's The Arabian Journal for Science and Engineering and Elsevier's Optics and Lasers in Engineering.

9. Dr. M. Gulam Nabi Alsath, Asso. Prof. reviewed articles submitted to IEEE Antennas and Wireless Propagation Letters, IEEE Antennas and Propagation Magazine and International Journal of RF and Microwave Computer Aided Engineering. As Associate Editor of IET Microwaves Antennas and Propagation, he also edited 8 papers and submitted recommendations to the Editor-in-Chief. In addition he also reviewed three research proposals submitted to DST SERB under CRG scheme and the recommendations were sent to the Member Secretary.

10. Dr. S. Ramprabhu, Asso. Prof. reviewed papers for IET Microwaves, Antennas & Propagation, IEEE Antennas and Wireless Propagation Letters, COMPEL: The International Journal for Computation and Mathematics in Electrical and Electronic Engineering, International Journal of RF and Microwave Computer Aided Engineering, International Conference on Electrical Energy Systems (ICEES 2020) conducted by EEE, SSNCE and IEEE Transactions on Electromagnetic Compatibility.

11	Dr. K. T. Selvan, Prof. reviewed papers for IEEE Antennas and Wireless Propagation Letters, IEEE Antennas and Propagation Magazine, International Journal of RF and Microwave Computer Aided Engineering and Microwave and Optical Technology Letters. He also reviewed papers for the Asia Pacific Microwave Conference to be held in December 2019 at Singapore and the 14th European Conference on Antennas and Propagation to be held in Denmark in March 2020
12	Dr. R. Jayaparvathy, Prof. was invited as an Expert for Academic Audit at B.S.Abdur Rahman Crescent Institute of Science and Technology, Chennai on 4th Jul. 2019.
13	Dr. K. K. Nagarajan, Asso. Prof. conducted the confirmation DC meeting for his research scholar Ms. K. Sumathi on 4th Jul. 2019.
14	Dr. K. Muthumeenakshi, Asso. Prof. conducted DC meeting for her full-time research scholar Ms. I. Divya on 16th Jul. 2019. As DC member, she also attended two DC meetings at SRM Institute of Science and Technology, Kattankulathur.
15	Dr. C. Annadurai, Asso. Prof. as DC member, attended a DC meeting at SRM Institute of Science and Technology, Kattankulathur and Muthayammal Engineering College, Rasipuram.
16	Dr. S. Sakthivel Murugan, Dr. B. Ramani, Dr. S. Ramprabhu, Asso. Prof(s)., conducted first DC meeting for their full-time research scholars during Jul. 2019.
17	Dr. R. Jayaparvathy, Prof. as DC member, attended the DC Meeting in the ECE Department, SRM Institute of Science and Technology, Kattankulathur on 29th Jul. 2019.
18	Dr. S. Radha, Prof. & Head presented the progress of “Centre of Excellence on Smart Technology” to RAC members in the meeting held at New Delhi on 29th Jul. 2019.
19	Dr. R. Jayaparvathy, Prof. co-ordinated the PhD Interview process and admission under the AICTE-NDF (National Doctoral Fellowship) programme. The Interview was conducted on 8th Jun. 2019 and the admissions were scheduled between 18th and 22nd Jul. 2019.
20	Dr. M. Gulam Nabi Alsath, Asso. Prof. is recognized and elevated to Senior Member Grade in IEEE.
21	Dr. A. Jawahar Prof. as DC member attended the synopsis meeting on 16th Aug. 2019 at Institute of Remote Sensing, Anna University, Chennai.
22	Dr. S. Salivahanan, Principal & Chief Coordinator and Dr. A. Jawahar, Professor, Department of ECE & Coordinator for Margdharshan Scheme participated in the meeting held on 18th July 2019 at AICTE HQ, New Delhi.
23	Dr. R. Jayaparvathy, Prof. visited Arya College of Engineering and Information Technology, Jaipur as an Expert Evaluator for ECE Program as part of the Expert team of the National Board of Accreditation (NBA) from 31st Aug. to 2nd Sep. 2019.
24	Dr. P. Vijayalakshmi, Prof. is appointed as Margdharshak by AICTE New Delhi on 5th Sep. 2019.
25	Dr. A. Jawahar, Prof. is appointed as a Margadarshak by AICTE New Delhi on September 5, 2019.

26 Dr. A. Jawahar, Prof. has been nominated as Academic Council member and attended XVI meeting of the Academic Council of VISTAS held on September 27, 2019.

27 Dr. B. S. Sreeja and Dr. M. Gulam Nabi Alsath, Asso. Prof(s). received the SSN Best Teacher Award during the Teacher's Day celebrations on 5th Sep. 2019. During the day's celebration, Dr. S. Sakthivel Murugan, Asso. Prof. received CTS Best Teacher Award for the year 2019.

28 Dr. G. Durga, Asso. Prof. reviewed a paper for Journal of Computational Electronics.

29 Dr. S. Sakthivel Murugan, Asso. Prof. conducted DC meeting to confirm the PhD work of his full time research scholar Ms. Mary Cecilia & Mr. K. Balaji on 30th and 31st Oct. 2019.

30 Dr. P. Vijayalakshmi, Prof. reviewed one journal each submitted to Journal of the Acoustical Society of America (JASA) and IETE technical review and four papers submitted to INTERSPEECH 2019.

31 Dr. A. Jawahar was invited as an expert member to audit the question papers and corrected answer papers during post academic audit held on 16th October 2019 at VIT Chennai.

32 Dr. A. Jawahar, Prof. attended the Question Paper Scrutiny Board meeting in the capacity as a member of the Scrutiny Board of Electronics & Communication Engineering for the Nov/Dec 2019 Examinations at Jerusalem College of Engineering, Chennai on 2nd Nov. 2019.

33 Dr. S. Radha, Prof. & Head; Dr. M. Gulam Nabi Alsath & Dr. S. Ramprabhu, Asso. Prof(s) received the publication excellence award from IEEE Madras Section during the IEEE day held on 3rd Nov. 2019.

34 Dr. S. Radha, Prof. & Head conducted Ph.D. Viva-voce for her part time research scholar Ms. Ranjana, Asst. Prof. at Sairam Engineering College on 21st Nov. 2019.

35 Dr. S. Esther Florence, Asso. Prof. conducted the doctoral committee meeting for the confirmation of provisional registration of her full-time research scholar Ms. Abirami.

36 Dr. K. T. Selvan, Prof. was nominated by AU Vice Chancellor to be a member in the Board of Studies of the Department of ECE, Kongunadu College of Engineering and Technology, for a period of three years from 2019.

37 Dr. P. Vijayalakshmi, Prof. is nominated by AU Vice Chancellor to be a university nominee in the Board of Studies of the Department of ECE, Government College of Engineering, Bargur, for a period of three years from 2019.

38 Dr. M. Anbuselvi, Asso. Prof. reviewed one journal each submitted to 'Circuit World Journal and IEEE Access Journal.

39 Dr. R. Jayaparvathy, Prof. was appointed by the NBA as an Expert Evaluator in the Accreditation Team that visited Rise Krishna Sai Prakasam Group of Institutions, Ongole, Andhra Pradesh during 29th Nov - 1st Dec 2019.

40 Dr.N.Venkateswaran, Prof. conducted the Doctoral Committee meeting for his scholars Mr. Ashok and Ms. Angeline Beulah.

RESEARCH NEWS

EXTERNAL FUNDED PROJECTS:

1. Dr. R. Vimal Samsingh, Asso. Prof./Mech as PI, Dr. S. Esther Florence, Asso. Prof. as Co-PI has submitted a proposal to DST-SERB CRG titled "Integrated Structural Design and Development of Mechanically Robust RADAR absorbing composite" worth Rs. 27.26 Lakh.

2. Dr. W. Jino Hans, Asso. Prof. as PI, Dr. N. Venkateswaran, Prof. and Dr. I. Nelson, Asso. Prof. as Co-PIs submitted a project proposal titled "Development of a real-time animal detection system for Indian roads using computer vision technique" for a possible grant of Rs. 34 Lakh to DST under CRG scheme.

3. Dr. R. Kalidoss, Asso. Prof. as PI, Dr. K. S. Vishvaksenan, Asso. Prof. and Dr. B. Partibane, Asso. Prof. as Co-PIs submitted a project proposal titled "Investigations and Experimental studies on the development of planar antenna arrays for 5G communications" for a possible grant of Rs. 34.49 Lakh to DST under CRG scheme.

4. Dr. K. J. Jegadish Kumar, Asso. Prof. as PI and Dr. M. Gulam Nabi Alsath, Asso. Prof. as Co-PI submitted a project proposal titled "Theoretical and experimental analysis of High-performance Implantable antenna for wireless body area networks" for a possible grant of Rs. 21.99 Lakh to DST under CRG scheme.

5. Dr. S. Kirubaveni, Asso. Prof. as PI, Dr. S. Radha, Prof. & Head and Dr. M. Gulam Nabi Alsath, Asso. Prof. as Co-PIs submitted a project proposal titled "Design and Fabrication of IOT Enabled Metal Oxide Based VOC and Toxic Nano Gas Sensor" for a possible grant of Rs. 30 Lakh to DST under CRG scheme.

6. Dr. S. Ramprabhu, Asso. Prof. as PI, Dr. M. Gulam Nabi Alsath and Dr. A. Murugesan as Co-PIs submitted a project proposal titled "Development of flexible frequency selective surface based guard for minimizing electromagnetic radiations from mobile phones" for a possible grant of Rs. 14 Lakh to DST under CRG scheme.

7. Dr. I. Nelson, Asso. Prof. as PI, Dr. W. Jino Hans, Asso. Prof. and Ms. S. Hanis, Asst. Prof. as Co-PIs submitted a project proposal titled "Investigations on Smart Fishing by tracking fish abundance in Indian Coast using Computer Vision Techniques" for a possible grant of Rs. 74.73 Lakh to DST under CRG scheme.

8. On 31st Jul. 2019, Dr. S. Radha, Prof & Head presented their project titled "Integrated two-stage hybrid fraphene-hydrogel biochar based electrochemical technology for recovery of water & real-time monitoring of electroplating effluent" to the DST-TDT panel members. The project PIs are: Dr. P. Jegathambal, Prof &Head/ Water Institute, Karunya Institute of Technolgy & Sciences, Dr. S. Radha, Prof & Head, SSNCE. The Co-PIs are Dr. K. Muthumeenakshi & Dr. B. S. Sreeja, Asso. Prof.s . The worth of the project is Rs. 120 Lakh.

9. The research proposal titled "Integrated two-stage hybrid grapheme–Hydrogel biochar based electrochemical technology for recovery of water & real-time monitoring of electroplating effluent" submitted under Technology Stream and Technology Validation Stream call for "Optimal Water Use in Industrial Sector-2018" has been technically recommended for funding by the DST for a duration of 3 years. The worth of the project is Rs. 81 Lakh. The Lead PI for the Project is Dr. P. Jagathambal, Professor,

Water Institute – A Centre of Excellence Water Institute Department, Karunya Institute of Technology and Sciences Karunya Nagar, Tamil Nadu -641 114 and Dr. S. Radha, Prof. & Head, is the PI from SSNCE, Dr B.S. Sreeja & Dr. K. Muthumeenakshi, Asso. Prof. are Co-PI.

10. The research proposal titled "Development of Ultrasonic Sensors for Monitoring Heavy Mineral Accumulation in the Littoral Zone of Mahabalipuram Coast" got sanctioned by the TNSCST, Govt. of Tamil Nadu, worth Rs. 4.8 Lakh under TNSCST – PRG Grant. Dr. S. Radha, Prof. & Head, and Dr B.S. Sreeja, Asso. Prof. are PI & Co-PI of the project.

11. Dr. K. Nirmala Asso. Prof./BME as PI and Dr. C. Vinoth Kumar Asso. Prof./ECE as Co-PI has submitted a proposal to DST-SEED titled "Non-invasive portable system to screen the blood cell count using optical image of nail-fold microcirculation", for a grant of Rs. 21.62 Lakh.

12. Dr. S. Radha, Prof. & Head as PI, Dr. R. Kishore, Dr. R. Hemalatha, Asso. Prof(s). & Dr. R. Selvarajan, ICAR as Co- PIs, Dr. Michael Segal, Dr. Shlomi Dolev, submitted a joint project proposal titled "Efficient water management in agricultural fields using mule based sensor networks", to SPARC for a grant of Rs. 1,24,07,902/-.

13. Dr. R. Kishore, Asso. Prof. as PI, Dr. N. Edna Elizabeth, Prof. & Dr. N. Prabagarane Asso. Prof. as Co-PI, and Dr. Shlomi Dolev, Dr. Michael Segal, Israel submitted a joint research proposal titled "Development of near-optimal algorithm for the clustering of vehicles on highways in terms of safety and throughput of the traffic", to SPARC for a grant or Rs.1,17,89,668/-.

14. Dr. R. Kishore, Dr. M. Gulam Nabi Alsath, Dr. N. Prabagarane, Asso. Prof(s)., Dr. N. Edna Elizabeth & Dr. S. Radha, Prof(s). and Dr. Jin Mitsugi, Dr. Yuki Sato, Mr. Taisuke Sato, Keio University, Fujisawa, Kanagawa, Japan submitted a joint research proposal to DST-JSPS under India-Japan cooperative science programme for Rs. 30,00,000/- (SSN Budget: 14,94,200)

15. Dr. R. Jayaparvathy, Prof. & Prof. Tadashi Dohi, Department of Information Engineering, Hiroshima University, Japan as PI and Prof. Hiroyuki Okumara, Department of Information Engineering, Hiroshima University, Japan submitted a proposal for a grant of Rs. 60, 00,000/- under SPARC.

16. Dr. N. Padmapriya (Maths) Asso. Prof. as PI, and Dr. N. Venkateswaran, Prof. submitted a project proposal titled "Development of an Automated system for Early diagnosis of Pediatric Myopia using ocular IR thermal imaging and Deep Learning", for a possible grant of Rs. 27 Lakh to DST under CRG scheme.

17. The SSN funded faculty research project titled "Development of Computer-aided Analysis for the diagnosis of Ocular Diseases using IR thermal imaging" was presented to the ethical committee on 28.09.2019. Dr. N. Padmapriya (Maths) PI and Dr. N. Venkateswaran (ECE) is the Co-PI.

18. Dr. N. Venkateswaran, Prof. as PIs submitted a project proposal titled "Design of Solar Powered GIS Aided Autonomous Boat for Harvesting at Potential Fishing Zones", a possible grant of Rs. 64 Lakh to DST under STDS.

INTERNALLY FUNDED PROJECTS:

1. Dr. S. Sakthivel Murugan, Asso. Prof. "Establishment of underwater acoustic test tank," worth Rs. 6 Lakh

2. Dr. K. J. Jegadish Kumar, Asso. Prof. & Dr. M. Gulam Nabi Alsath, Asso. Prof., "Design and fabrication of compact implantable dual band antenna integrated with an implantable medical device for biotelemetry applications," worth Rs. 2 Lakh.

INTELLECTUAL PROPERTY RIGHTS:

1. Dr. M. Gulam Nabi Alsath, Asso. Prof., Dr. S. Kirubaveni, Asso. Prof., Ms. B. Pranamika, (UG-ECE 2015-2019 batch) filed a patent for their invention titled "Ultra-Wideband (UWB) Reconfigurable Filtering Antenna: A Method & Device Thereof". Application No.: 201941033454.

2. Dr. P. Vijayalakshmi, Prof., Dr. T. Nagarajan, Prof & Head/IT, Ms. T.A. Mariya Celin, RS filed a patent titled "A Speech-input Speech-output Communication aid (SISOCA) for speakers with cerebral palsy". Application No.: 201941031287.

3. Dr. S. Esther Florence, Asso. Prof., Ms. B. Harini, UG-ECE 2016-2020 batch & Mr. M. S. Vignesh, UG-CSE 2015-2019 batch filed a patent titled "Flexible Wearable Sensor for Wireless Screening of Obstructive Sleep Apnea". Application number: 201941048258.

JOURNAL ARTICLES:

1. K. Ashwini, RS; R. Amutha, Prof.; "Sparse based image fusion using compact sub-dictionaries," Journal of Engineering Science and Technology, vol. 14, no. 3, pp. 1231-1247, 2019.

2. N. Edna Elizabeth, Prof.; S. Varsha (UG-ECE 2015-2019 batch); A. R. Tharun Kishor (UG-ECE 2015-2019 batch); S. Saihariharan (UG-ECE 2015-2019 batch); "Performance analysis of Cryptographic Primitives" in the Caribbean Journal of Science, vol. 53 (2), pp. 2490-2496, 2019.

3. M. Anbuselvi, Asso. Prof.; P. Saravanan, Asso. Prof./EEE; "Efficient fuzzy feature matching and optimal feature points for multiple objects tracking in fixed and active camera models;" Journal Multimedia Tools and Applications, pp. 1-26, 2019.

4. V. Lingasamy, RS; K. T. Selvan, Prof.; P. H. Rao, (Scientist/SAMEER); "Performance Comparison of Stepped and Smooth Dielectric Lens-Loaded Flat Reflectors," Progress in Electromagnetics Research M, vol. 81, pp. 203-213, 2019.

5. R. Kiruthika, RS; S. Radha, Prof. & Head; S. Kirubaveni, Asso. Prof.; E. Priyadharshini, (PG-AE 2016-2018 batch); Mr. R. Govindaraj, SSNRC; N. Santhosh, SSNRC; P. Ramasamy, Dean (Research); "Experimental study of different Vanadium dopant concentrations in Zno nanorods for a low frequency piezoelectric accelerometer," Journal of Electronics Materials, pp. 1-13, 2019.

6. M. Kavitha, RS; N. Venkateswaran, Prof.; "An Ultra-Thin Triple-Band Polarization-Independent Wide-Angle Microwave Metamaterial Absorber," Plasmonics, Springer Journal, pp.1-9, 2019.

7. N. Padmapriya, Asst. Prof./Maths; N. Venkateswaran, Prof.; K. Vijayalakshmi (UG-ECE 2014-2018 batch); G. K. Mallieswaran, VIT Chennai; R. Padmanabhan, Prof./VIT Chennai; "Characterization of friction stir welds by logistic regression using fractal and wavelet features," Journal of Advances in Materials and

Processing Technologies, pp.1-17, 2019.

8. B. Arun Kumar (PG-CS 2017-2019 batch), S. Sakthivel Murugan, Asso. Prof.; "Seawater-Activated Battery: Developing Prototype for Underwater Alternative Energy Source," Journal Sea Technology, 2019.

9. V. Lingasamy, RS; K. T. Selvan, Prof.; "A comparison of planar convex dielectric lens loaded flat reflector with parabolic reflector and reflectarray," Microwave and Optical Technology Letters, 2019.

10. S. Padmathilagam, RS/CEG; S. Sangeetha, Faculty/VIT; K. Malathi, Faculty/CEG; M. Gulam Nabi Alsath, Asso. Prof.; T. Deepa, PG scholar/CEG; N. Rajesh, Faculty/VIT; P. Sandeep Kumar, Faculty/SRM; T. Rama Rao, Faculty/SRM; "Integration of Slot Array with MIMO Antenna for 4G and 5G Applications," Springer's Wireless Personal Communications, 2019.

11. Saffrine Kingsly, Faculty/VIT; T. Deepa, PG scholar/CEG; K. Malathi, Faculty/CEG; M. Gulam Nabi Alsath, Asso. Prof.; P. Sandeep Kumar, Faculty/SRM; T Rama Rao, Faculty/SRM; S. Sangeetha, Faculty/VIT; S. Padmathilagam, RS/CEG; G. Geetha, Faculty/CEG; "Tunable Band Notched High Selective UWB Filtering Monopole Antenna," IEEE Transactions on Antennas and Propagation, vol. 67, no. 8, pp.5658 - 5661, 2019.

12. N. Rajesh, Faculty/VIT; M. Gulam Nabi Alsath, Asso. Prof.; K. Malathi, Faculty/CEG; B. Sridhar, Faculty/MSAJCE; M. Shanmugapriya, Faculty/CEG; "Integrated Vivaldi Antenna for UWB/Diversity Applications in Vehicular Environment," International Journal of RF and Microwave Computer-Aided Engineering, Wiley, 2019.

13. R. Shanthapriya, RS, V. Vaithianathan, Asso. Prof., "Secured healthcare monitoring system in wireless body area network using polynomial based technique," Polish Journal of Medical Physics and Engineering, vol. 25 (3), pp. 171-177, 2019.

14. Ramprabhu Sivasamy, Asso. Prof., K. Malathi, Prof./CEG, "A novel miniaturized frequency selective surface," International Journal of RF And Microwave Computer-Aided Engineering, Wiley, 2019.

15. Ramprabhu Sivasamy, Asso. Prof. and K. Malathi, Prof./CEG; "Design and fabrication of flexible FSS polarizer," International Journal of RF And Microwave Computer-Aided Engineering, Wiley, 2019.

16. S. Famila, RS, A. Jawahar, Prof., "Improved artificial bee colony optimization-based clustering algorithm for SMART sensor environments", Peer-to-Peer Networking and Applications, pp. 1-9, 2019.

17. K. Tamilarasi, RS, A. Jawahar, Prof., G. Senthilkumar, N. R. Shanker, "Diagnosis of Delusion and Hallucination from Schizophrenia Patient Using RADWT", Journal of Medical Systems, 2019.

18. Kannagi Varadarajan, RS, A. Jawahar, Prof., "Epidermal Antenna in Palmar Arch Region for Anemia Detection to Avoid Peripheral Perfusion Artifact in Optical Sensor During Hemoglobin Measurement", Microsystem Technologies, 2019.

19. Sathyapriya Loganathan, RS, A. Jawahar, Prof., "Energy centroid clustering algorithm to

enhance the network lifetime of wireless sensor networks", Multidimensional Systems and Signal Processing, 2019.

20. S. Famila, RS, A. Jawahar, Prof., "Improved Artificial Bee Colony Optimization-Based Clustering Technique for WSNs", Wireless Personal Communications, 2019.

21. S. Rajkumar, RS, K. T. Selvan, Prof., "Compact hybrid Sierpenski Kock fractal UWB MIMO antenna with pattern diversity," International Journal of RF and Microwave Computer Aided Engineering, October 2019.

22. G. Nithyanandham, RS/ECE, K. J. Jegadish Kumar, Dr. M. Gulam Nabi Alsath, Asso. Prof(s), S. Vidyashree, JRF, "Design of a Dual-Band Circular Implantable Antenna for Biomedical Applications," IEEE Antennas and Wireless Propagation Letters, November 2019.

23. V. Aruna, RS, M. Gulam Nabi Alsath, S. Kirubaveni, Asso. Prof(s)., M. Maheswari, PG-CS 2017-2019, "Flexible and Beam Steerable Planar UWB Quasi-Yagi antenna for WBAN," IETE Journal of Research, November 2019.

24. K. Nirmala, Asso. Prof./BME, C. Vinoth Kumar, Asso. Prof., "Hybrid feature vector based detection of Glaucoma", Multimedia Tools and Applications, vol. 78, no. 24, pp. 34247 - 34276, 2019.

25. A. Sheeba Angel, RS and R. Jayaparvathy, Prof., "Performance modeling of an intelligent emergency evacuation system in buildings on accidental fire occurrence Safety Science, vol. 112, pp. 196-205, 2019.

26. S. R. Ramesh, RS and R. Jayaparvathy, Prof., "Artificial neural network model for arrival time computation in gate level circuits", Automatika, vol. 60, no. 4, pp. 397 - 404, 2019

27. S. Annapoorani, UG ECE 2018 Batch, R. Jayaparvathy, Prof., B. N. Priyanka, SSN, "Performance Enhancement of a Single-Stage CUK Based Three Phase Photovoltaic Inverter using ANFIS Controller," International Journal of Innovative Technology and Exploring Engineering, vol. 8, no. 11, 2019.

28. S. Karthie, Asst. Prof. and S. Salivahanan, Prof. & Principal, "Fractally slotted patch resonator based compact dual-mode microstrip bandpass filter for Wireless LAN applications", AEU-International Journal of Electronics and Communications, vol. 107, pp. 264 - 274, 2019.

29. S. Karthie, Asst. Prof. and S. Salivahanan, Prof. & Principal, "Fractal-based triangular bandpass filter with a notched band for interference rejection in wideband applications," Circuit World, vol. 45 No. 3, pp. 141-147, 2019.

30. P. Kaythry (ASP/ECE), R. Kishore (ASP/ECE) & V. Nancy Priyanka (PG Student): Performance analysis of LT code-based HARQ error control in underwater acoustic sensor networks, Journal of Marine Engineering & Technology, June 2019, Thomson Reuters, Impact factor: 0.548, DOI: 10.1080/20464177.2019.1632682.

31. Muthu Lekshmi V S, Harish Kumar K (UG Students 2019)and Venkateswaran N, Professor, Published a Book Chapter titled "Efficient Computation of Sparse Spectra Using Sparse Fourier Transform",in the Emerging Trends in Computing and Expert Technology, Springer, Nov 2019.

CONFERENCE PRESENTATIONS:

1. S. Johanan Joy Singh, RS/IT; P. Vijayalakshmi, Prof., T. Nagarajan, Prof & Head/IT; "Development of Large Annotated Music Datasets using HMM based Forced Viterbi Alignment," in IEEE TENCON'19, October 2019 held at Kerala.

2. M. Nanmalar, RS/IT; P. Vijayalakshmi, Prof., T. Nagarajan, Prof. & Head/IT; "Literary and Colloquial Dialect Identification for Tamil using Acoustic Features" in IEEE TENCON'19, October 2019 held at Kerala.

3. T. Lavanya, RS; K. Mrinalini, RS; P. Vijayalakshmi, Prof.; T. Nagarajan, Prof. & Head/IT; "Histogram Matching based Optimized Energy Redistribution for Near End Listening Enhancement," in IEEE TENCON'19, October 2019 held at Kerala.

4. Melvin C. Jose, RS; S. Radha, Prof. & Head; B. S Sreeja, Asso. Prof.; Pratap Kumar, RS; "Design of 28 GHz High Gain 5G MIMO Antenna Array System", in IEEE TENCON'19, October 2019 held at Kerala.

5. A. Elakkiya, RS; S. Radha, Prof. & Head; E. Manikandan, Asst. Prof./BSARCIST; B. S. Sreeja, Asso. Prof.; "Design and Numerical Analysis of Tri-band Terahertz Metamaterial," in IEEE TENCON'19, October 2019 held at Kerala.

6. Joannes Sam Mertens J, Dr.Edna Elizabeth, Dr. Kaythry.P, "Vehicle to Infrastructure Based Automobile Pollution Monitoring System" 1st International Conference on Recent Trends in Clean Technologies for Sustainable Environmental, 26th-27th September 2019, SSN College of Engineering, Tamil Nadu-603110, India.

7. Harika Sridharan, Seyezhai Ramalingam, Jawahar A, "Investigation of Dc Fast Charging Topologies for Electric Vehicle Charging Station (Evcs)," IEEE Tencon 2019. held on 17 - 20 October 2019, at Hotel Grand Hyatt, Bolgatty, Kochi, Kerala, India.

CONSULTANCY SERVICES

1. Dr. S. Sakthivel Murugan, Asso. Prof. signed a consultancy for Rs.5900/- to be carried in Underwater Acoustic Research Lab (UWARL) with Ms. Menaka from SRM University for testing of localization algorithm in underwater environment on 17th Jul. 2019.

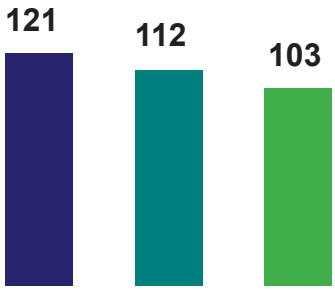
2. Dr. S. Radha, Prof & Head, Dr. M. Gulam Nabi Alsath, Asso. Prof., Dr. S. Ramprabhu, Asso. Prof., Dr. S. Esther Florence, Asso. Prof. executed consultancy work for Mr. Sandeep, Research Scholar, Andra University and generated a revenue of Rs. 5900/-.

3. Dr. S. Radha, Prof & Head , Dr. M. Gulam Nabi Alsath, Asso. Prof., Dr. S. Ramprabhu, Asso. Prof. , Dr. S. Esther Florence, Asso. Prof. executed consultancy work for Mr. Suresh Kumar, Scientist, TIRF, Pune and generated a revenue of Rs. 10030/- on 18th Oct. 2019.

STUDENTS' CORNER

PLACEMENT REPORT:

UG:



No. of companies visited : 103
Total no. of offers :161

PG:

No. of students placed in ME AE - 1

No. of students placed in ME VLSI - 4

No. of students placed in ME CS - 4

Total no. of students registered

Total no. of eligible students

Total no. of students placed

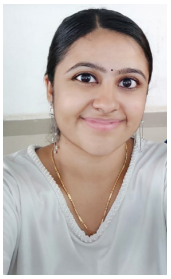
Super Dream Companies:

- NAVIS
- McKinsey
- ClariTrics India Private Ltd.
- Goldman Sachs
- Citibank
- Paypal
- Google
- Accolite Software Pvt. Ltd.
- Thorogood
- Viasat
- Think & Learn (BYJU'S)
- Commvault
- Jaro Education
- Avalara Technologies

Students placed in Super Dream Companies:

Sanjana Ganesh
(Citibank) - 13LPA

Nandhini K
(Citibank) - 13LPA



Aishwarya Narayanan
(McKinsey) - 10LPA

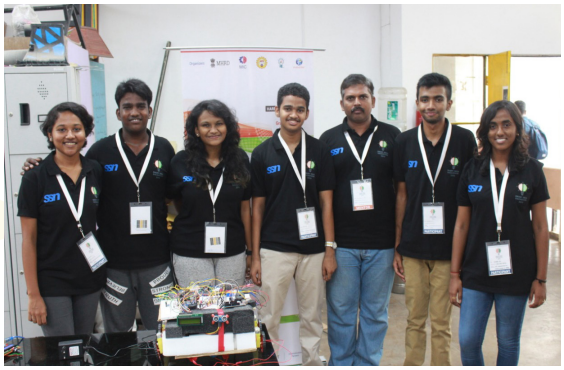
M. Purvaja
(Citibank) - 13LPA

STUDENT PROJECT COMPETETIONS:

1. From 8th to 12th Jul. 2019, Dr. W. Jino Hans, Asso. Prof. participated as a mentor for the team “Infinity Clones” in Smart India Hackathon - Hardware Edition 2019 held at IISER, Pune. The student participants were: Ms. D. P. Sharavanee, Ms. M. P. Shwetha, Ms. R. Kirthana, Mr. Aparajith Srinivasan from III year and Mr. S. Surendran & Mr. S. Suryaprakash from III year/Chemical. The team won first prize worth Rs. 75,000/-.

Infinity Clones winnning 1st place-SIH’19

2. Dr. S. Sakthivel Murugan, Asso. Prof. mentored the team “Ctrl + Alt + Elite” in the finals of Smart India Hackathon - Hardware Edition held at IIT Delhi held from 8th - 12th Jul. 2019. The team members were: Mr. S. Shrinivas Badri, Mr. Mohammed Fayaz from III year, Mr. Saravanan, Ms. Samyuktha, Ms. Shivani, Ms. Saranya from III year/IT.



‘Ctrl + Alt + Elite’ Team at IIT Delhi for SIH’19

3 Dr. K. J. Jegadish Kumar, Asso. Prof. mentored the team “Still variables” in the finals of Smart India Hackathon - Hardware Edition held at SRM Institute of Science and Technology, Kattankulathur from 8th - 12th Jul. 2019. The team members were: Ms. Pooja Shankar, Ms. R. Sinciga, Ms. P. Vigneswari, Mr. L. Nidhin, Mr. K. Vignesh from IV year & Mr. M. Balaji from III year.

4 Dr. K. K. Nagarajan, Asso. Prof. attended Smart India Hackathon 2019 Hardware Edition as mentor for the team “Hardware Hackerz” at Forge Accelerator, KCT Tech Park, Coimbatore from 8th - 12th Jul. 2019. The team members were: Mr. S. Sanjay, Ms. S. Swetha, Mr. Vinayak Hebbar, Mr. Sumit Kumar from III year and Mr. Dinesh kumar, Mr. Adithya Avinash from IV Year.

Hardware Hackerz’ project display at SIH’19

5 ‘Team Butterflies’ with C. Kiruthika, UG-ECE 2017-2021 batch, as team leader & Dr. W. Jino Hans, Asso. Prof. as mentor has been selected to display their project at the finals of IEEE YESIST12-Maker fair to be held at Stamford International University, Bangkok, Thailand during Sep. 7th & 8th, 2019.

Team Butterflies’ project display at finals of IEEE YESIST12-Maker fair

INTERNSHIPS / FIELD VISITS:

- Ms. M. Akila, RS visited IISC Bangalore for research related discussion and clarification on 26th and 27th Jul. 2019.

- Dr. R. Kishore, Asso. Prof., Dr. S. Radha, Prof & Head, Dr. M. Gulam Nabi Alsath, Asso. Prof., Ms. G. Yogalakshmi (II year ME CS Student) & Dr. Jin Mitsugi, Dr. Yuki Sato, Keio University, Shonan Fujisawa Campus, Fujisawa, Kanagawa, Japan discussed through video conferencing over skype regarding the possibilities of student exchange programme between Keio University and SSN CE. In continuation to this, Prof. Jin Mitsugi accepted to partially support one student for an internship programme at Keio University, Japan during the beginning of January 2020.

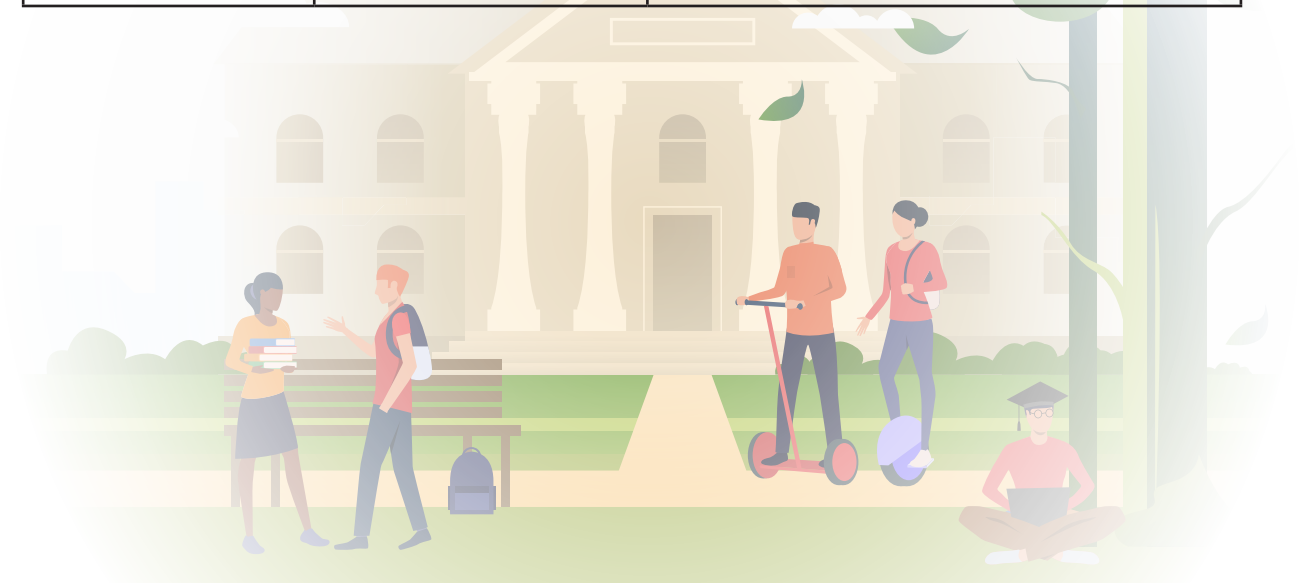
- The final year ECE students, Ms. Taruna Sudhakar, Ms. Varshini Kannan, Ms. J. R. Shilpa and Ms. Sanjana Ganesh, under the mentorship of Dr. R. Kalidoss, Asso. Prof. applied their project proposal “Food delivery app from rural areas” for consideration of AICTE-Vishwakarma Awards-2019.

- 93 undergraduate students from ECE participated in the internship program offered by various Government and Private companies in India and abroad. Some of them include University of Catania, Italy; BITS-Pilani, Dubai; BHEL, Hyderabad, Bangalore & Ranipet; ONGC, Chennai; CSIR-CEERI, CLRI; AAI, Chennai; IIT Madras, Chennai; Smart Bridge Educational Services; Experts Hub, Chennai; ARCI, Hyderabad; DRDO, CVRDE & RCI; BSNL, TVS Sensing Technologies; MAPS, Kalpakkam; Citicorp Services; UNIQ Technologies, Chennai; Voltech Manufacturing Company Ltd., Chennai; Taken Minds Inc., Chennai; Saama Technologies Pvt. Ltd., Chennai; Novateur Electrical and Digital Systems Pvt. Ltd., Chennai; Next Sphere Technologies; Flextronics Technologies; DAIICT, Gujarat; Axiom Research Labs; Virtu Sense; QUBE Cinema Technologies; uScope Compact ASTechnologies; Saint Gobain; Aapin Technology Lab; Infogro Technologies; Barola Technologies; Venkateswara Electricals; Mind Maps Technologies; ADMATIC Solutions.

ALUMINI UPDATES:

Here, we have a list of alumni students from the department who've secured admission to some of the most coveted institutions world wide.

Sr. No.	Student Name	Name of the University/ Institutions
1	Akshay Kumar C	Indian Institute of Space Science and Technology, Trivandrum
2	A Uma	Carnegie Mellon University
3	Kashyap R	North Carolina State University
4	Kowshik Raj D	The University of Texas at Dallas
5	K Raeshak	University of Eindhoven
6	M S Praveen Kumar	University of Maryland
7	Nagulan	Northeastern University
8	Rahul K	University of California, Davis
9	Sarjana O S	University of Maryland
10	Savitha S	University of California San Diego
11	Shakthivelu J	Technical University of Munich
12	Sidharth S	University of California San Diego
13	SVarsha	Carnegie Mellon University
14	Tharun Kishor A R	The University of Texas at Dallas
15	Vishal I B	University of California, Davis
16	V M Kumar	North Carolina State University
17	Yogesh V Narayan	Carnegie Mellon University



ANNA UNIVERSITY RANK HOLDERS :

Shakthivelu J
CGPA - 9.19
Rank - 8

Savitha S
CGPA - 9.14
Rank - 11

Krithika K
CGPA - 9.08
Rank - 17

Gali Kavya Shree Sai
CGPA - 9.08
Rank - 17

Nadeen Naushad
(M.E, VLSI)
CGPA - 9.17
Rank - 2

Emi Pushpam P
(M.E, VLSI)
CGPA - 8.81
Rank - 6

Praveen S
(M.E, VLSI)
CGPA - 8.81
Rank - 6

Maheswari M
(M.E, CS)
CGPA - 8.79
Rank - 14

Congratulations

TECH CLUB REPORT:

Since its inception in 2014, Tech Club SSN serves to elevate student involvement in the fields revolving around Electronics and Computer Science. We do this by conducting classes on booming fields such as IOT, Robotics and machine learning. We organize technical events and hackathons around the year where students can apply their newly acquired skills. Our motto is to guide our juniors to pursue their aspirations in the fields of their interest by preparing them for internships, independent research work, significant technical events and hackathons.

Working towards our motto, we kick started this semester by organizing MS session talk given by our dear senior Kashyap. This session gave an insight into how the MS application process works and what are the requirements for a student to be able to secure an admit from his/her dream university. Following the session, we made an MS Application survey (of Batch 2019) which summarized the scores and profiles of our seniors who got admit from profound universities. The link to the document is given below:
https://docs.google.com/document/d/1KdG35P3Vsuys-S3qJZBBeakcbeDwtBwYkyaA7yGO4CE/edit

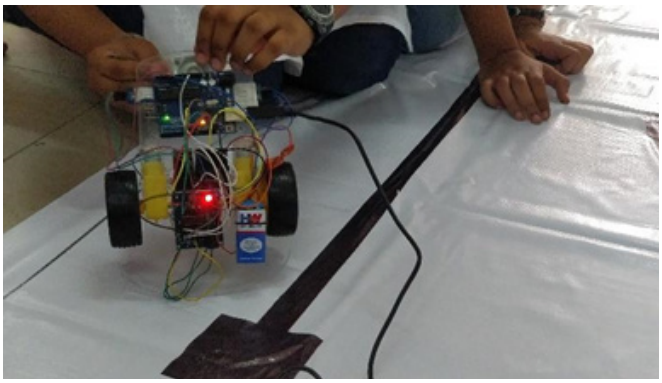
We conducted weekly sessions and several events throughout the semester. Following the MS talk, a session was held to introduce the second years to the various domains of ECE. The objective of the session was to enable the students to better understand the value of their degree and the types of employment opportunities they had after graduation. The session also aimed to inspire the students to work on projects and pursue research opportunities in various domains. These domains include Networking and IOT, Machine learning, Robotics and computer vision, Full stack development and Antenna and telecommunication engineering. Following this, domain specific classes were held.

Introduction to Machine Learning:

Machine learning is the field where we program the machine in order to stop being programmed. Sessions were conducted on machine learning. The basics of python programming was taught to the participants followed by the installation of various dependencies required. The fundamental concepts of machine learning and algorithms like Regression, classification, optimizations were taught. Students were encouraged to build a small project on their own applying this knowledge. Tech Club now has an official github repository used for uploading the session materials.

Line Follower Robot:

Around 4 sessions were conducted to build the line follower bot. All the components were arranged and provided to juniors. A fully functioning bot was built in 3 sessions and a session for testing their bots in tracks was also arranged. Participants were encouraged to take part in many LFR competitions. Introduction to maze solving logic was also given.



Line Follower Bot built by students

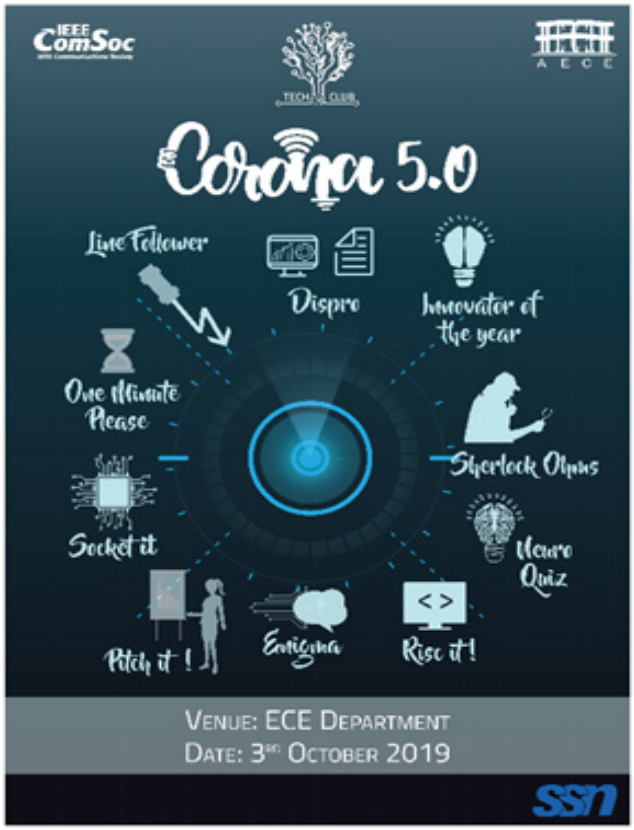
Matlab GUI:

A session was organized for the second years to introduce them to matlab tool. The prominence of this tool was listed to the juniors. They were encouraged to explore this tool. Juniors were also given a small assignment to test their understanding.

Classroom Session for Matlab

CORONOA 5.0:

Tech Club of ECE organized the fourth edition of the annual intra-college technical fest CORONA in association with the IEEE Communication Society on 3rd October 2019. A total of 10 events were conducted with 8 technical and 2 non-technical events. The list of technical events include:



Line Follower Robot:

This event was an opportunity for participants to build their own autonomous robot to achieve maximum speed to beat other robots on the given track and reach the destination in minimum time.

Risc It:

Participants should implement the objective considering the production factors. This was followed by decoding a binary file working to a code script and implementing a static website.

DISPRO:

This event made the participants think out of the box and present their ideas on the theme given.

Socket It:

In this event participants were required to identify and simulate the given circuit using PSpice or LtSpice. It was an event designed for EEE and ECE freaks with a prelims round on fundamental circuit questions.

Enigma:

This event was an opportunity for participants to showcase their circuit building skills by solving puzzles and riddles to reach the final stage – which included digital circuit designing.

One Minute Please!:

This was a fun filled event where testing the electronics skills of a person was done through a connection game. Different pictures were displayed on the screen and were connected to give meaningful words related to electronics.

Pitch It:

This event involved participants pitching their ideas, bidding for property right, negotiating with already established companies to invest in their product. The best team was given the investment and titled as winner.

Innovator of the year:

This event challenged the participants' grey matter to come up with innovative solutions to real-life problems. They were judged on the novelty, feasibility and marketability of their idea.
And two non-technical events include:

Neuro quiz:

A three round quiz which challenged participants' grey matter. Facts in and around the world, and even beyond it were asked.

Sherlock Holmes:

This event involved energetic students running across the campus and cracking puzzles to solve the crime.

Over 150 students participated in the events and prizes worth over Rs. 10,500 were distributed to the winners.

Innovator of the Year Event

Corona 5.0

HACKINFINITY:

Tech club organized HackInfinity – a 24 hour hackathon powered by Visteon corporation and Saama technologies. HackInfinity was a flagship event that was a part of Invente 4.0. The participants were encouraged to use technologies such as AI, IoT, AR/VR and BlockChain to build products in the domains of Environment, Assistance, Security & surveillance, logistics, Healthcare. The event was spread over the 13th and 14th of September, 2019.

The Hackathon saw a whooping participation of 43 teams submitting their abstracts from various colleges across Tamil Nadu. Out of which 14 teams were filtered to participate in the hackathon. Two weeks before the hackathon, posters were released advertising the event. Stucor app – anna university also promoted the same. As a result, we were able to get a good number of applicants with eclectic mix of abstracts. Based on novelty, feasibility and domain 14 best abstracts were selected by tech club members.

On 13th September around 10AM, commencement of hackathon took place in the presence of Dr. Ramprabhu. Around 12PM, he evaluated the novelty of the problem statements and general evaluation on team was made. From that till text day 12PM participants worked continuously to achieve their goal. Tech club members assisted their timely needs and provided them with all basic amenities. One participant even thanked us through LinkedIn.

HackInfinity

The hackathon ended at 12PM on 14th September. After that each team was requested to make a presentation to show their working demos so as to evaluate them. An elite group of 7 employees from Visteon along with 2 senior software developer from saama were the judges for the event. The following were the results

Winner: Stakz who worked on Drive alert
Runner up: Ateam who worked on Med chain

They were rewarded up to 20k cash price along with internship opportunities to worthy candidates. Students found this event attractive because it broadened their horizons in the field of modern technologies with emphasis in the real domain challenges. This event brought students an experience how to process tasks in different domains in limited time.

HackInfinity Participants

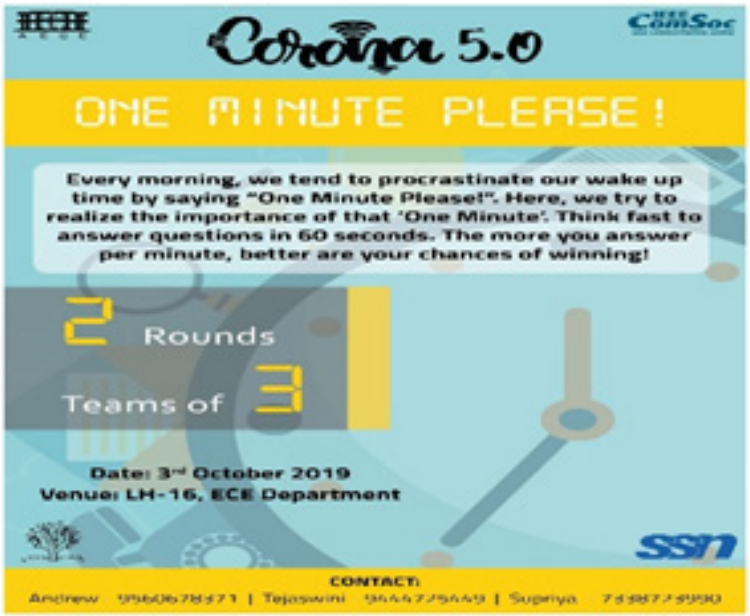
IEEE Communications Society Report:

The IEEE Communications Society Student Branch, SSNCE has organized three events during the odd semester from the month of July to November. The events conducted in order were:

1. One minute please
2. Pitch It
3. Innovator of the year 3.0

The events were organized with the members of the society and volunteers from third and fourth years from the Department of Electronics and Communication. All the events were open to both IEEE and Non-IEEE Events.

One minute Please:



An exact mix of technical and non-technical skill display held as a part of Corona 5.0 at the ECE department on the 3rd of October, 2019. The event comprised of two rounds out of which the second round had two sub rounds. Nearly 21 teams participated making it a huge success in the first round which involved a questionnaire of interesting electronic puzzles. Multiple teams consisting of three per each team were circulated with three different sets of the questionnaire. Each team competed with the other teams not only based on number of correct answers but also based on the time within which they had finished answering it. Various teams across the departments had participated in it. The first round tested the basic electronics knowledge each team was equipped with. Seven teams successfully cleared the first round making it to the second round. The second round was a fun round which maintained the vibrancy of all the seven teams equally. Connections which involved electronic and communication terms was conducted as the first sub round. Three pictures

which depicted an electronic term when combined were displayed on the screen. Fifteen words were to be guessed and each set of five were given a time of one minute. This sub round focused on enriching and testing the technical vocabulary of the teams and we embraced the enthusiasm they displayed. Finally, in the second sub round, Pictionary was conducted which was non-technical. A set of words one after another was given to one of the team member and other two were expected to guess the word based on the drawing within a minute. The team that guessed maximum words in one minute were awarded with more points. This was a cheerful round and all the teams had given their best. Three teams bagged the cash price. Being third years, it was a really great experience conducting the event with our senior's assistance. The whole event was a huge success.

Event Coordinators:

1. Andrew – 4th year ECE
2. Tejaswini – 3rd year ECE
3. Supriya- 3rd year ECE

Pitch It:

Pitch It was held as a part of Corona 5.0 at the ECE Department on the 3rd of October, 2019. The event comprised of two rounds .Seven teams competed during the first round out of which 4 teams qualified for the second round and each team had 1-2 members each. During the first round, the participants had to answer 11 questions which tested their approximation skills, interest in finance, basic knowledge about the India tax laws and their ability to come up with a basic idea to start a company. The second round saw the 4 qualified teams demonstrating their ideas after which they were bombarded with a very possible real life scenarios that companies face as a part of the rapid fire round. The teams had to come up with an immediate answer as to how they will respond

to the posed scenario. Based on the answer they were given a chance to elaborate their response and points were awarded according and a winner was chosen based on the aggregate of the points obtained in both rounds. The real winner though was the fact that NO PAPER was used during the course of the event. The questions of the first round were displayed using the projector and answers were emailed by the participants. The second round was conducted orally. This was a real triumph as all the other events spent hundreds of rupees on buying paper for their respective events where as the event saw no such unwanted spending of them rupees. I would like to kindly request the organisers to look into this aspect of things and make the whole process of conducting their respective events more eco-friendly and easy on the pocket. On the whole, the event panned out as planned as was a success.

Event coordinator:

Sowmya C - 4th year ECE

Innovator of the Year 3.0:

The idea presentation contest was divided into 2 rounds. Initially, topics were assigned to each team. The first round was abstract writing. In this round, teams (each consisting of 3 members) had to come up with a suitable abstract for the problem statement given to them. In the second round the teams selected, had to give an oral presentation for 5 minutes along with its impact on the target group and how they thought of marketing it. Clarity, Relevance to their abstract, Impact of their design on the target group were some factors considered for evaluating the teams. The event was judged by Dr.Krishnasamy.T Selvan, Professor, Department of ECE and Dr. S.Ramprabhu, Associate Professor, Department of ECE.

Innovator of the Year Event

TECH AND TRAVEL

Imagine your holidays are spent creating memories along with doing some useful chunk of productive work. Sounds like the ideal package right? In this section, we've interviewed students who have managed to make this a reality. Take a moment to hear out their experience!

ITALIA INTERNSHIP

Students transform a lot in the four years of their undergraduate and it's pretty obvious. In the first-year, right after school, all they care about is to have loads of fun. In the second year, a little responsibility starts developing in their minds but everyone still finds time to have fun, and watch Netflix. In the third-year, the responsibilities increase greatly because this is the time when everything for everybody starts turning around. They think on how to build their resume and start to give importance to internships and online courses. Fourth-year is the year when everybody stands out. They choose what they want in their lives and aim to achieve their goals. In any case, every student would like to have a good resume and frankly, everybody aims to do at least one good internship by the end of fourth year. An internship makes the classroom's abstract theories and learned examples of concrete, by placing the student in a real-life work situation, which the job encompasses. Now, we take a sneak peek at a few internships done by students in our department.

Harine G and Karthik Eswar from the fourth year, have used their opportunities to do an internship at the University of Catania, Italy. They got to know about the internship around the mid of last year through Dr. Prabagarane N, who had a good rapport with the professors at the University of Catania. The professors have visited our college during the conference, WISPNET. As a matter of fact, they have both met their mentors through the conference, well before they even applied for the internship. They both applied in January and were able to get the confirmation by March. Once the application was accepted, they had to complete all other formalities like getting the invitation letter, consent forms, visa process, etc.

Harine says, "You can build a global network and get a chance to network with professionals working in other parts of the world. A lot of things I studied in college came in handy while applying it practically".

Harine worked on an innovative satellite antenna for the CubeSat application. CubeSats are miniaturized satellites, which are used exclusively in low earth orbital. The CubeSat uses a different antenna to work in a different frequency band. She worked to develop a cross dipole antenna operating in L-band as a

Università degli Studi di Catania

feed structure of parabolic reflector in CubeSat. Furthermore, she had an opportunity to test the electromagnetic compatibility- the interaction of electrical and electronic equipment with its electromagnetic environment of many other satellite components. She worked under Dr. Gino Sorbello, who was her mentor throughout the two months. Even though she was the only person to work on the project, she also got a chance to work with the professor's associates.

HARINE G

He had a tie-up with a company called 'SicilSat'. They operate in the area of satellite communication, who design, build and test many microwave systems and satellite systems. Besides, she worked with them in designing a few other antennas in the X band and S band.

On the other hand, Karthik Eswar worked on the project "Networking Intelligence in 5G Systems," which focuses on reducing the end-to-end latency of communication networks for high-speed applications by imparting cognition to it. His contribution was to apply machine learning and forecasting techniques to a bilateral network and evaluate its efficiency. He also worked alongside with his other classmate, Mridhula. They worked together on this project under their mentor, Dr. Giovanni Schembra.

KARTHIK ESWAR

He helped them throughout the two months not only academically, but also with their visa, transportation, accommodation, etc. Moreover, they were also accompanied by a PhD student there, who eased the language barrier between them and the mentor.

To say, they both worked for about 8-9 hours on an average, on weekdays. There are some major advantages to working with professionals around the world.

Karthik Eswar says that "The college system in Italy seems to be very much different than ours, as they tend to spend more time in laboratory sessions rather than lectures. It is fascinating to see how their everyday routines differ significantly from ours. The weather, food and the locality there, were flattering".

If it's something they're missing out, it's about the tourist places that can be visited on the weekends, which are worthwhile. It was pretty clearly stated by them that the advantage was obviously learning practical applications in their domains through the internship and also

experiencing the local food, culture, and different people. Nevertheless, they stated that it was hard for them to understand and interact with locals because they hardly communicated in English.

The college does help students in providing opportunities, but it is the student's responsibility to make use of them at the right time and get benefitted. Never miss out on an opportunity because it never happens, it has to be created.

Anirudh.L,
III, A

REACHING THE MOON WITH TEAM INDUS

I spoke to Shilpa Rudhraapathy, a final year student who spent her summer at TeamIndus. TeamIndus is an Indian aerospace company that originated from a team, competing in the Google Lunar X competition. The company is working on launching its lunar rover. She was offered this internship by her mentor based on her performance at a workshop she had attended earlier.

She came to know about this workshop through the company's newsletter. After an exchange of 4-5 emails with the HR, she was one of the seven recruited students for the workshop. The workshop was conducted for 2 weeks during the summer, her second-year. Grouped with other electronics engineers, she worked on control and guidance systems.

In the internship during her 3rd year summer holidays, she was working with the winners of the Lab2Moon Global Challenge conducted by TeamIndus. The contest shortlisted experiments, which are to be carried as payload on their rover. She worked on Avionic systems for a duration of 3.5 months from May to August.

"The work they do matched with my idea of what engineering should be like" Shilpa says, when asked about her work experience and why she picked this company.

The experience made her "fall in love with engineering all over again," she says. It was an opportunity to engineer solutions and to take a break from rote learning.

SHILPA RUDHRAAPATHY AND HER TEAM

When asked if she had any advice for students who are indecisive about their futures, she emphasized that "It is completely normal to explore various domains during the second and third years of college and exploring helps you figure out what you like". She mentions that she was able to narrow down the field she wanted to work in because of her love for space.

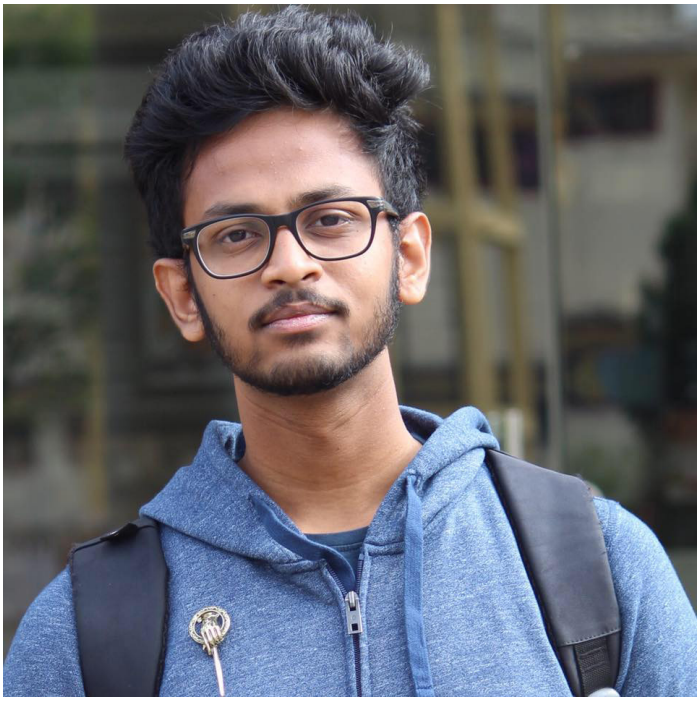
To conclude, we do many things in our life, but it's more important that we should do what we really love. As students, drawing parallels from Shilpa's account, we must grab the opportunities that come our way and work hard to make our dream a reality.

Shwetha .S,
II, C

CAMPUS STARS

Bharath Raj, Siemens

Bharath raj, an alumnus of ECE, SSN'19, is currently working at Siemens, Chennai. He is remembered fondly by several of his classmates and juniors as "Barry" and his endeavours in tech club events are legendary in the department. We managed to catch up with him and got him to spill the beans about how he landed this prestigious job and tips for those who want to follow his footsteps. Read on to know more!



Being an Engineering student means constantly grappling with questions of what we want to do, where we want to go and how do we get there. Bharath, an alumnus who was much like us, shares his rather intriguing story in this interview. He is currently working at Siemens in the fascinating field of autonomous vehicles. In a brief summary, the work they do concerns developing new and improved algorithms to better the standards of self-driving cars based on client requirement with an emphasis on their visions.

As for how he got here? This is where it gets interesting. Interviewing Bharath, we quickly found out his story is rather a unique tale of following one's passion despite all not going according to plan.

1) What were the steps that led you to the path you are currently on?

Bharath laughs a little at the question as he recalls past events that led to his present area of work. It's a rather weird journey he felt and admits that initially, it was never his plan to work after graduation. In fact, he had his heart set on pursuing an MS! Like all other students, he faced six gruelling months of applications only to find out much to his crushing dismay that none of the applications to his preferred institutions had been accepted.

Funnily enough, back in his third year, Bharath started writing several technical blogs based on machine learning and computation. He never expected it to pick up much traction from the public, but it was eventually well received and he even found himself at the receiving end many an offer from interested parties. Incidentally, one such offer was made by the man who would today end up being his boss at Siemens. And the kicker? Bharath had declined the offer to intern due to an

ongoing commitment to another internship but reconsidered it a second time after his plans of an MS went awry.

To his pleasant surprise, Bharath found his new working environment to be everything he loved and more. The sheer scale of the technology present and the learning curve astounded him. It's safe to say that although the initial disappointment left him devastated, he is very happy doing what he does today.

2) I'm sure you felt nervous venturing into this. How did you find the confidence to back yourself?

Thinking about it, Bharath feels that although the jump he took may not necessarily be as big and daring as others, it was still quite nerve-wracking. He made the choice to switch from VLSI, an ECE core field, that initially interested him in his first two years to Machine Learning in the latter part of his college life. The odds were however against him since as an ECE student he did not have many of the prerequisites for his field of interest. It was mostly him that backed himself up by saying things will be alright. As long as you do the right things as your next step towards your interest it would eventually pay off someday. Whenever he felt in doubt, he would devote his time and effort to his blogs or a hobby project. This way he increased his experience and simultaneously developed his profile while building his confidence. He calls it the cumulative compound effect and in a way also the butterfly effect. Who knew his future boss would find him through a blog? You never know!

3) If you had to pick a key moment from your college days what would it be?

Going back to his college days, Bharath looks back at the time he participated in an intra-department Project Display competition hosted by the ECE seniors in his third year. It was a time when he was just testing the waters of machine learning and decide to enter the competition more on a whim to see what he could achieve. Equipped with knowledge from online courses he was quite nervous about delving into deep learning with python for the first time. His project, an interesting one I assure you, was essentially designing an AI that could crack the captcha in the Anna University web portal. After working tirelessly towards his target he eventually succeeded! This foray into ML sparked his interest that would later be his current line of work. As it so happens he also placed first in the competition which was a pivotal moment in deciding what he wanted to do in the future.

4) What advice would you be looking to give for students who are looking to head into the exciting world of ML?

Bharath categorizes his advice into two parts- a) things that will make you better and succeed in this field and b) things that you should avoid.

In point a, he recommends that in the infinite ML courses that are offered to an unknowing confused engineering student, go for the popular recommended ones. They are tried and tested, and will not fail you. At the same time, one must not stop at just finishing the course. True learning lies

in the application he says. Never be afraid to apply. We should constantly be applying what we learn and compare our learning, despite our reserves. It is okay to fail. Without failing we cannot make mistakes that we can learn from. A little bit of effort and venturing from your side is definitely required.

In point b, he describes something he calls the influencer epidemic where said unsuspecting engineering student is biased on what the right thing is to follow, further confusing them. Especially in the trendy field of ML, pseudo-intellectuals are found everywhere promoting their own products and spreading false information. Therefore it is first safe to experiment with trusted sources and building strong fundamentals before arriving at a decision.

5) What is your opinion on being smart versus working hard?

After a bit of pondering, Bharath concludes that smart hardworking is the best way to go. It may not necessarily be enough to just work smart all the time. You must be smart enough to discover what is the best route forward within your niche and work hard enough to reach your target in the best manner possible. So definitely a little bit of both is required.

6) Would you rather be someone who is extraordinary at irregular periods of time or maintain a level of decent work all the time?

Bharath confesses that he prefers to be extraordinary once in a while than complacent all the time. He finds this to be parallel to being either a 'Jack of all trades' or a 'Master of one', in which case he would rather be a 'Master of one'. He feels it really depends on a person's perspective as well as the instance and their interests.

7) What are your plans going forward into the future?

You'd think the confusion ends with graduation, but no. Bharath tells us otherwise. Despite having a pretty good job, he's still confused about what his next step is. Even though he knows his area of interest, he still needs to figure out how far he wants to go with it. Do I work more? Do I do an MS and then maybe a PhD? These are some of the questions swirling in Bharath's mind. This is where smart hardworking comes in to play he says to effectively plan out how to move forward. So in truth, he feels just like everyone else here in college but just a little bit closer to his dream.

Shivani Devi G
III, C

STUDY CORNER

Electronics and communications engineering is a vast, rapidly growing field of engineering. All its vastness is out on display, vying for your attention! One such is "Underwater Acoustic Communication". Get exploring!

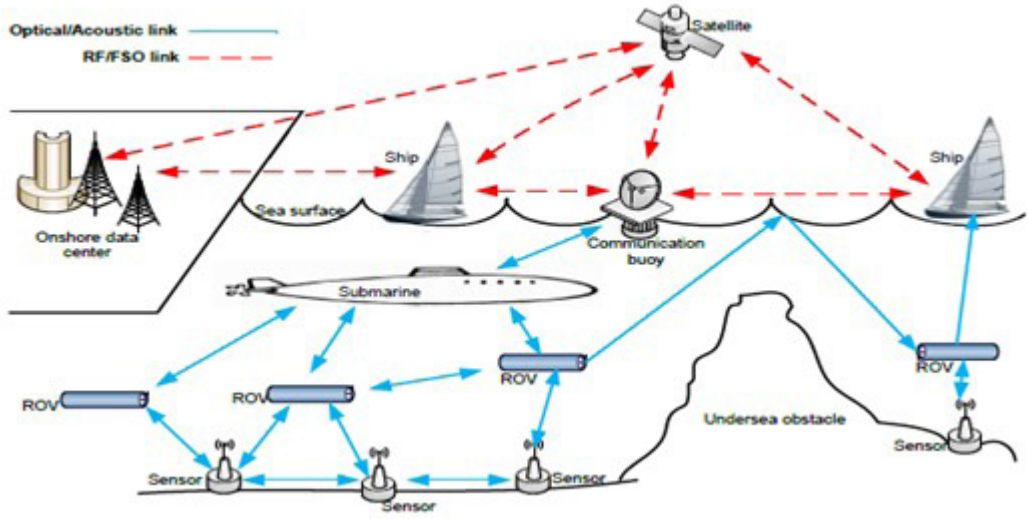
UNDERWATER ACOUSTIC COMMUNICATION

Water is the most abundant compound on Earth, covering about 70% of our planet's surface and most of the earth's r esources reside inside the oceans. According to a survey, only 10-15% of the ocean floor has been explored when compared to the surface of Mars. This prompted the scientists to venture into deep oceans that once seemed impossible due to dark and high-pressure conditions. UNDERWATER ACOUSTIC COMMUNICATION is the framework which paves the way to analyse the state of the sea. Being a unique domain, we interviewed Dr S. Sakthivel Murugan, who has immense experience in this area. Here's the transcript!

1. What is Underwater acoustic communication? What's the basic idea behind this technology?

Underwater acoustic communication is a technology wherein the transmission of data occurs through water. Conventionally, acoustic signals are used as the primary carrier due to their relatively low absorption property in underwater environment besides having a low transmission rate. The basic principle focuses on transmitting an acoustic signal from a source into water which hits the ocean floor and gets reflected back. This reflected signal is detected by hydrophones and is processed to obtain detailed information on Underwater resources.

Though terrestrial and space communications have propelled to the forefront, Underwater communication is merely developing as the environmental conditions in deep water is dynamic and quite rough, causing severe attenuation and multipath dispersion.



2. Where is underwater technology extensively used? Could you mention some of the common and notable applications?

Underwater technology is used in shallow and deep ocean regions and is pervasive in varied applications.

» Scientific applications: Observing the environment, remote sensing, seafloor exploration, geological processes on the ocean floor (tsunamis detection), water characteristics (temperature, salinity, oxygen levels, bacterial and other pollutant content), imaging, animal bio-acoustics.

» Industrial applications: Monitor and control commercial activities, such as underwater equipment related to oil or mineral extraction, underwater pipelines or commercial fisheries, construction of bridges.

» Military and homeland security applications: Securing and monitoring port facilities or ships in harbours, alerting the harbour in case of intruders, communication with submarines and divers.

Some commonly used underwater vehicles are

- Remotely Operated Vehicle (ROV):

  An underwater robot that is connected to a ship by a series of cables to transmit control signals. Common applications include object identification (for submerged navigation hazards) and vessel hull inspections.

- Autonomous underwater vehicle (AUV):

  An unmanned vehicle used for underwater survey missions such as mapping submerged wrecks and obstructions, without operator intervention. When a mission is complete, the AUV returns to a pre-programmed location where the data is processed.

- Manned submersible vehicle is in research which can carry 3-6 persons to the bottom of the sea (about 6-10km).

3. Are there any prerequisites to work in this field?

Fundamentals of physics and basic knowledge of the ocean characteristics is vital. Moreover, Underwater communication is an interdisciplinary field. It involves building a robot or similar devices(mechanical), designing appropriate sensors and devising suitable protocols for communication (electronic and communication), developing effective underwater power systems(electrical) and constructing the necessary codes for better transmission and acquisition of data(software). Thus, students from various disciplines can work in a collaborative way.

4. What are the electives to be pursued in order to have better knowledge in underwater technology?

There are few electives available which feature the basic understanding on underwater communication technology.

» Oceanography and instrumentation : Outlines about the water channel and its characteristics along with numerous underwater instruments.

» Underwater signal processing : Deals with the optimization of communication channels and protocols for the underwater system.

Advanced underwater signal processing can also be pursued, as underwater communication is a hybrid model involving both terrestrial and underwater communication.

5. How can the students equip themselves to widen their skill by different means apart from our curriculum?

Students, interested in improving their skill set, could undertake online courses in renowned sites like NPTEL (offers a multitude of courses on ocean engineering and communication), Coursera and Udacity.

There are quite a few standard books available:

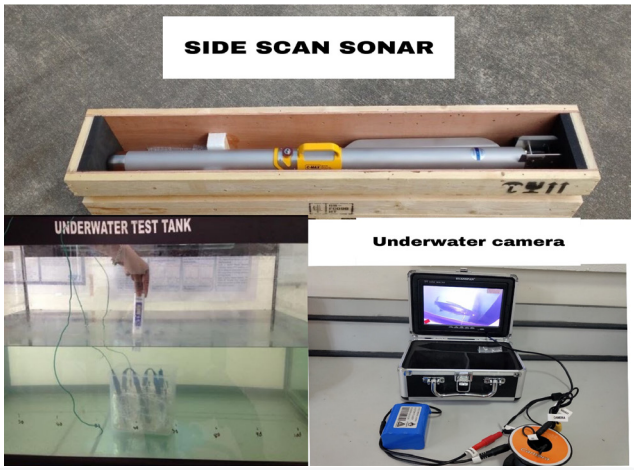
- Underwater Acoustic Modelling and simulation (Paul C. Etter)
- Computational ocean acoustics (Jensen springer second edition)
- Bottom interacting ocean acoustics (William A. Kuperman springer)

Students can enhance their cognition by utilizing the facilities available at our esteemed institution. We have a well-equipped UNDERWATER ACOUSTIC RESEARCH LAB. Wide range of equipment are available such as side-scan SONAR, hydrophones array, acoustic transmitter, DAS, underwater battery, underwater camera, ROV. Experience in handling high-priced equipment and data processing techniques, which has a huge demand in the industry, can be gained here.

To know more about the lab and various projects that are carried out in UWAR lab, students can have a look at the given link:

https://sites.google.com/view/uwarlssn/home

Evidently, students need to work meticulously and constantly endeavour to bring out more thought-provoking ideas.



6. What's the current stand of underwater communication? Do you recommend this field for higher studies?

Underwater communication has a huge scope for the next few decades. This technology is picking up its pace to unleash its fullest potential. While in terrain communication the improvement is more profound, the advancement in underwater communication is still far-fetched. The challenges faced in deep water manifest the need for cutting-edge innovations by contemplating its characteristics. We have 5G, 6G communications coming up inland, whereas we still have not touched Mega-hertz communication in water. Nonetheless, the intrusion of IoT has reformed the underwater technology keeping its doors wide open for research.

This course is definitely recommendable for higher studies as this field is still in the emerging stage. Some eminent universities in India like IIT-M, IIT-Kharagpur have a separate department for oceanic research. IIT-D has an underwater sensor development lab with acoustic tank facility. Foreign Universities like NTNU, Southampton University, MIT lamss, NUS also have this domain as one of its courses.

7. Who are the major recruiters and what is expected from people who specialize in this domain?

Kongsberg Maritime, L&T, Caterpillar, Fugro India, Sonar dyne, Planys tech, Ixblue, Smd UK, Honeywell etc are some of the major recruiters. National organizations such as NIO GOA, NIOT, NPOL FOR NAVY APLLICATIONS also recruit people who are specialized and have sufficient competence in this field. Moreover, these organizations provide internships as well, which helps the students to deal with real-time problems.

People interested in jobs are expected to be skilled in one of the given subfields:

- Mapping of seafloor
- Oceanography survey
- Equipment handling expertise
- Data post-processing expertise
- Underwater sensor networking

Another option is to open a start-up or work as a freelancer. The fact that this domain has just come into the limelight and the players are quite less, the probability to turn out successful is high.

8. Could you tell us about some of the projects you have worked on in this area?

While searching for an interesting field to work on for PhD, underwater acoustic communication intrigued me and hence I started my research in the same. I developed a denoising adaptive algorithm for wind-driven ambient noise, in association with NIOT. The hardware filter system is deployed in the coastal regions of the Bay of Bengal.

Currently we are working on a project titled, 'Offshore excavation of heritage-rich submerged sites of Poompuhar and Mahabalipuram' by EMD using Machine Learning which is funded by DST for around Rs. 50 lakhs.

We have also developed an underwater battery which uses the seawater as an electrolyte and carbon and iron electrodes to power the fisherman boat during sailing. This is highly robust and cost-effective. We are working on an energy harvesting system, wherein wind waves are used as a source for generating energy.

At the brink of creating a revolution in the underwater communication, researchers are expected to produce state-of-the-art solutions to the challenges and mysteries left unexplored in deep seas. Being a novel technology, its demand is rising swiftly.

We thank our professor, Dr. S. Sakthivel Murugan, who spared his valuable time to share his insights with us. We hope this article gives a clear picture on underwater communication to the students.

Divya Seshadri .M,
III, A

COUNSEL FOR CONFUSION

As we look back in retrospect at the end of each semester, it is really breathtaking to wonder how time has flown away. We are one step closer to the end of our college journey. It is equally worth to look ahead beyond the end of our college journey just as much as we look back in retrospect. Looking ahead, not all people have the same decisions in their mind but we all share a common confusion - Higher studies or placements? Even though both options are rewarding, which one best fits you? To answer this question, you could list out the pros and cons of each side and select the side that has greater pros in the end. Don't worry if you can't figure out the pros or cons, this section is here to guide you with that.

The tension these days is running high. It's time to make hard decisions. There are consequences to bear in the future. A word that has always been in the back of the mind comes to light now - "Career". Several questions remain to be answered and to be thought through. The biggest of them all being- What next? People bombard you with options. Some talk about higher studies, some about civil services and other govt. jobs and some talk

about finding your dream company. There are methods and pieces of advice everywhere. But which advice to take? How to prevent yourself from weeping about the roads untravelled?

Then one starts to make a list of all there is for one to do. Let's see: Join a company right away - Money! Civil Services - Let me make the world a better place! MBA - Can I leave engineering fast enough? MS or M.Tech - I still have so much to learn Maybe I can get a better job after this? Entrepreneurship- I'll be my own boss! Maybe it's finally time for me to follow my passion. Let me go for writing/acting/singing... You sit pondering at the list and trying to figure out what to do?

We all are going through the same struggle or are soon enough going to get trapped in this, like any other engineering student, ever. The question is how to deal with the pressure on your shoulders right now. There are possibly two ways to approach the decision you have to make- with a fixed mindset and a growth mindset.

The people who think there is always a scope for development in their talents are said to

have a growth mindset. They perform better in harder tasks as compared to those who have fixed mindsets. People with fixed mindsets tend to feel that their talents are innate gifts. Everyone at one point wants to feel that they were born really good at technology or in their preferred domain. Turns out, such a need to prove the implicitness of talents does more harm than good. It fairs well to focus on learning than to feel that if you are not instinctively

good at something, your perspectives of ever becoming an expert in it are bleak.

The concept of growth and fixed mindsets was given in the learning theory developed by Dr. Carol Dweck. Several experiments have been conducted in this area to find out the consequences possessing either of the mindsets. It was found out the people who have a growth mindset have several advantages over those who have a fixed mindset including -

- They persevere and seek out better feedback.
- They are most capable of stress management and aggression control. They have better self esteem and reduced helplessness.
- They are better at solving problems. They have improved self-esteem and increased emotional functioning.

So, in these trying days, why not reap the benefits of a growth mindset and cultivate habits that make you calmer and more self-confident. It is good to know that if one possesses the right mindset one can excel at whatever option they chose. The reasons to choose a particular field become clearer. Your growth as an engineer and human being becomes the right

decisive factor to be considered rather than superficial factors like money or public opinion.

Now, if I have done everything right in explaining the need to have a growth mindset, you would want to know how to cultivate it. There are several practices which can be undertaken to shift your paradigms a little in life, including -

1. Start viewing challenges merely as opportunities to learn something new.
2. Acknowledge and embrace your imperfections.
3. Follow research on your brain plasticity Start to value the process over the result.
4. Cultivate a sense of purpose.
5. Try not to seek approval. Repeat: “GENIUS requires HARD WORK, not talent alone”
6. Analyze your failures objectively and learn from them.

> ***GENIUS requires HARD WORK, not talent alone***

These simple habits can change what you strive for and what you see as success. By changing the definition, significance, and impact of failure, you change the deepest meaning of effort.

Shreya Gaur
III, C

WASSUP

As college students, we are gung-ho and ready for our next big break (electronically speaking). This is a section of opportunities in that very sense. Explore some of the opportunities that await you all!

Event: One day workshop on Opportunities for Industry 4.0 applications in Indian Industries 2020

Venue: NIT Tiruchirappalli, Tamilnadu
Date: 3rd - 4th January 2020
Event type: Workshop

Event: Carte Blanche 2020

Venue: Madras Institute of Technology Anna University, Chennai,Tamilnadu
Date: 4th - 5th January 2020
Event type: Technical Symposium

Event: Short Term Course on Power Converters for E-Mobility 2020

Venue: PSG College of Technology, Tamilnadu
Date: 6th - 10th January 2020
Event type: Short term course

Event: Shaastra IIT Madras 2020

Venue: IIT Madras, Tamilnadu
Date: 3rd - 6th January 2020
Event type: Technical festival

Event: International Conference on Intelligent Systems and Control ISCO 20

Venue: Karpagam College of Engineering, Coimbatore, Tamilnadu
Date: 9th -10th January 2020
Event type: International conference

Event: E-Summit 20

Venue: IIT Bhubaneswar
Date: 10th - 12th January 2020
Event type: Annual Entrepreneurial Conclave

Event: One Day Workshop on Data Science for Environmental Applications 2020

Venue: Sathyabama Institute of Science and Technology, Tamilnadu
Date: 2^{2nd} January 2020
Event type: Workshop

Event: International Conference on Industrial, Environmental Safety Management and Climate Change 2020

Venue: ASET College of Fire and Safety Engineering, Tamilnadu
Date: 24th - 25th January 2020
Event type: International Conference

Event: HackVerse NITK 2020

Venue: NITK Surathkal, Karnataka.
Date: 25th - 26th January 2020
Event type: Hackathon

Event: Aakaar Technical Workshop Series 2020

Venue: IIT Bombay, Mumbai
Date: 25th - 26th January 2020
Event type: Workshop

Event: Fluxus IIT Indore 2019

Venue: IIT Indore, Indore
Date: 30th January - 1st February 2020
Event type: Techno Cultural Fest

Event: Stepcone 2020

Venue: GMR Institute of Technology , Rajam, Andhra Pradesh
Date: 31st January - 2nd February 2020
Event type: Technical Paper and Project Contest Exhibition

Event: SPECTRA -The Fest 2020

Venue: Sardar Patel College of Engineering, Mumbai
Date: 31st January - 1st February 2020
Event type: Technical Festival

Event: Wissenaire 2020
Venue: IIT Bhubaneswar, Bhubaneswar
Date: 31st January - 2nd February 2020
Event type: Technical Festival

Event: ABHYUDAYA 2020

Venue: GLA University, Mathura, Uttar pradesh
Date:14th February 2020
Event type: Technical Festival

Event: Hack36 2020

Venue: MNNIT Allahabad, Allahabad
Date: 14th - 16th February 2020
Event type: Hackathon

Event: International Conference on Modern Engineering, Science and Technology MEST 2020

Venue: Dr Kalam Institute of Engineering Research, Tamilnadu
Date: 17th February 2020
Event type: International conference

Event: ICTAMDMES 2020

Venue: St. Joseph's College of Engineering, Tamilnadu
Date: 20th - 21st February 2020
Event type: International Conference

Event: International Conference on Electrical Energy Systems ICEES 2020

Venue: SSN College of Engineering, Tamilnadu
Date: 20th - 22nd February 2020
Event type: International conference

Event: International Conference on Mathematical Sciences ICMS 2020

Venue: Sathyabama Institute of Science and Technology, Tamilnadu
Date:4th - 6th March 2020
Event type: International Conference

Event: 8th International Conference on Contemporary Engineering and Technology ICCET 2020

Venue: Prince Shri Venkateshwara Padmavathy Engineering College, Tamilnadu
Date: 14th - 15th March 2020
Event type: International Conference

Event: SANDHAAN 2020

Venue: BIT Sindri, Dhanbad
Date:15th - 16th march 2020
Event type: Techno Management Fest

Event: Triveni 20

Venue: BIT Sindri, Dhanbad
Date: 20th - 22nd march 2020
Event type: Techno Management Fest

Event: International Conference on Novelty in Applied Science Engineering and Technology 2020

Venue: New Prince Shri Bhavani College of Engineering and Technology, Tamilnadu
Date: 28th March 2020
Event type: International Conference

Event: Fourth National Conference on Emerging Trends in Sciences EMERGE 2020

Venue: Dr. M.G.R. Educational And Research Institute, Tamilnadu
Date: 8th - 9th April 2020
Event type: National Conference

Event: 2nd International Conference on Advances in Applied Engineering and Technology ICAAET 2020

Venue: Syed Ammal Engineering College, Ramanathapuram, Tamilnadu
Date: 14th - 16th May 2020
Event type: International Conference

Divya. N
III, A

GADGET GIZMOS

The era of electronics began with the invention of the transistor in 1947 and silicon-based semiconductor technology. Seven decades later, we are immersed ear-deep with electronic devices! Take a look at some of the ground-breaking advancements in the field this year!

FOLDING SMARTPHONES

Mobile phones have come a long way since their invention and have been enhanced at every step. Starting from the old heavy mobile phones with buttons to the touch-based smartphones currently in use. Of course, everyone would remember that once-famous 'snakes' game. It was available in Nokia 1100. That's where the evolution started, Nokia 1100, and proceeded towards flip phones and then touch-based phones to the latest smartphones.

Samsung Galaxy Fold

At every milestone, changes were made to the basic mobile phone to make it more user-friendly. Initially, the weight of the phone was reduced and to make it more classy, flip-type phones were introduced by companies such as Sony Ericsson and Samsung. Along with that, the camera was integrated. Since it was difficult to press the same button twice or thrice to get a single letter, keypad with separate buttons for different letters was introduced by Blackberry. But this increased the phone's weight. Then came into existence the touch-based smart mobile phones which had no keypad and has reduced weight.

In that hierarchy, the latest enhanced version of a mobile phone is called as 'Folding Smartphone'. A flip-type phone is foldable in which the upper part has the screen and the lower part has the keypad. On the contrary, the folding smartphone has a full length display which is touch-based. It allows access to a larger tablet-like display or a phablet when needed by unfolding the device, whilst maintaining a similar functionality to a standard smartphone when folded. It is based on bendable mobile design technology.

It can be folded along the vertical axis or horizontal axis. When it is foldable along the horizontal axis, it is handled similar to flip type phones. In the case of folding along the horizontal axis, it can be folded inwards or outwards or some phones allow both. Each folded side can function independently and provide two separate displays or they can function together to provide a single continuous display.

The main motive behind the design of folding smartphones was to increase the display size without compromising the compatibility of the device. People often complain of not being able to read documents or e-books on a mobile phone as it causes strain to the eyes due to the small size of the screen. In a folding smartphone, this problem is addressed and is solved to a good extent by an appreciable large display. The other great thing about foldable screens is they offer the first chance

to produce highly differentiated products. Not only are the devices which integrate these screens much different than traditional smartphones, where design differences are measured in millimeters of bezel size, but there's also going to be a great deal of variation between foldable phones as well. Some will have screens that fold in, others will have screens that fold out, some will have multiple different screens, some only one and each will likely feature unique variations on camera placement, hinge design, and more.

Coming to the software part of the folding smartphones, all the currently available folding phones are Android-based. Apple hasn't designed any foldable phone as of October 2019. Among the Android based mobile phones, there are many different manufacturers such as Samsung, Huawei, Xioami, Oppo and Blackberry who are coming up with foldable phones with unique features of its own.

ZTE Foldable Phone Concept

Samsung Galaxy Fold, Xiaomi Dual Flex, Huawei Foldable Smartphone, Microsoft Surface Duo, Royole Flexpay, Moto Razr 2019, Blackberry Foldable Smartphone, iQOO Foldable Phone, Intel Foldable Smartphone are some of the best folding smartphones currently available in the market. They vary from each other in terms of size, software, and cost, yet they all have the special ability to fold. They all can just fold like a purse or a hand-kerchief to fit in the pocket. They are convenient to carry and to be used for reading purposes.

In spite of its advantages, folding phones do have some notable shortcomings. Folding phones are inherently bulkier. They have more weight than normal smartphones because they have to accommodate both halves of the display. Longevity isn't a guarantee with this technology. Foldable screens rely on an internal hinge, which like any moving part, which represents a vulnerability. It will weaken over time, potentially introducing more problems.

Royole Flexpai

The eager techies who gobble up every new technology are likely excited about the concept of a foldable phone, but otherwise, consumer demand is flat. Tech experts have suggested that while gadget lovers will take to the phone instantly, other consumers will be taken aback by the device's limited usability and low mainstream appeal. Adding to that idea, foldable phones are ridiculously expensive. It can cost twice as much as any average dual SIM smartphone. This could be a major cause of the decrease in demand for the device. Another disadvantage is that Android apps don't run properly on a folding smartphone just like how they don't run properly on a tablet.

These setbacks are being a great obstacle to the growth of this technology, yet the technology is still appreciated and encouraged worldwide and it could serve as a base for much more advanced mobile technologies. If you are a gadget lover and if you can afford, folding smartphones are 'must-try' devices. Irrespective of whether folding phones are successful or a failure, they are considered as an important milestone in the evolution of mobile phones and will continue to stay that.

INDHUJA U.S
III, A

PHILIPS SOMNEO: THE SLEEP & WAKE-UP LIGHT

Who said, roses aren't red? Violets aren't blue? and Waking up isn't hard? But as history has it, technology always helps those who ask for it.

Naturally, our daily routine starts when the sun rises, and we begin to relax after the sun sets. However, for most of us, it is not possible to follow this natural rhythm. Many people struggle to sleep mainly because of the busy and hectic life we lead. And if it is not possible to sleep peacefully during the night, there is a chance of the domino effect to happen: we wake up harder and it is a struggle to maintain our energy level throughout the day.

Philips Somneo

Philips Somneo: The Sleep & Wake-up Light provides a pleasant, natural way to start your morning. It features a coloured sunrise simulation and 20 brightness settings along with FM radio and functions like tap to snooze. The light gradually increases between 20 to 40 minutes prior to your alarm time. Just like we gradually fall asleep, we can gradually wake up to this smooth natural lighting .The background sounds, ensure us a grump free morning, getting rid of the sudden attack of the alarm. The light also offers the option of waking up to one of five different nature-inspired sounds. Backed by clinical research, the UV-free Wake-Up Light is proven to wake you up with an improved mood and good energy level. A light-responsive dimming feature guides us to a natural, restful sleep. With its seamlessly integrated multi-touch display we can make our choices quickly and intuitively. The brightness of the screen automatically adjusts to the light level of the room and we can also switch it off completely. The Philips Somneo also has a USB port with which we can easily charge your mobile phone. This means we no longer need any extra chargers and we need not have any cable on the table beside us.

This is how the Philip Somneo works: Select the time you want to wake up, and let a gentle sunrise ease you to start your day in a better way. 30 minutes before your chosen wake-up time, the light will come on, very gently at first, and gets gradually brighter. By the time, 30 minutes is up, you will be fully awake, gently and naturally. Have a good day!

AMRUTHA MANNE
II, A

WRITER'S ENCLAVE

Have you ever wondered why people love the authors of the books they read? It's because of how well an author expresses his story and fantasies to his readers in the form of writing and allowing them to imagine. Writing is an art, it is beautiful and magnificent. The only way we know about prehistoric culture today is because of the paintings, manuscripts, and sketches that were preserved as an art form. From old manuscripts to digital blogs and articles, we have come a long way. Welcome to Writer's Enclave!

CITIZEN SCIENCE AND HOW IT CHANGED RESEARCH

Probably the last thing that a scientist or researcher would want to do is seek the help of a non-scientist or layman in his/her work. What would be the gain? Perhaps only nuisance and a waste of time, right? Wrong. It has been found that delegating research problems to the mass population of the world actually helps achieve better solutions. And this is called citizen science. It might seem like a counter-intuitive idea at first, but citizen science is definitely a workable idea and it pays big dividends. The best and probably the most amusing part about this is that the public need not have an iota of knowledge about the underlying concepts concerning the problem at hand.The success of citizen science was maybe foreseen by the late economist and Nobel laureate Herbert A. Simon, who famously said, "Solving a problem simply means representing it so as to make the solution transparent". This profound statement has found huge validation in the success of citizen science initiatives.One might ask, how exactly does citizen science work, especially when it does not require the public to be educated in the line of research? The answer, like Dr. Simon said, is that the problems are presented to the public in ways they can easily comprehend. The most obvious way would be the gamification of research problems. These games are built on the lines of the problem statement but obscure it from the user. The user only attempts to play the game and win but is actually presenting the solution of the problem from a human perspective. Researchers subsequently take cues from these solutions and build upon the feasible ones.There are legions of research problems in the field of engineering and science. The most popular attempts to solve it are programming the problem, using extensive statistics, math and data analytics and experimentally ratifying the results. A big role in this process is played by the human sense of intuition. However, most research problems are extremely complicated, and there is no obvious or easy solution in sight. Moreover, there is only so much that human intuition can do.This roadblock arises because most research problems are just problems aimed at the betterment of existing systems or creating a nouveau perspective with the help of (mostly) math. Now, what if the math is ignored for some time? What if research problems could be decomposed into real-life scenarios and problems? If this was possible, we could attempt to solve it more intuitively and most importantly, get an insight into how the human mind and brain, the most intelligent and emotional computer known, would attempt to solve such a problem. The solution, which would probably say how to evade monsters chasing you in temple run, could be transformed into algorithms and math now, which can be refined to get the best solution. Jokes apart, this has been found to have an incredible impact on the progress of research, not only because a solution is achieved, but also because researchers get

to know the perspective of a significant percentage of the world's population on such problems. Therefore, what this is effectively doing is creating more space and comfort for human intuition and thus utilizing human intelligence to achieve better results, more than what was achieved conventionally.The most remarkable feat achieved by citizen science so far has been the revolution it created in the research of artificial intelligence and quantum computing simultaneously. This was done by creating a game called Quantum Moves and its sequel, where the objects involved represented quantum mechanical entities, and the solution to the game gave clues regarding the optimization algorithms. The details of the game are beyond the scope of this article. One tremendous feat that this game has achieved is that it has helped scientists synthesize the enigmatic Bose-Einstein condensate, which until recently, was considered extremely difficult and cumbersome. Another was that it demonstrated the manner in which we can maintain balance in the exploration and exploitation aspects of hill climbing and mountain ranking algorithms. It is not difficult to imagine what citizen science can do to the world, mainly through its ability to involve the human mind in the solving of every problem. Games are only one way of doing things. Engineers and scientists would do well to ensure that decomposition of problems into simpler situations is done more frequently. This would not only solve many problems but also push the world forward by taking a quantum leap. The scope of citizen science is truly infinite.

Rangasubramanian K
II, B

THE PARTY, THE STARS AND THE PATH

It's 1 AM. The music reverberated behind him but his eyes were staring into oblivion as they faced the faraway stars. He sipped his drink, heedless to the growing sound of footsteps.''Veer, the party is downstairs. What're you doing up here on the terrace?" Ram said as he walked up to him."It's more peaceful up here. I was just about to leave anyway" he replied."Leave? But it's just 1, the party has barely begun." Ram exclaimed. Veer chuckles mirthlessly and says "I don't even want to be here man. Sameer dragged me here. I could be doing so many other things right now." "And here you go again. Dude, you have got to chill." "There'll be time for chilling later, this is the time to focus." Veer replied coldly. He was tired of the constant immaturity everyone displayed."Oh really? When?" Ram smirked."Dude, we're 22. We have our whole lives ahead of us. And it entirely depends on what we do now." "Exactly man, we're 22. This is the time to have fun, to make memories. Not just hole up in our rooms studying the whole day." "I don't expect you to understand, Ram. We want different things out of life. Some of us have to look for real jobs" Veer replied, condescendingly. Ram ignored the barb. "Well, enlighten me. What do you want to do, to achieve?" "Graduate with honors. Land a good job with a good salary." "And then?" Ram interrupted."Promotions. Find a good wife. Start a family." "Buy an expensive car, a big house, a holiday home you never use" Ram interjected. Veer glared at him, "And what would be so bad about that?" "Oh, nothing, nothing at all. I still don't see when you plan on chilling" "Whenever I feel I've achieved everything I wanted." Veer replied."Oh please, you really think such a time will come? And even if it does, you'll probably be old and living in a retirement home by then" Ram said."So what? I would have done everything I wanted to by then. I will be happy." Veer replied, annoyed. "You honestly don't get it, do you? Do you really

think any of that is going to matter at that point in life? Sure, you have a full bank account, the house and car every man wants. But so what? Do you really think you're going to regale your grandchildren with your stories of only working all day long? Do you really think that while you're sitting in that rocking chair while time whizzes past you, you're going to be thinking of the number of hours you studied every day? Don't you get it Veer? There is so much more to life and happiness than all this." Veer stood, shocked.Ram continued "I'm not saying that you have to forget about your ambitions. But at what cost are you going to be pursuing them? You're missing out on the things that actually matter. Life is about the experiences not what your biodata will be saying about you. And happiness, true happiness? It's about the small things. It's about contentment. It's about the memories that fuel you, from the big ones to the small ones. Your friends' laughter, your wife's smile, your child's first steps, the sun as it rises above the mountains, these are things that will keep you company while you wither away on your rocking chair. The stories you have to share, the experiences that you have had, the knowledge that you've accumulated. That's the wealth you'll be taking with you." He paused. "By all means, chase your aims but don't forget to live while you do." With that, Ram turned around and walked away. Veer stood there, as the footsteps receded, his foundation shaken. He turned towards the sky, actually looked at the stars and what a marvelous sight it was!

Nimisha
II, C

#NOTASHAMED

As Indians, there are a few things that we're not supposed to talk about openly. We are told either to completely avoid any conversation pertaining to these "taboo" topics, or to talk about them in whispers. The number one topic on that list is mental illness and the unnecessary stigma and negativity that is attached to it. This comes in the wake of many students ending their lives across the country. As a person who has battled with OCD (Obsessive Compulsive Disorder) and depression and won it hands down, I feel like I need to take things into my own hands and break the silence on mental health; a hazardous silence that threatens to take many more lives and hearts if not broken immediately, and one that has been hanging around pointlessly for ages. The single most important thing to keep in mind is how complex mental health issues are with regards to awareness, treatment and rehabilitation. The issues are not as simple as going to your neighbourhood doctor and popping a few pills, as you would normally do with any other physical illness. It requires a lot more effort and attention. Concerted efforts have to be put in by all the involved parties – the individual suffering from the illness, family, friends, psychiatrist, teachers, employers etc.
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Stats

The World Health Organization (WHO) has rightfully said that "without mental health there can be no true physical health". The repercussions mental illnesses have on a person are far reaching, and affect not just the person with the illness but also his/her family and friends. A recent study shows that college students are one of the most vulnerable groups who are prone to mental illnesses. It also goes on to say that around 37% college students in India are suffering from some form of mental illness, with depression topping the list. Unfortunately, India also has one of the highest suicide rates in the world, and on an average, one student commits suicide every hour, according to data presented by the National Crime Records Bureau (NCRB).

Relevance in the College Scene

Sadly, mental health issues among students often go unnoticed by parents, teachers, friends and as weird as it might sound, more often than not, by those suffering themselves. Even if the case were the other way around, there are a lot of factors that contribute to lack of awareness and proper treatment. Let us shed more light on those factors.

● Stigma

It really is funny when we think about howwe, as a country, have attached stigma to so many things. We clearly haven't spared mental health, and we, as a society, are the sole reason behind the heavy stigma that revolves around the hyper-sensitive topic of mental health issues.This stigma is extremely dangerous though. When I went through mental health issues, I found it extremely difficult to come out and speak up. I was scared of being judged by society. Every time I came very close to letting the cat of the bag, that persistent gulp in my throat would silence me. The "what-if" questions were in abundance, and they simply prevented me from seeking help.

● Lack of Awareness

Another major issue that I faced from my close ones was questions. Questions to which I was expected to have answers, but I didn't. The questions that were thrown at me were simply atrocious, such as, "Why would you go into depression? You have a good family, good friends, you're financially well to do, and you're studying well." Statements like, "It's all in your head! Cheer up!" and the most hurtful of all: "Mental problems are for the rich". Sadly, we might boast of being well educated, but as far as mental health is concerned, we still continue to be laymen.Mental illness does NOT discriminate based on social / financial / economic status. It can happen to anybody and everybody. The poorest man living on the streets and the world's richest billionaire are equally likely to suffer from mental illness at some point in their lives. Mental illness is majorly caused due to chemical imbalances in one's brain. Thereby, those suffering are helpless and can NOT do much about altering their brain chemistry for the good. This is the point where the all-important mental health professionals come into the picture.

● Lack of Access to Proper Treatment

So, let us say that an individual with mental illness has crossed the above stated hurdles and has now come to the point where he is ready to get help. Sadly, even at this stage, he is faced with another major obstacle and additional questions with no clear answers: "What do I do now? To whom should I go to? From where do I get help?". A very alarming statistic adds weight to this point: For a country like India with a massive population of 1.3 billion, there are only around 9,000 psychiatrists! This means that India has around 0.75 psychiatrists for every 1 lakh people – Not even ONE psychiatrist for ONE LAKH people. This explains why access to proper treatment is very less. Even if you did find a psychiatrist, you are not assured of getting a magical cure. Sadly,

from personal experience, I can safely say that most psychiatrists in the country are absolutely incompetent and money minded. They don't really care about their patients' wellbeing. The average consultation fee for a visit with your general doctor is around ₹300, whereas, you'll have to shell out a whopping ₹1,000 per half-hour of consultation with your psychiatrist.The sky-high consultation fees prove to be a major deterrent to people seeking to get help. And, even if you did have the money to pay the doctor, as stated earlier, very few doctors are actually competent enough to assess you correctly and give you the treatment you'll need to get better.

- Getting the Right Support System

This is the most crucial stage with regards to getting better and back on track. Thankfully, for me, my support system was excellent. My friends were incredibly supportive and went to great lengths in giving me much-needed help. They also helped me out with notes, books and the never-ending list of doubts I had. However, the ECE Department has been the most impactful entity with regards to helping my derailed academic train get back on the track. I had missed nearly a month of college, and when I finally managed to get back to it, the amount of work that had piled up was mind boggling. I was staring at a point of no return, filled with tests, assignments and concepts that I had not the slightest idea about. But my professors played an instrumental role in making sure that the transition from long medical leave to getting back to business was smooth. Of course, there's no denying the fact that the learning curve was steep and almost seemed unconquerable. However, as clichéd as it might sound, nothing is impossible, after all! Apart from helping me academically, my professors also gave me the much-needed motivation and made me feel better with every passing day. What I really appreciate about them is how they keep students' welfare as their topmost priority. I went to get help from them several times a day, and not a single time did they send me back without it. They felt more like family rather than professors.

The Biggest Takeaway

Having said so much, I can conclude by saying only one thing: Speak up. Get help. There's nothing to feel ashamed about suffering from mental illness. Once you realise that you're not feeling well, just talk. To anyone – your parents, siblings, friends or even your professors. Remember: The faster you speak up and get help, the sooner you get better. So, let's join hands together, one at a time, and break the stigma. We're all here for each other, and together, we can do so much more than we can alone.

Shrinivas Badri
III, C