The Department of
Electronics and Communication Engineering

PRESENTS

Impulse

Volume 10 Issue 2
Half-yearly Newsletter
June 2021 - Nov 2021

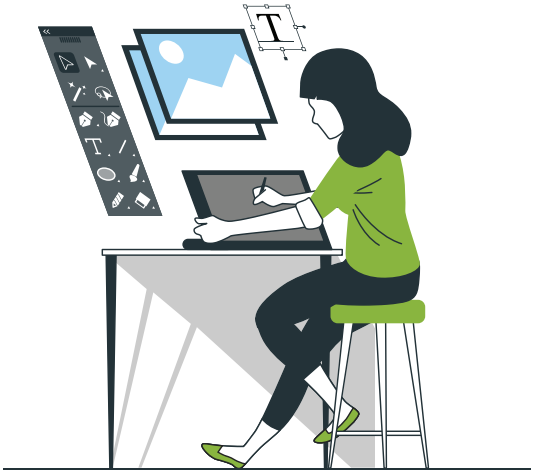
EDITOR'S NOTE

Greetings from Team Impulse!

It gives us immense pleasure to bring to you another edition of the Impulse Magazine!

This magazine is the cumulative effort of a band of creative designers and content writers who worked tirelessly over months to make this magazine a reality. Working with them was a thorough pleasure, we got to interact with curious, intuitive juniors who brought in quality content and interactive designs for the magazine, making it the thought provoking visual treat it is today. We've put together articles on students' experiences during the different internships undertaken by them, during placements, their journey while pursuing their masters etc to serve as a knowledge repository to whomsoever it might benefit. Our magazine would not have been possible without our faculty in-charge, Dr. Gulam Nabi Alsath who never hesitated to clarify our doubts, and encouraged us to get creative with respect to content and design for the magazine. The shift from online to offline college was stressful for the most part but we're eternally grateful to the college and the department for allowing us to carry on with our work regardless.

Andrea Solomon, IV A
Shwetha S, IV C



MEET THE TEAM

FACULTY CO-ORDINATORS :

1. Dr. P. Vijayalakshmi
   Prof. & HOD, ECE
2. Dr. K.T. Selvan
   Professor, ECE

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   Associate Professor, ECE

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CONTENTS

INVITED ARTICLE

WEARABLE SENSORS FOR ACTIVITY RECOGNITION

Dr. R. Amutha,
B.E., M.E., Ph.D.,
Professor

Recently, due to the development of microelectronic devices, wearable sensors are being used as an indispensable tool for the recognition of human actions. Wearable technology involves accessories and clothing that incorporates electronic devices that can be easily worn by individuals. Human action recognition is a crucial research domain due to its wide range of applications that include military, security and medical applications.

The research in this field is set to grow tremendously in the future. The main advantages of using wearable sensors in action recognition include flexibility, cheap, light independency, occlusion independency and miniature size. Figure 1 shows the block diagram of activity recognition using wearable sensors.

The main steps include the acquisition of data from wearable devices, feature extraction and classification. The result of the classification step indicates the type of activity performed by the individual.

The most commonly used wearable devices include accelerometer sensor, gyroscope sensor, magnetometer sensor, smart watch, shimmer sensing platform, Xsens sensing device and MTx tracker.

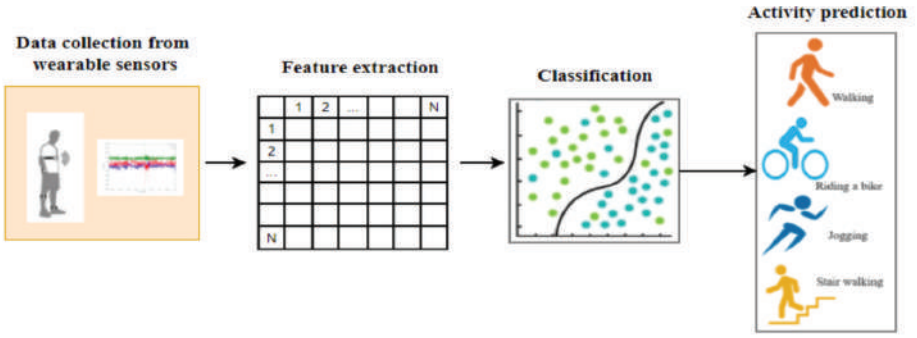


Figure 1. Block diagram of activity recognition using wearable sensors

Accelerometer sensor

The accelerometer sensor (Figure 2) is used for measuring the inertial body motions along three axes (i.e., x-,y- and z-axes). This sensor is popularly being employed in human action recognition as it offers rich information about the human movements. Further, the accelerometer data can be acquired with minimal expense due to the wide availability and low cost of the sensor.

The accuracy of classification from the signals acquired by accelerometer sensor is high since each action creates a unique acceleration signal pattern. Thus, by learning these signal patters, diverse human actions can be easily categorized using suitable machine learning algorithms.

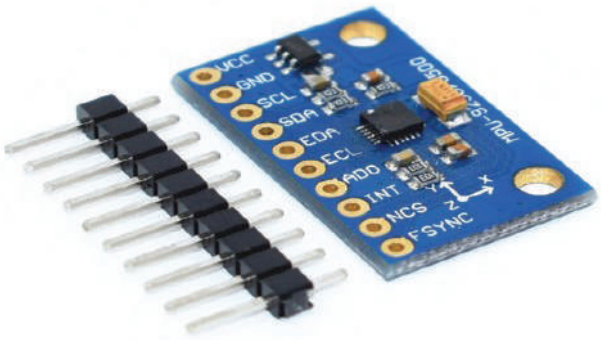


Figure 2. Accelerometer sensor [1]

Gyroscope sensor

The gyroscope sensor (Figure 3) is used for measuring the angular velocity of a moving object. This sensor is also capable of identifying the lateral orientation of an object. The gyroscope sensors are also called as angular rate sensor or angular velocity sensors. These sensors are installed in the applications where the orientation of the object changes rapidly. Apart from measuring the angular velocity, these sensors are also capable of measuring the motion of an object. Thus, gyroscope sensors can be effectively used for robust and accurate classification of human actions.

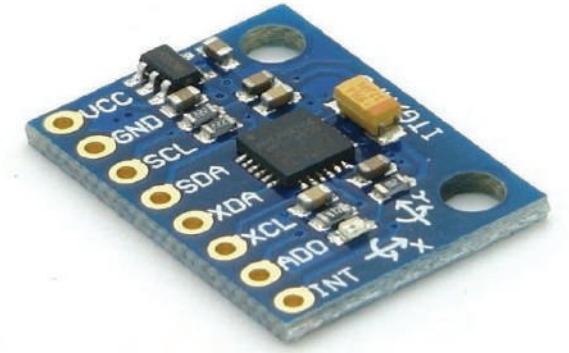


Figure 3. Gyroscope sensor [2]

Magnetometer sensor

The magnetometer sensor (Figure 4) is used for measuring the magnetic induction or magnetic field intensity. It computes the strength and direction of magnetic field in the vicinity of the instrument. Magnetometers are widely used in applications like aircraft, spacecraft, defense, aerospace, medicine, agriculture, etc. These sensors have to capability to be operated under severe and limited conditions. Based on the reference model of the earth's magnetic field and the local magnetic field, the angle information of the individual motion can be obtained. This information is used in the identification of action performed by the individual.

Smart watch

Smart watches are widely being employed as wearable devices due to their unique advantages that include portability, reliability, stability, universality and low environmental dependence. The smart watches are equipped with a tri-axial accelerometer and a tri-axial gyroscope sensor. The sampling rate of smart watch is usually fixed as 25 Hz. These watches are worn around the wrist of the individuals as shown in Figure 5. They are especially suitable for the classification of sports activities that involve motion of the hands. In addition to action classification, the smart watches are also employed in the monitoring of health indicators such as human heart rate.

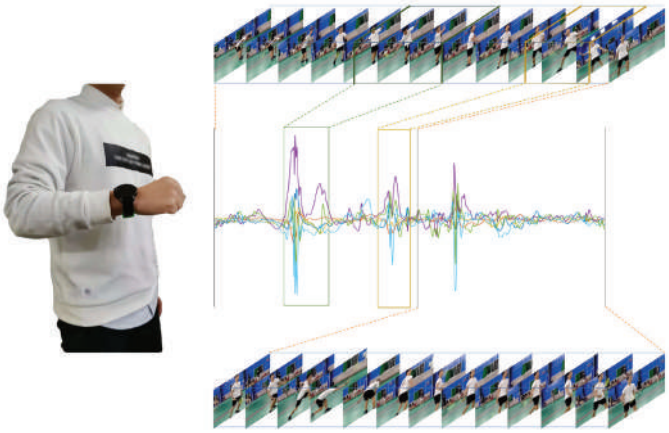


Figure 5. Action recognition using smart watch [4]

Shimmer sensing platform

Shimmer sensing devices are the popularly used wearable devices for applications like remote health monitoring and fall detection. It is a small, low weight and low power wireless wearable sensing platform. The shimmer sensing platform (Figure 6) includes a tri-axial accelerometer, a tri-axial gyroscope, a tri-axial magnetometer and electrocardiography sensors. These devices have the ability to transfer the sensor data in wireless mode using a Shimmer bluetooth link. Similarly to any wearable device, Shimmer needs to be recharged regularly, and since it targets mainly healthcare applications, it may be quite critical if its battery becomes very low.

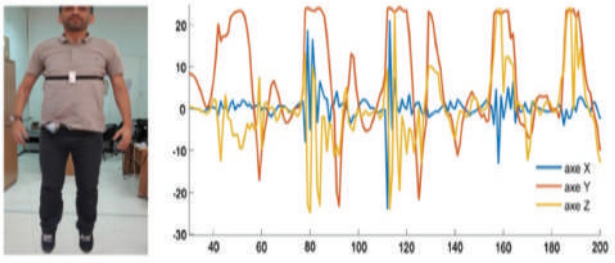


Figure 6. Shimmer sensing platform [5]

Xsens sensing device

Xsens sensing device is a wearable platform that ensures accurate time synchronization. This device (Figure 7) has an internal sampling rate of 1000 Hz along with buffer duration of 10s. It has an overall battery life time of 6 hours. This device has a weight of 16g and can be operated in the temperature range of 0ºC to 50ºC. The Xsens sensing device can be operated up to 20m in free space. The applications of this sensing device include ergonomics, sports, virtual reality and human machine interaction.

Figure 7. Xsens sensing device [6]

MTx tracker

The MTx trackers are 3-DOF orientation trackers that include a tri-axial accelerometer, a tri-axial gyroscope and a tri-axial magnetometer. The MTx motion tracker (Figure 8) is programmed via an interface program called MT Manager to capture the raw or calibrated data with a sampling frequency of up to 512 Hz. The accelerometers of MTx trackers can sense up to ±5g. The gyroscope units in the MTx trackers can sense up to ±1200º/s. The magnetometer in the MTx tracker function as a compass and can sense magnetic fields in the range of ±75μT.

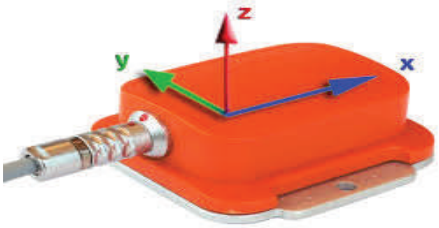


Figure 8. MTx tracker [7]

Summary and Discussions

In this article, the main highlights of wearable devices employed in action recognition were discussed. Employment of wearable sensors for human action recognition has become unavoidable in various fields including health care, surveillance, automation, sports, etc. Even though there are potential gains of using wearable sensors for action recognition there are still challenges in terms of technological advancements to design wearable sensors that are easy to use and comfortable to the wearer.

References

[1] Tarapiah S, Atalla S, Alsayid B. Smart on-board transportation management system Geo Casting featured. In2014 World Congress on Computer Applications and Information Systems (WCCAIS) 2014 Jan 17 (pp. 1-6). IEEE.
[2] https://www.elprocus.com/gyroscope-sensor/
[3] https://www.electronicscomp.com/gy-273-hmc5883l-triple-axis-compass-magnetometer sensor-module
[4] Zhuang Z, Xue Y. Sport-related human activity detection and recognition using a smartwatch. Sensors. 2019 Jan;19(22):5001.
[5] Kerdjidj O, Ramzan N, Ghanem K, Amira A, Chouireb F. Fall detection and human activity classification using wearable sensors and compressed sensing. Journal of Ambient Intelligence and Humanized Computing. 2020 Jan;11(1):349-61.
[6] https://in.element14.com/xsens/mti-630/mems-module-gyroscope-accelero/dp/3225727
[7] Barshan B, Yüksek MC. Recognizing daily and sports activities in two open source machine learning environments using body-worn sensor units.

VISITS AND INTERACTIONS

- Dr. S. Sakthivel Murugan, Asso. Prof. facilitated the execution of a MoU signing between SSN and TNFU (Tamilnadu Fisheries University) and the MoU copy was received and submitted on 28.06.2021.
- Dr. S. Radha, Prof & Head attended the TPDM -11, technical review meeting of BRNS sponsored project along with IGCAR Principal Collaborator at IGCAR, Kalpakkam on 09.07.2021.
- Dr. S. Sakthivel Murugan, Asso. Prof. with his research scholars Mr. M. Vimalraj & Ms. M. Dhanalakshmi carried the underwater image collection using the tank facilities of Paraprofessional Research Institute (TNFU) using Sofat Trident underwater drone and Gopro camera on 02.08.2021.
- Dr. S. Sakthivel Murugan, Asso. Prof. along with his research scholar Mr. M. Vimalraj carried the data collection using underwater drone and camera at Kolovai lake, Chengalpet on 14.08.2021
- Dr. S. Radha, Prof & Head, Dr. N. Edna Elizabeth, Prof. & Dr. R. Kishore, Asso. Prof. visited IGCAR and discussed the first version of the joint proposal draft on 17.08.2021, to be submitted to BRNS.
- Dr. N. Prabagarane, Asso. Prof. along with Ms. J. Nevhedhithaa, Mr. A. Ramkarthick, and Mr. S. M. Nandhagopalan, UG-ECE 2018-2022 Batch students had a meeting with Prof. Santi Concetto Pavone and Prof. Gino Sorbello regarding the project on ML-based 2D metasurface lens optimization on 23.08.2021.
- Dr. S. Radha, Prof. & Head, Dr. R. Rajavel, Asso. Prof. held discussion with Mr. Kathirvelan, Innovation Head, & Mr. Sivashankaran, General Manager from Preethi Kitchen Appliances Pvt. Ltd, Chennai for possible collaboration on 30.08.2021.
- Dr. N. Prabagarane, Asso. Prof. along with Mr. M. Vignesh, Mr. V. Vignesh, and Mr. S. Vishvambar Panth, UG-ECE 2018-2022 Batch students had a meeting with Prof. Dejan Vukobratovic, the University of Novi Sad on 27.08.2021 regarding the project on GNN
- Dr. S. Radha, Prof. & Head presented the Department's research strengths to the Philips industry on 30.08.2021.
- Dr. K. T. Selvan, Prof. had a meeting with Drs. Ivan Gratchev and Hugo Espinosa of Griffith University, Australia, regarding the recent proposal to launch Griffith-SSN Joint Seminars on Learning & Teaching on 30.09.2021.

- Dr. K. T. Selvan, Prof. in respect of the LRDE project, attended a review meeting with LRDE scientists on 01.10.2021. Ms. M. Akila, SRF too attended the virtual meeting.
- Dr. S. Radha, Prof. & Head and Dr. M. Gulam Nabi Alsath, Asso. Prof. attended the weekly research review meeting for the recently funded industry project on Reflectarray Antennas during Oct. & Nov. 2021.
- Dr. S. Radha, Prof. & Head attended the Vigyan Utsav meeting organized by TNSCST on 06.10.2021.
- Dr. R. Rajavel, Asso. Prof. had a meeting with Mr. V Balaji & Mr. S. K. Murugan, Electrical & Electronics, Innovation & Development, Philips DA, Chennai to discuss the updates on the ongoing consultancy projects and its possible extension on 16.11.2021 & 23.11.2021.
- Dr. S. Radha, Prof & Head, Dr. S. Esther Florence, Dr. K. Muthumeenakshi and Dr. C. Vinoth Kumar, Asso. Prof(s) attended the meeting with Prof. Ganesh Samudra on the feedback of common framework for PO-CO attainment, CC and PIs.
- Dr. N. Edna Elizabeth, Prof. & Dr. R. Kishore, Asso. Prof. visited IGCAR and discussed the second version of the joint proposal draft on 12.10.2021, to be submitted to BRNS.

EXPERT LECTURES

GUEST LECTURES

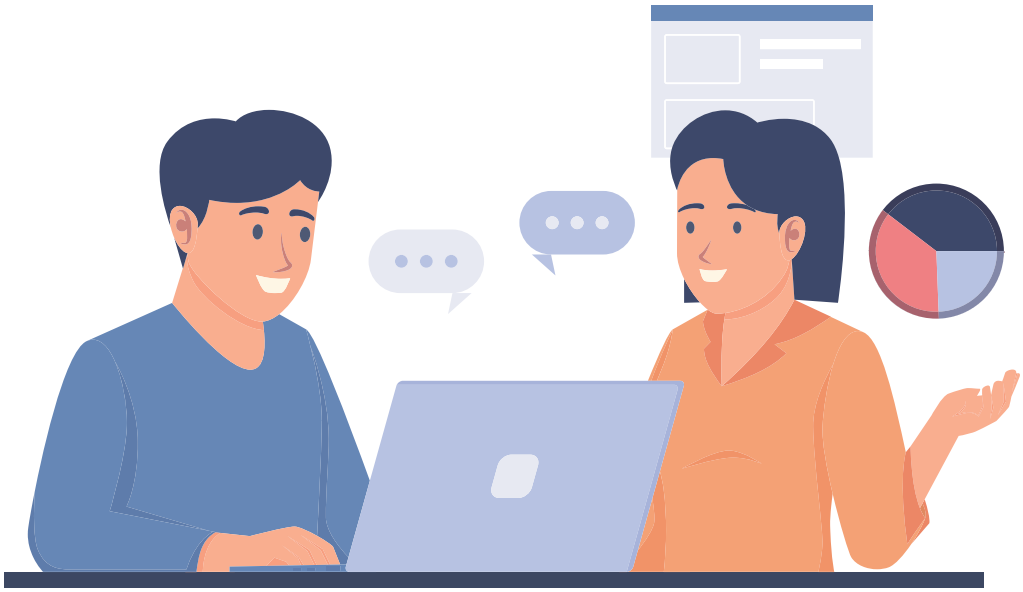
- Dr. Richards Joe Stanislaus, Asst. Prof./SENSE/VIT Chennai on the topic “Travelling Wave Tubes” was arranged on 19.07.2021. Dr. S. Esther Florence coordinated the event.
- Dr. P. Sudharsan, Asst. Prof. Dept. of ECE, NIT Tiruchirappalli on the topic “Applications of Machine Learning in Wireless Communication” on Wednesday, 18.08.2021

FACULTY EXPERT LECTURES

- Dr. S. Radha, Prof. & Head, delivered a webinar on “Assessment Strategy for OBE: Two-Step Process” to the faculty of Sri Sairam College of Engineering, Chennai on 04.06.2021
- Dr. P. Vijayalakshmi, delivered a talk on “Machine learning techniques for speech-enabled devices” in a virtual FDP titled “Machine learning for signal processing and VLSI” organized by Centre for Artificial Intelligence and Machine Learning, Dept. of ECE, Anurag University, Hyderabad on 05.06.2020
- Dr. K. Muthumeenakshi, Asso. Prof. delivered a talk on “K–Nearest Neighbour Learning and Locally Weighted Regression” for the CFD-Anna University-sponsored FDTP on Machine Learning Techniques at the Department of ECE, Sri Sairam Engineering College, Chennai on 10.06.2021.
- Dr. S. Ramprabhu, Asso. Prof. delivered a talk on “Design of Frequency Selective Surfaces for Electromagnetic Shield Applications” during the five day online FDP conducted by Dr. NGP Institute of Technology, Coimbatore on 10.06.2021.
- Dr. B. Ramani, Asso. Prof. delivered a virtual lecture on “Transistor Biasing and Stability Analysis” at the Department of ECE, Rajalakshmi Engineering College, Chennai on 11.06.2021.
- Dr. N. Venkateswaran, Prof. was a Panel Speaker in the 2nd Signal Processing Research and Innovation Conclave held virtually on 14.06.2021, invited by the Chair, IEEE Bangladesh Section.
- Dr. N. Venkateswaran, Prof. presented a talk on the topic, “Signal Processing and Machine Learning” at the Department of ECE, Sri Sairam Engineering College on 16.06.2021.
- Dr. S. Ramprabhu, Asso. Prof. delivered a guest lecture titled “Frequency Selective Surfaces and its applications” in the one-day national level webinar conducted by Hindustan Institute of Technology, Coimbatore on 17.06.2021.

- Dr. N. Edna Elizabeth, Prof. delivered a guest lecture in the National webinar on “Introduction to V2X, Standards, its Use Cases and Application in Air quality monitoring system” jointly organized by SSN with the initiative of Dr. K. T. Selvan, Prof. and Dr. M. Krishnan of Tata Elxsi on 18.06.2021.

  Dr. B. S. Sreeja, Asso. Prof. delivered a guest lecture on “Scope of Antenna and Sensor Devices for 5G Wireless Communication Applications” at the Department of EEE, Vidya Institute of Science and Technology on 30.06.2021.
- Dr. K. T. Selvan, Prof. delivered a talk entitled “Design thinking framework” at an IEEE Antennas and Propagation Society seminar held on 23.09.2021.
- Dr. S. Sakthivel Murugan, Asso. Prof. delivered a lecture in a webinar on “Challenges in underwater data collection for various applications” organized by K S School of Engineering and Management, Bangalore on 29.09.2021.
- Dr. N. Venkateswaran, Prof. was a Guest speaker for the IEEE Day Celebration on 07.10.2021 and delivered a guest lecture on the topic “5G Communication & Beyond ‘’ at Jeppiaar Institute of Technology.
- Dr. K. T. Selvan, Prof. on an invitation from the Griffith School of Engineering and Built Environment, Australia, delivered a talk entitled “Teaching in higher education: Why we should broaden our educational goals” at their Learning & Teaching Webinar Series on 08.10.2021.
- Dr. P. Vijayalakshmi delivered an invited talk titled “AI and speech disorders - the challenges” in ATAL FDP conducted by CDAC on “Introduction to speech processing and its applications using AI and ML” on 27.10.2021.
- Dr. K. Muthumeenakshi, Asso. Prof. delivered a guest lecture on “Signals and Systems - Convolution Integral and its Properties” at the department of ECE, Velammal Engineering College, Chennai on 04.10.2021.



EVENTS ORGANIZED

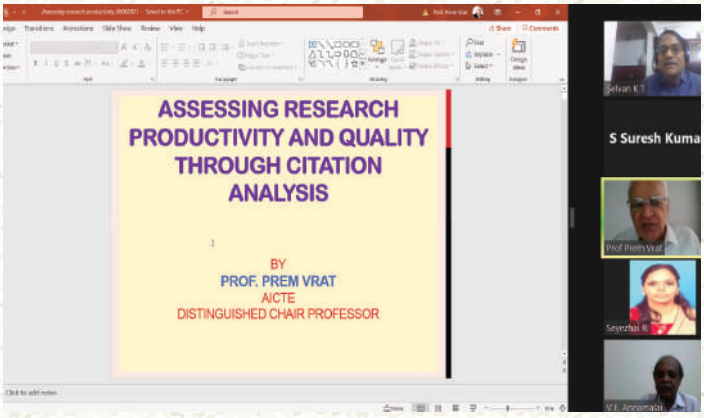
Workshop on "Academic Writing for PG Students"

Date: 3rd June 2021
Coordinators: Dr. K.T. Selvan, Prof., Dr. Premanand V. Chandramani, Prof. and Dr. S.Thiruvenkataswami, Prof. & Head/English.
Organizers: Dr. K. T. Selvan, Prof. on behalf of the ECE Department in association with the Department of English and SSN IIC

Lecture sessions by Prof. Prem Vrat - AICTE Distinguished Chair Professor

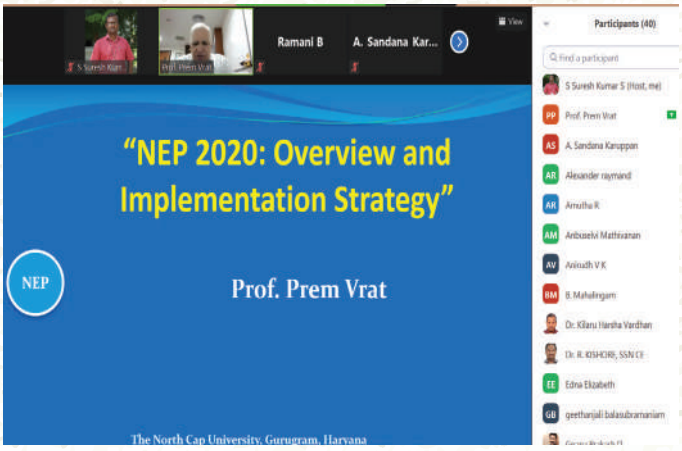
Coordinators: Dr. K. T. Selvan, Prof. and IIC representatives were Dr. R. Seyezhai, Asso. Prof./ EEE and Dr. S. Sureshkumar, Ass. Prof./Mech.
Organizers: Dr. K. T. Selvan, Prof. as institutional activity, and in collaboration with SSN IIC
Speaker: Prof. Prem Vrat, AICTE Distinguished Chair Professor

Session 1 conducted on 10th June 2021



Session 2 conducted on 17th June 2021

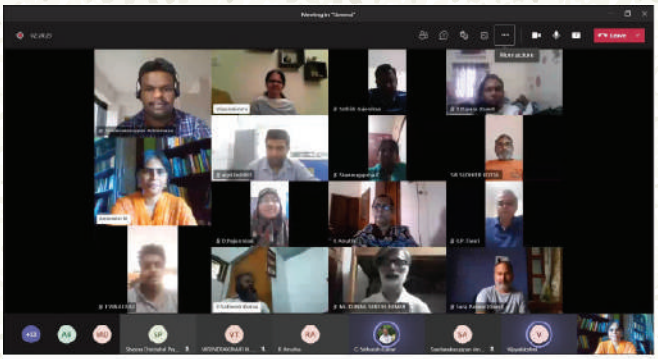
Session 3 conducted on 23rd June 2021-1



Session 3 conducted on 23rd June 2021-2

5-day Faculty Development Program (FDP) on "System Design for Healthcare and assistive technologies"

Date: 14th - 18th June 2021
Organizers: Dr. P. Vijayalakshmi, Prof., Dr. M. Anbuselvi, Asso. Prof., Dr. G. Satheeshkumar, Asso. Prof.t/Mech and Ms. M. Dhanalakshmi, Asst. Prof//BME

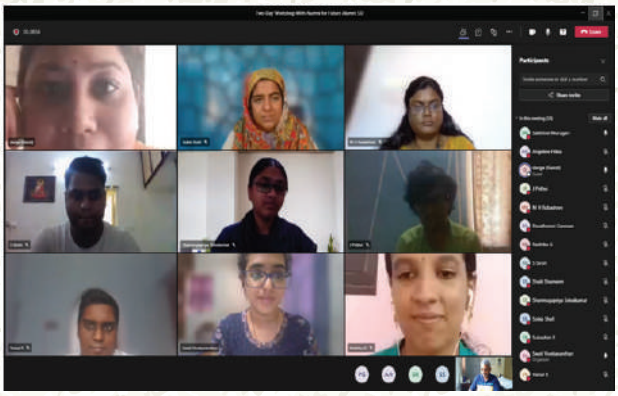


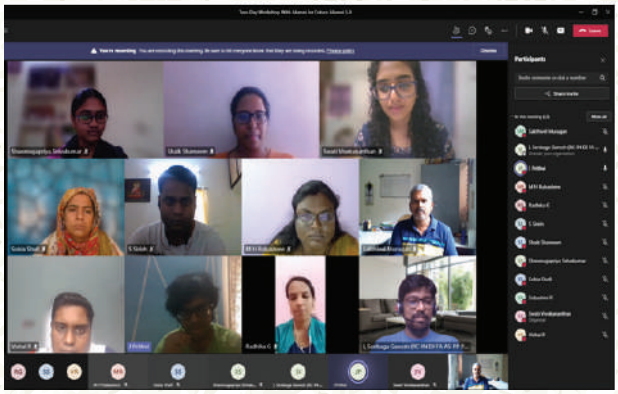
Glimpses of the FDP

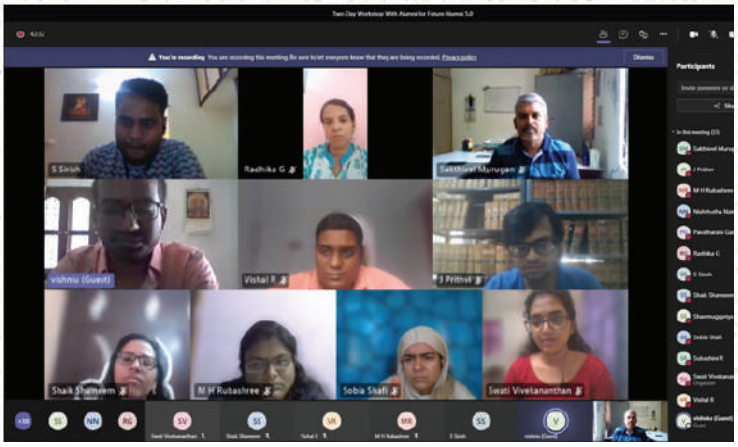
Two-day workshop on "With Alumni for future Alumni V 5.0"

Date: 5th and 6th August 2021
Organizer: Sakthivel Murugan, Asso. Prof.

Glimpses from the Two-day workshop on "With Alumni for future Alumni V 5.0"







NON-TEACHING STAFF TRAINING PROGRAMS

1. Mr. D. Sundaravadivel and seven other non-teaching staff members attended the two weeks professional development programme for Non-Teaching Faculty on “Skill Upgradation” organized by AMET University, Chennai from May 24 - June 04, 2021.
2. Mr. D. Sundaravadivel attended a webinar on “PCB Designing and its Applications” organized by Sharad Institute of Technology College of Engineering, Chennai on 02.06.2021.
3. Ms. P. Nalitha attended the following webinars:
    - “IoT and blockchain” organized by GVR&S College of Engineering and Technology, Chennai on 11.06.2021.
    - “Wireless Sensor Network Design and Validation” by SNM Institute of Management and Technology on 14.06.2021
4. Ms. V. Metha Devi completed the online courses on “Introduction to BJT Amplifiers and Operational Amplifiers” & “Introduction to Communication Skills” through Alison.
5. Mr. E. Kumaresan attended the following webinars:
    - “IoT Systems” organized by Siddharth Institute of Engineering & Technology, Puttur on 02.06.2021.
    - “PCB Designing and its Applications” organized by Sharad Institute of Technology College of Engineering, Chennai on 02.06.2021.
    - “Python Programming and its Applications” organized by Balaji Institute of Technology & Science on 16.06.2021.
    - “Digital security Awareness” by Alison.
6. Mr. D. Sundaravadivel, Mr. G. Subramanian, Mr. E. Kumaresan and Mr. S. Murugan attended the Two weeks motivational programme for non-teaching staff members titled “Skill Development on Positive Thinking” organized by the Department of Nautical Science, AMET, Chennai from July 09-17, 2021.

EVENTS ATTENDED

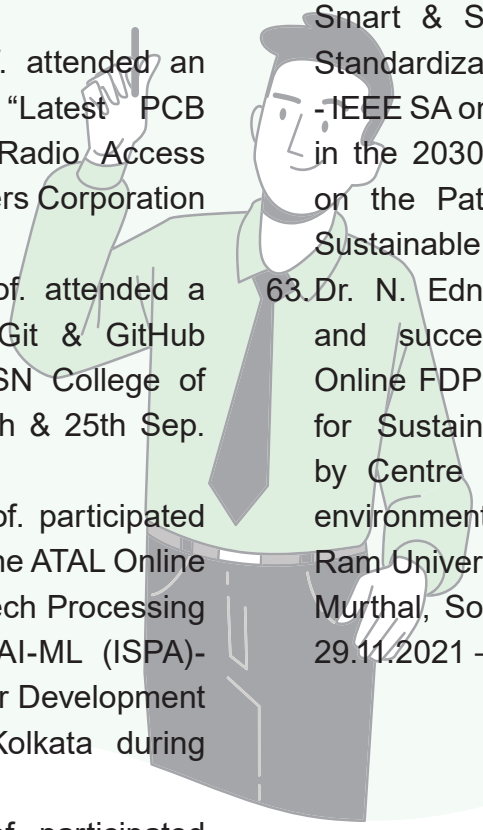
1. Dr. K. T. Selvan, Prof. attended a webinar titled “Learning and Teaching Seminar” organized by Griffith University, Australia on 19.05.2021.
2. Dr. S. Karthie, Asso. Prof. attended a workshop on “Space Robotics” organized by IIC SSN CE, IEEE ComSoc Student Chapter, Dept. of ECE, SSN CE and SSN Alumni Association on 20.05.2021.
3. Dr. R. Amutha, Prof. attended a webinar on “Artificial Intelligence and Machine learning” organized jointly by Sri Ramakrishna Institute of Technology and Pantech Elearning on 31.5.2021.
4. Dr. N. Prabagarane, Asso. Prof. participated and successfully completed the ATAL online FDP on “Recent Trends in Precision Agriculture” organized by Sant Longowal Institute of Engineering and Technology, Longowal from 31st May to 4th June 2021.
5. Dr. R. Rajavel, Asso. Prof. attended one-week FDP on “Machine Learning-Based Applications” organized by the ECE Department, Sreyas Institute of Engineering and Technology, Hyderabad, from 31st May to 6th June 2021.
6. Dr. P. Kaythry, Asso. Prof. attended the Lead Auditor Course on “Environment Management System, Green Campus Audit, Energy Audit and Hygiene Audit to Educational Institutions and Industries” from 31st May to 4th June 2021.
7. Dr. C. Annadurai, Dr. I. Nelson and Dr. S. Esther Florence, Asso. Prof(s). successfully completed the ATAL online FDP on “Embedding AI in Smart Sensors” organized by Sri Ramakrishna Engineering College, Coimbatore June 07-11, 2021.
8. Dr. B. Partibane, Asso. Prof., Dr. R. Hemalatha, Asso. Prof. participated and successfully completed the ATAL Online FDP on “AI and IoT- Based Technology for Precision Farming and Smart Agriculture” organized by KGiSL Institute of Technology, Coimbatore during June 07-11, 2021.
9. Dr. C. Vinoth Kumar Asso. Prof. participated and successfully completed the ATAL online FDP on “Combating Cancer: Role of ML Techniques in Prevention and Treatments” organized by Kalaignar Karunanidhi Institute of Technology, Coimbatore during June 07-11, 2021.
10. Dr. M. Anbuselvi, Asso. Prof. successfully completed ATAL Online Elementary FDP on “Quantum Computing and Quantum Cryptography” organized by the National Institute of Technology, Karnataka during June 07-11, 2021.
11. Dr. P. Kaythry, Asso. Prof., attended webinars on “Machine Learning for Wireless Communications” organized by IEEE Inÿormation Theory Society (ITS) Bangalore Chapter on 08.06.2021; “Climate Change Risk Management & The Education Sector Confirmation” organized by AICTE and IRM affiliate on 11.06.2021 & “Default is Digital - Trends and Opportunities” organized by BVICAM, New Delhi on 12.06.2021
12. Dr. P. Kaythry, Asso. Prof., Dr. C. Vinoth Kumar, Asso. Prof. attended an international webinar on “Quantum Encryption - Overview, use cases and adoption” organized by IEEE R10 on 12.06.2021.

13. Dr. R. Amutha, Prof. attended a five-day FDP program on “System Design Healthcare and Assistive Technologies” organized by the Department of ECE, SSNCE during June 14-18, 2021.
14. Dr. N. Edna Elizabeth, Prof. successfully completed the ATAL Online FDP on “Cutting edge technologies in Energy storage system for E-Mobility” organized by KPR Institute of Engineering and Technology from June 14-18, 2021.
15. Dr. P. Kaythry, Asso. Prof. attended a webinar on “The United States and India as Partners in Climate Action: The Clean Energy Agenda” organized by the Center for Public Policy Research on 17.06.2021. & “Communication in Crisis Management - How to Do it Right?” organized by BVICAM, New Delhi on 19.06.2021.
16. Dr. Premanand V. Chandramani, Dr. K. T. Selvan, Prof. & Dr. N. Venkateswaran, Prof. successfully completed the ATAL Online Elementary FDP on “Short Term Course on Innovative Pedagogical Practices in Higher Education” organized by Lovely Professional University, Punjab during June 21-25, 2021.
17. Dr. C. Vinoth Kumar Asso. Prof. successfully completed the ATAL online FDP on “Quantum Computing” organized by the Government College of Engineering, Tanjore during June 21-25, 2021.
18. Dr. P. Kaythry, Asso. Prof. attended an international webinar on “sub-THz communication - A Key enabler for Beyond 5G?” organized by IEEE Spectrum on 23.06.2021 & an International Workshop on “Future Communications” organized by the Singapore University of Technology and Design during 23-24, June 2021.
19. Dr. P. Kaythry, Asso. Prof. attended a webinar on “Power of Positivity: Optimism & 7th Sense” by Dr. Padmakali Banerjee, ProVC, AUH, DELNET on 24.06.2021 & “Research in Digital Age - Problems and Opportunities” organized by BVICAM, New Delhi on 26.06.2021.
20. Dr. I. Nelson, Dr. R. Kishore, Asso. Prof(s)/ ECE attended Webinar on “L&T EduTech’s Engineers’ Forum - Ensemble” organized by L&T EduTech CollegeConnect, L & T Construction on 25.06. 2021.
21. Dr. P. Kaythry, Asso. Prof. attended IEEE R10 talk on “Professional Ethics and Getting Ahead” organized by IEEE Young Professionals on 26.06.2021 & “Higher Education Model for Smart Cities” organized by IEEE Smart cities Society on 29.06.2021.
22. Dr. N. Venkateswaran, Prof. attended the 12th edition of JTG/IEEE ITSoc Summer School on “Information Theory, Telecommunications, Signal Processing, and Networks” sponsored by platinum sponsors: IEEE Information Theory Society, during 27-30, June 2021.
23. Dr. S. Ramprabhu, Asso. Prof. attended a one-day workshop titled “New Product Innovation using Failure Analysis” conducted by the Department of Mechanical Engineering, SSNCE on 29.06.2021.
24. Dr. K. K. Nagarajan, Asso. Prof. successfully completed the ATAL online FDP on “Formal Verification of Digital Designs” organized by PES UNIVERSITY during June 7-11, 2021.
25. Dr. R. Rajavel, Asso. Prof. participated in the online FDP on “DSP Builder, AI, FPGA Accelerator using Intel FPGA” during 25-26 June 2021 in VIT Chennai. He also attended the webinars on “Image Processing with computer vision made easy with MATLAB” and “AWS Machine Learning” on 30.06.2021.

26. Dr. R. Hemalatha, Asso. Prof., attended a webinar on “Integrating Smart Vehicles into the Undergraduate ECE Curriculum: From “We have NO idea” to “Wait, this actually makes sense!” organized by the Quanser team on 30.06.2021.
27. Dr. M. Gulam Nabi Alsath, Asso. Prof. successfully completed the ATAL Online FDP on “BioMEMS and Lab on Chip Technologies for Point of Care Applications” organized by C. Abdul Hakeem College of Engineering and Technology, Vellore during July 05-09, 2021.
28. Dr. N. Edna Elizabeth, Prof., successfully completed the ATAL Online FDP on “Device Security in Internet of Things Internet of Things (IoT) Engineering” organized by the Department of CSE, Indian Institute of Information Technology Guwahati, Assam during July 07-12, 2021.
29. Dr. W Jino Hans, Asso. Prof. participated and successfully completed the ATAL Online FDP on “Leadership Excellence for Academic Development (LEAD)-Elementary ‘’ organized by the National Institute of Technology Karnataka, Surathkal during July 12-16, 2021.
30. Dr. N. Venkateswaran, Prof. successfully completed the ATAL Online FDP on “Cyber Crimes, Defensive Practices and Safe Computing” organized by Pondicherry Engineering College during July 12-16, 2021.
31. Dr. P. Kaythry, Asso. Prof. successfully completed the ATAL Online FDP on “Strategies and Outcomes to Enhance sustainable Green Environment” organized by the University College of Engineering -BIT Campus, Tiruchirappalli during July 19-23, 2021.
32. Dr. R. Hemalatha, Asso. Prof., attended the webinar on “Automated Warehouse Environment using Deep Learning Methods for Smart Manufacturing” organized by IEEE SA on 01.07.2021.
33. Dr. P. Kaythry. Asso. Prof. attended international webinars on “Predictive Analysis” organized by Seeq on 07.07.2021 & “Implementing the Smart Port Concept” organized by IEEE Smart Cities on 13.07.2021.
34. Dr. N. Edna Elizabeth, Prof. participated in the webinar on “Building an Innovation/Product Fit for Market” organized by the Institution’s Innovation Council of Sri Sivasubramaniya Nadar College of Engineering on 15.07.2021.
35. Dr. P. Kaythry, Asso. Prof. attended international webinars on “Synergising Clean Energy and Green Transportation” organized by IEEE smart cities on 20.07.2021 & “Exploring the Importance of Sensors and Their Real-Life Applications in Life-Saving Wearable Devices” organized by IEEE standards Association on 21.07.2021.
36. Dr. R. Hemalatha, Asso. Prof. attended part 1 of the Deep Learning Webinar Series on “Automated Labeling and Iterative Learning” organized by Math works on 21.07.2021.
37. Dr. B. Ramani, Asso. Prof. attended the webinar series on “Machine Learning for Signal Processing Applications” organized by Kumaraguru College of Technology, Coimbatore during July 22-24, 2021.
38. Dr. P. Kaythry, Asso. Prof. completed the online course “Nanotechnology and Nanosensors Part-1” in Coursera offered by Technion Israel Institute of technology.
39. Dr. N. Venkateswaran, Prof. successfully completed the ATAL online FDP on “Photonics” organized by IIT Bhilai during July 19-23, 2021.

40. Dr. C. Annadurai, Asso. Prof. attended the FDP on "AI-ML Software Tools" organized by VIT Chennai during July 21-25, 2021.
41. Dr. K. J. Jegadish Kumar, Asso. Prof. successfully completed the ATAL Online Elementary FDP on "Advances in Electronics and Communication Engineering for Industrial Applications" organized by Stanley College of Engineering and Technology for Women during July 26-30, 2021.
42. Dr. P. Kaythry, Asso. Prof. successfully completed the ATAL online FDP on "Capacity building through for Emotional Intelligence for Women" organized by Dr. SNS Rajalakshmi College of Arts and Science, Coimbatore during August 16-20, 2021.
43. Dr. K. J. Jegadish Kumar, Asso. Prof. successfully completed the ATAL Online Elementary FDP on "Advances of Artificial Intelligence and Machine Learning in Societal Development" organized by Uttarakhand Open University during August 16-20, 2021.
44. Dr. B. Ramani, Asso. Prof. successfully completed the ATAL Online FDP on "Internet of Things" organized by Rajagopal Polytechnic College, Gudiyattam during August 23-27, 2021.
45. Dr. S. Karthie, Asso. Prof. attended the international webinar on "The spectrum sharing challenges for enabling large bandwidth mmWave/THz spectrum access above 100 GHz for 6G and other applications" organized by IEEE MTT-S on 10.08.2021.
46. Dr. S. Radha, Prof. & Head attended the National Webinar on Research, Innovation, and Ranking, organized by AICTE on 11.08.2021 and the SDG workshop organized by SNF on 12.08.2021.
47. Dr. K. J. Jegadish Kumar, Asso. Prof., Dr. C. Vinoth Kumar, Asso. Prof., Dr. K. Muthumeenakshi, Asso. Prof. attended the two-day international workshop on "Mathematical Foundations for Machine Learning and Data Science" organized by IT Department, SSNCE during August 13-14, 2021.
48. Dr. M. Anbuselvi, Asso. Prof. attended the faculty workshop on "Embedded Systems - An Application-Driven Approach" organized by ARM Education, AICTE and STMicroelectronics during August 25-27, 2021.
49. Dr. S. Radha, Prof. & Head attended a webinar on AICTE Strategic Approach for Research and Innovation on 26.08.2021 & AICTE Quality Initiatives on 27.08.2021.
50. Dr. C. Annadurai, Asso. Prof., Dr. I. Nelson, Asso. Prof. attended the One-day workshop on "Genetic Algorithm, Simulated Annealing, ANN and Fuzzy Logic" conducted by the Department of Mechanical Engineering, SSNCE on 27.08.2021.
51. Dr. S. Ramprabhu, Asso. Prof. attended a workshop on "Hindrance faced by the Entrepreneurs" organized by SSN-IIC on 28.08.2021.
52. Dr. R. Rajavel, Asso. Prof. successfully completed the online course "Getting Started with Deepstream for Video Analytics on Jetson Nano" offered by NVIDIA Deep Learning Institute during Aug. 2021.
53. Dr. W Jino Hans, Asso. Prof. successfully completed the ATAL Online FDP on "Transformational Leadership" organized by Mahatma Jyotiba Phule Rohilkhand University during September 02-06, 2021.

54. Dr. B. Ramani, Asso. Prof. participated and successfully completed the ATAL Online FDP on “Artificial Intelligence for Speech and Bio-Signal Processing” organized by the Indian Institute of Information Technology Dharwad during September 20-24, 2021.
55. Dr. R. Rajavel, Asso. Prof. participated and successfully completed the ATAL Online FDP on “Internet of Things (IoT) in Smart Cities” organized by Kongunadu College of Engineering and Technology, Trichy, during September 20-24, 2021.
56. Dr. S. Karthie, Asso. Prof. attended an international webinar on “Latest PCB Material Solutions for 5G Radio Access Networks” organized by Rogers Corporation on 15.09.2021.
57. Dr. R. Rajavel, Asso. Prof. attended a workshop on “SCM With Git & GitHub Workshop” organized by SSN College of Engineering, held during 24th & 25th Sep. 2021.
58. Dr. W. Jino Hans, Asso. Prof. participated and successfully completed the ATAL Online FDP on “Introduction to Speech Processing and its Applications using AI-ML (ISPA)-2021” organized by Centre for Development of Advanced Computing, Kolkata during Oct. 25-29, 2021.
59. Dr. M. Anbuselvi, Asso. Prof. participated and successfully completed the ATAL Online FDPs on “VLSI Design Techniques and its Applications in AI/ML” organized by Thapar Institute of Engineering & Technology, Patiala during Nov. 15-19, 2021 and “Soft Computing and its Application in Electromagnetics (SCAE-2021)” organized by Indian Institute of Information Technology Ranchi during Nov. 23-27, 2021.
60. Dr. R. Kishore & Dr. S. Hanis, Asso. Prof(s) participated and successfully completed the ATAL Online FDP on “Introduction to Cryptology” organized by NIT Trichy during Nov. 24-25, 2021.
61. Dr. S. Karthie, Asso. Prof. attended an international webinar on “Avoiding RF Isolators - Reflectionless Filtering Components for Emerging Wireless Systems” organized by IEEE MTT-S on 09.11.2021.
62. Dr. P. Kaythry, Asso. Prof. attended an international workshop on “Realizing Smart & Sustainable Agriculture through Standardization” jointly organized by NARO - IEEE SA on 16.11.2021 & “Communications in the 2030s - Objectives of Sustainability on the Path to 6G” organized by IEEE Sustainable ICT on 30.11.2021.
63. Dr. N. Edna Elizabeth, Prof. participated and successfully completed the ATAL Online FDP on “Role of Green Technology for Sustainable Development” organized by Centre of Excellence for energy and environmental studies Deenbandhu Chhotu Ram University of Science and Technology, Murthal, Sonepet (Haryana)-131039 during 29.11.2021 – 03.12.2021



PROFESSIONAL ROLES AND RECOGNITIONS

1. Dr. W. Jino Hans, Asso. Prof. acted as a session chair for the International Conference power of Digital Technologies in Societal Empowerment - IETE CHENCON 2021 on 05.06. 021.
2. Dr. R. Amutha, Prof. has been selected as an evaluator for the power Judging round of Toycathon organized by the Ministry of Education's Innovation Cell and AICTE and evaluated the teams on 22-24 June 2021.
3. Dr. S.Radha, Prof. & Head has been nominated by AICTE as Margdarshak under Margadarshan Scheme on 28.06.2021, for 18 months to guide three institutions for Accreditation.
4. Dr. K. T. Selvan, Prof. as a Track Chair of the Special Sessio n on "Transforming electro magnetics education after COVID" to be organized at 2021 IEEE AP-S International Symposiumin Singapore in December 2021, assigned papers for review, and reviewed 5 papers for the same session.
5. Dr. N. Venkateswaran, Prof. is the Lead Editor for the Special Issue entitled "Artificial Intelligence Techniques for Joint Sensing and Localization in Future Wireless Networks" for Wireless Communications and Mobile Computing, Hindawi.
6. The following webinars by Dr. K. T. Selvan, Prof. were made available on the Resource Centre of IEEE Antennas and Propagation Society on 01.06.2021.
   (i) "Maxwell's displacement current: A teaching approach infusing ideas of creativity an in innovation"
   (ii) "Teaching and learning electromagnetics in modern times"
7. Dr. P. Vijayalakshmi, Prof. has been appointed as a member of the syllabus sub-committee for framing curricula and syllabi for M.E. Electronics and communication engineering, M.E. Communication systems, M.E. Communication and networking and M.E. Electronics and communication engineering (industry integrated) under R2021 for constituent colleges and non-autonomous affiliated institutions of Anna university.
8. Dr. P. Vijayalakshmi, Prof. has been appointed as a Margadharshak to mentor MBA and MCA Departments of Ethiraj College for Women, Chennai. 09.08.2021.

9. Dr. R. Jayaparvathy has been nominated by AICTE as Margdarshak under Marga darshan Scheme on 22.06.2021, for 18 months to guide three for Accreditation.
10. Dr. S. Radha, Prof. & Head attended AU Chennai syllabus committee meeting to frame syllabus for both B.E.(ECE) & B.E. (E & TE) of AU affiliated non-autonomous colleges on 09.08.2021.
11. Dr. M. Gulam Nabi Alsath, Asso. Prof. acted as external examiner during the central online valuation hosted by RMK Engineering College on August 11-12, 2021.
12. Dr. N. Venkateswaran, Prof. attended the BOS meeting at Sri Manakula Vinayagar Engineering College (autonomous) for B.E.(ECE) & PhD courses on 28.08.2021.
13. Dr. K. T. Selvan, Prof. as Anna University nominee, attended the Board of Studies meeting of the Department of ECE, Kongunadu College of Engineering &Technology on 16.09.2021.
14. Dr. S. Radha, Prof. & Head attended the Online interaction with Margadharshak on AICTE Scholarship Scheme for Students 2021-22 on 23.09.2021.
15. Dr. S. Sakthivel Murugan, Asso. Prof. acted as a session chair in the "International Conference on Innovative Computing, Intelligent Communication and Smart Electrical Systems (ICSES 2021)" on 24.09.2021.
16. Dr. S. Radha, Prof. & Head, Dr. C. Vinoth Kumar, Asso. Prof., Dr. K. Muthumeenakshi, Asso. Prof. and Dr. S. Esther Florence, Asso. Prof. had a discussion with Prof. Ganesh Samudra for a common framework for PO-CO attainment on 27.09.2021.
17. Dr. M. Gulam Nabi Alsath & Dr. S. Esther Florence, Asso. Prof(s)., reviewed proposals submitted for DST-SERB.
18. Dr. R. Jayaparvathy, Prof. was appointed as an Expert Member of the NBA team for grant of Accreditation to Pimpri Chinchwad College of Engineering and Research. Pune during Oct 8-10,2021. The visit was conducted Online.
19. Dr. G. Durga, Asso. Prof. acted as a session chair during the 2 days "International Conference on Advancements in Electrical, Electronics, Communication, Computing and Automation ICAE CA 2021" organized by Kumaraguru College of Technology and technically co-sponsored by IEEE Madras section on 09.10.2021.
20. Dr. R. Jayaparvathy, Prof. as External DAAC member audited the question papers and answer scripts for B.E. (ECE) programme for the academic year 2020-21 at Crescent Institute of Science and Technology, Vandalur on 20.11.2021.

PhD Viva-voce Examination

1. Dr. B. S. Sreeja, Asso. Prof. conducted the PhD viva-voce examination for her full-time research scholar, Ms. S. Deepa Nivethika on 28.07.2021.
2. Dr. S. Esther Florence, Asso. Prof. conducted the PhD viva-voce examination for her full-time research scholar, Ms. B. Sakthi Abirami on 02.08.2021.
3. Dr. M. Gulam Nabi Alsath, Asso. Prof. conducted the PhD public viva-voce examination for his full-time research scholar, Ms. P. Devisowjanya on 09.08.2021.
4. Dr. S. Ramprabhu, Asso. Prof. conducted the PhD viva-voce for his full-time scholar Ms. S. Sayi Soundaiya on 12.08.2021.
5. Dr. P. Vijayalakshmi, Prof. conducted the PhD public viva-voce examination for her part-time research scholar Ms. M. Dhanalakshmi, AP/BME on 19.08.2021.
6. Dr. N. Venkateswaran, Prof. conducted the PhD viva-voce examination for his full-time research scholar, Ms. V. Angeline Beulah on 22.09.2021.
7. Ms. G. Premalatha part-time research scholar of Dr. Premanand V. Chandramani defended her thesis titled “View invariant gait recognition using machine learning techniques” on 08.10.2021.
8. Dr. B. S. Sreeja, Asso. Prof. conducted the viva-voce meeting for her part-time research scholar, Ms. J.Saranya on 22.10.2021.
9. Dr. S. Radha, Prof & Head conducted PhD viva voce examination for her full-time research scholar Ms. D. Kanchana on 01.11.2021.
10. Dr. R. Amutha, Prof. conducted the PhD viva-voce examination for her part-time research scholar K. Selvakumarasamy on 25.10.2021

RESEARCH NEWS

EXTERNAL FUNDED PROJECTS:

Grants received:

» Dr. M. Gulam Nabi Alsath & Dr. S. Radha presented the project proposal on “Beam Scanning Reflectarray Antennas” for possible industrial collaboration with BigCAT Wireless Pvt. Ltd. on 07.08.2021. After this, the investigators got their industry project sanctioned from BigCAT Wireless, Chennai for the project titled “Optimum Design of C and Ku Band Reflectarray Antenna” worth Rs. 2 Crores.

» Dr. K. Malathi, Prof/CEG as PI, Dr. M. Gulam Nabi Alsath, Asso. Prof. and Dr. Y. V. Ramana Rao, Prof/CEG as Co-PIs received a project grant for “Design, development and experimental evaluation of highly integrated multi-standard antennas for MIMO implementation in automobiles as a part of intelligent transport system” worth Rs. 20.88 Lakh under the DST Indo-Sri Lankan International Collaborative Project. The participating foreign collaborator is Dr. Jeevani Jayasinghe, Wayamba University of Sri Lanka.

Proposals Submitted:

» Dr. M. Gulam Nabi Alsath, Asso. Prof. as inventor submitted the proposal “Frequency Agile Beam Scanning Reflectarray Antenna (RA) with an Integrated Electronic Control Board (ECB)” for Rs. 30 Lakh to DST-SERB under the scheme Technology Translation Award. The co-inventors are Dr. S. Kirubaveni, Asso. Prof. and Ms. N. Kavitha, Project Associate/ECE.

» Dr. S. Esther Florence, Asso. Prof. as PI, Dr. R. Vimal Samsingh, Asso. Prof./Mech as Co-PI submitted a proposal titled “Wearable Fabric-based Sensor for Assessment of Limb Kinematics in post-operative rehabilitation protocol after osteotomy” to DST-SERB POWER for funding worth Rs.28.09 Lakh.

» Dr. M. Anbuselvi, Asso. Prof, as PI, Dr P. Saravanan, Asso. Prof/EEE as Co-PI submitted a project proposal on the title, “Design and implementation of Wireless Power Transfer System for Electric Vehicle Applications”, under the DST SERB-POWER grant worth Rs.29.80Lakh.

INTERNALLY FUNDED PROJECTS:

Faculty Projects:

» Dr. S. Esther Florence, Asso. Prof. as PI, Dr. R. Vimal Samsingh, Asso. Prof./Mech as Co-PI, submitted a project proposal titled "Development of Mechanically Robust and Durable Textile Interconnects for Wearable Electronics" worth Rs. 2.7 Lakh.

» Dr. S. Radha, Prof. & Head as PI, Dr. B. S. Sreeja, Asso. Prof. as Co-PI submitted a project proposal titled "Development of heavy metal ion detecting probing sensor for industrial effluent water monitoring applications" worth Rs. 4 Lakh.

» Dr. Edna Elizabeth.N Prof and Dr. P.Kaythry Asso.Prof, as Co-PI submitted a project proposal titled " A Secure Smart Building based on WoT paradigm for Indoor Environment" worth Rs. 1.13 Lakh.

» Dr. S. Kirubaveni, Asso. Prof./ECE as PI & Dr. R. Govindarajan, Research Scientist/SSNRC as Co-PI submitted a project proposal titled "Experimental analysis on the development of adulteration sensor using nanomaterials" worth Rs. 1.72 Lakh.

INTELLECTUAL PROPERTY RIGHTS:

Patent Granted:

Title: "A Method to Fully Integrate Multi-Layer Woven Electro-Textile Patch Antenna".
Inventors: Dr. K. Malathi, Faculty/CEG, Dr. S. Esther Florence, Asso. Prof., Dr. R. Vimal Samsingh, Asso. Prof./Mech
Patent No: 370289

Patent Published:

Title: "Frequency Agile Beam Scanning Reflectarray Antenna (RA) with an Integrated Electronic Control Board (ECB)"
Inventors: Ms. N. Kavtiha, JRF/ECE; Dr. M. Gulam Nabi Alsath & Dr. S. Kirubaveni, Asso. Prof(s).
Application number: 202141041836.

BOOKS & CHAPTERS

1. Dr. K. T. Selvan, Prof., Prof. K. F. Warnick, BYU, USA published a book titled "Teaching electromagnetics: Innovative approaches and pedagogical strategies", CRC Press, June 2021.
2. Prof. K. F. Warnick, BYU, USA, Dr. K. T. Selvan, Prof. published a book chapter titled "Teaching and learning electromagnetics in 2020", eds. K. T. Selvan and K. F. Warnick, CRC Press, pp. 7-20, June 2021.
3. Dr. K. T. Selvan, Prof. published a book chapter titled "Maxwell's displacement current: A teaching approach infusing ideas of creativity and innovation", eds. K. T. Selvan and K.F.Warnick, CRC Press, pp. 165-182, June 2021.
4. Ms. U. Indumathi, Dr. S. Ramprabhu, Asso. Prof. published a book chapter titled "Planar Antenna: Design, Fabrication, Testing, and Application/Design and Fabrication of a simple modified Swastik FSS for Antenna Gain Enhancement" Ed. Praveen Kumar Malik, Nova Science Publisher, Newyork, pp. 219-232, Sep. 2021.

JOURNAL ARTICLES

1. Ms. B. Rammyaa, PT-RS/ECE, Dr. K. S. Vishvaksenan, Asso. Prof., "CPW Fed Metamaterial Loaded Dual-Band Roof-Top Antenna for Vehicular Communications" in RF and Microwave Computer-Aided Engineering, pp. 1-10, May 2021.
2. Ms. S. Annapoorani, Dr. R. Jayaparvathy, "Performance comparison of modified elephant herding optimization tuned MPPT for PV based solar energy systems" Circuit World, Jun. 2021.
3. Dr. S. Sangeetha, Faculty/VIT, Dr. K. Malathi, Faculty/CEG, Dr. M. Gulam Nabi Alsath, Asso. Prof., Dr. K. Saffrine, Faculty/Symbiosis, Dr. P. Sandeep Kumar, Faculty/SRM, Dr. Y. V. Ramanarao, Faculty/CEG, Dr. AKS Shrivastav, Faculty/SEC, "Integration of Dual Function Array with Nested Slot Radiator for MIMO Applications" in the International Journal of RF and Microwave Computer-Aided Engineering, June 2021.
4. Ms. V. Aruna, PT-RS/ECE, Dr. M. Gulam Nabi Alsath, Asso. Prof., Dr. S. Kirubaveni, Asso. Prof., Dr. S. Radha, Prof. & Head, "A novel multi-band biomedical sensor for THz regime" in Optical and Quantum Electronics, June 2021.
5. Ms. R. Kiruthika, RS/ECE, Dr. S. Radha, Prof. & Head, Dr. S. Kirubaveni, Asso. Prof., Ms. V. Shyamala, RS/ECE, Ms. S. Gayathri, Ms. M. Devipriya, (UG-ECE 2017-2021 Batch), Mr. G. Iyappan, RS/SSNRC, "Experimental verification of mixed metal oxide-based sensor for multiple sensing application" in Materials Letters, Elsevier, vol. 301, pp. 1-4, June 2021.
6. Ms. P. Tejaswini, Ms. I. Sai Deepika, UG-ECE 2017-2021 Batch students, Dr. S. Sakthivel Murugan, Asso. Prof., "Development of a Navigation and Position Tracking System for a Remotely Operated Vehicle (ROV)-ORCA" in the Journal of Physics: Conference Series, vol. 1911 (012017), pp. 1-9, June 2021.
7. Ms. S. Mary Cecilia, RS/ECE, Dr. S. Sakthivel Murugan, Asso. Prof., "Edge Aware Turbidity Restoration of Single Shallow Coastal Water Image" in the Journal of Physics: Conference Series, vol. 1911 (012017), pp. 1-8, June 2021.
8. Mr. M. VimalRaj, RS/ECE, Dr. S. Sakthivel Murugan, Asso. Prof., "Motion Deblurring Analysis for Underwater Image Restoration" in the Journal of Physics: Conference Series, vol. 1911 (012028), pp. 1-10, June 2021.
9. Ms. Sukanthi (PG-AE 2018-2020 Batch), Dr. S. Sakthivel Murugan, Asso. Prof., Dr. S. Hanis, Asso. Prof., "Binarization of Stone Inscription Images by Modified Bi-level Entropy Thresholding" in Fluctuation and Noise Letters, vol. 20 (6), pp. 1-16, May 2021.

10. Dr. S. Radha, Prof. & Head, Dr. S. Kirubaveni, Asso. Prof., Ms. M. Sudha, Ms. R. Kiruthika, RS/ECE, Dr. R. Govindaraj, SSNRC, Mr. Santhosh Narendhiran, RS/SSNRC, "Experimental Analysis of UV Activated Ethanol Sensor Based on the Formation of Organic/Inorganic Heterojunction" in Circuit world, vol. 47, pp. 1-5, June 2021.
11. Ms. R. Nithya, AP/BME, Dr. N. Venkateswaran, Prof., Ms. K. V. Swetha, Ms. Janani Aiyer, UG-BME students, "Deep CNN framework for retinal disease diagnosis using optical coherence tomography images" in the Journal of Ambient Intelligence and Humanized Computing, vol. 12, pp. 7569-7580, June 2021.
12. Ms. M. Dhana Lakshmi, RS/ECE, Dr. S. Sakthivel Murugan, Asso. Prof., "Modified Restoration technique for improved visual perception of shallow underwater imagery" in Current Science, vol. 121 (1), pp. 103-108, July 2021.
13. Dr. K. Malathi, Faculty/CEG, Ms. S. Padmathilagam, RS/CEG, Dr. M. Gulam Nabi Alsath, Asso. Prof., Dr. P. Sandeep Kumar, Faculty/SRM, Ms. R. Abinaya and Ms. G. Cibita, UG Students/CEG, "Miniaturized Circularly Polarized UWB Antenna for Body Centric Communication" in IEEE Transactions on Antennas and Propagation, pp. 1-8, July 2021.
14. Ms. M. Akila, RS/ECE, Dr. K.T. Selvan, Prof., "On further enhancing the bandwidth of wideband RCS reduction checkerboard meta-surfaces using an optimization algorithm" in International Journal of RF and Microwave Computer-Aided Engineering, vol. 31, pp. 1-12, July 2021.
15. Mr. Melvin C. Jose, RS/ECE, Dr. S. Radha, Prof. & Head, Dr. B. S. Sreeja, Asso. Prof., Dr. M. Gulam Nabi Alsath, Asso. Prof., Mr. Pratap Kumar, RS/ECE, "A compact omnidirectional to directional frequency reconfigurable antenna for wireless sensor network applications" in International Journal of Microwave and Wireless Technologies, pp.1-12, July 2021.
16. Ms. G. Revathi, RS/ECE, Dr. S. Radha, Prof. & Head, Dr. S. Ramprabhu, Asso. Prof., "Design of Miniaturized Tri-Band Microstrip Bandpass Filter Using Meandered Stubs for WLAN and Wi-Max Band" in IETE Journal of Research, July 2021.
17. Ms. R. Nithya, Asst. Prof./BME, Dr. N. Venkateswaran, Prof., Dr. Alex Noel Josephraj, Prof./Shantou University/China, Ms. E. Srithaladevi, BME, "Diagnosis of retinal disorders from Optical Coherence Tomography images using CNN" in PLOS ONE, pp.1-17, July 2021.
18. Ms. J. Saranya, Faculty/REC, Dr. B. S. Sreeja, Asso. Prof., Dr. G. Padmalaya, Dr. S. Radha, Prof. & Head, Dr. M. Arivanandan, AU, "Microwave Thermally Assisted Porous Structured Cerium Oxide/Zinc Oxide Design: Fabrication, Electrochemical Activity Towards Pb Ions, Anticancer Assessment in HeLa and VERO Cell Line" in Journal of Inorganic and Organometallic Polymers and Materials, vol. 31, pp. 1279-1292, March 2021. (Clarivate Analytics, IF: 3.543)

19. Dr. M. Dhanalakshmi, Asst. Prof./BME, Dr. T. Nagarajan, HoD/CSE/SNU Chennai, Dr. P. Vijayalakshmi, Prof., “Significant sensors and parameters in assessment of dysarthric speech” in Sensor review, vol. 41 (3), pp. 271-286, July 2021.
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30. Dr. C. Annadurai, Asso. Prof., Dr. I. Nelson, Asso. Prof., Mr. X. N. Ranald Nivethan (UG-ECE 2017-2021 Batch), Mr. Suraj Vinod (UG-ECE 2017-2021 Batch), Mr. M. Senthil Kumar (UG-ECE 2017-2021 Batch), "Implementation of IoT in Workplace Monitoring and Safety Systems" in Advances in Parallel Computing, Smart Computing and Communication Technology, IOS Press, vol. 38, pp. 354-357, October 2021.
31. Dr. I. Nelson, Asso. Prof., Dr. C. Annadurai, Asso. Prof., Ms. E. Ramya (UG-ECE 2017-2021 Batch), Ms. R. Shivani (UG-ECE 2017-2021 Batch), Ms. V. Mathusana (UG-ECE 2017-2021 Batch) published a paper titled "IoT Based Smart Energy Meter System Using Machine Learning" in Advances in Parallel Computing, Smart Computing and Communication Technology, IOS Press, vol. 38, pp. 358-362, October 2021.
32. Ms. S. Kalpana, Faculty/SRMIST, Dr. C. Annadurai, Asso. Prof., "A novel energy-efficient architecture for wireless body area networks" in Personal and Ubiquitous Computing, Springer, October 2021.
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35. Dr. B. Sakthi Abirami, Dr. S. Esther Florence, Asso. Prof., Dr. R. Vimal Samsingh, ASP/Mech, "On-Body RF Sensor Toward Tremor Detection in Parkinson's Disease" in IEEE/ASME Transactions on Mechatronics, vol. 26 (5), pp. 2814-2817, October 2021.
36. Dr. J. Saranya, Faculty/REC, Dr. B. S. Sreeja, Asso. Prof., Dr. M. Arivanandan, Anna University, Dr. K. Bhuvaneswari, PDF/ECE, Ms. S. Sherin, Ms. K. S. Shivani, Ms. G. Saradha Preetha, Ms. K. K. Saroja, UG Students/REC, "Nano-architectonics of Cerium Oxide/Zinc Oxide/Graphene Oxide Composites for Evaluation of Cytotoxicity and Apoptotic Behavior in HeLa and VERO Cell Lines" in Journal of Inorganic and Organometallic Polymers and Materials, pp. 1-12, November

37. Ms. A. Elakkiya, RS/ECE, Dr. S. Radha, Prof. & Head, Dr. B. S. Sreeja, Asso. Prof., Dr. E. Manikandan, Faculty/VIT Chennai, "Terahertz single dual multi-band metamaterial absorber" in Pramana- Journal of Physics, vol. 95:163, pp.1-8, October 2021.
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39. Dr. Santi C. Pavone, University of Catania/Italy, Mr. Kesav Ravichandran, Mr. S. Palaniappan, Mr. K. Balaji Prasanna, UG-ECE 2017-2021 batch students, Dr. Loreto Di Donato, Dr. Ottavio Crisafulli, University of Catania/Italy, Dr. S. Radha, Prof. & Head, Dr. N. Prabagarane, Asso. Prof., Dr. Gino Sorbello, University of Catania/Italy, "Comparative analysis of machine learning and physics-based optimizations of a dual circularly polarized antenna for V2X applications" in AEU - International Journal of Electronics and Communications, pp.1-7, October 2021 (Published Online), vol. 142, December 2021.
40. Mr. G. Iyappan, RS/SSNRC, Dr. R. Govindaraj, SSNRC, Mr. N. Santhosh, RS/SSNRC, Dr. P. Ramasamy, Dean/Research, Ms. R. Kiruthika, RS/ECE, Dr. S. Radha, Prof & Head published a paper titled "Fabrication of vibration sensors using precursor molar concentration varied ZnO nanostructures grown by refresh hydrothermal method" in Circuit World, September 2021.
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44. Dr. P. Devi Sowjanya, RS/ECE, Dr. S. Kirubaveni, ASP/ECE, Ms. G. Sudhilaya (PG-VLSI 2017-2019 Batch), Dr. M. Gulam Nabi Alsath, ASP/ECE, Dr. S. Radha, Prof & Head, "Thin film based optically transparent circular monopole antenna for wideband applications" in the Analog Integrated Circuits and Signal Processing, Nov. 2021.
45. Ms. M. Dhana Lakshmi, RS/ECE, Dr. S. Sakthivel Murugan, ASP/ECE published a paper titled "Visibility improvement of underwater turbid image using hybrid restoration network with weighted filter" in the Journal of Multidimensional Systems and Signal Processing, pp. 1-26, Nov. 2021.

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49. Dr. P. Devi Sowjanya, Amritha Vishwa Vidyapeetham, Dr. M. Gulam Nabi Alsath, Asso. Prof., Ms. G. Sudhilaya (PG-VLSI 2017-2019 Batch), Dr. S. Kirubaveni, Asso. Prof., "Design and Development of Optically Transparent Rectenna for RF Energy Harvesting Applications" in the International Journal of Microwave and Wireless Technologies, pp. 1-8, Nov. 2021.
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51. Ms. M. Akhila, RS/ECE, Dr. K. T. Selvan, Prof., Dr. A. K. Iyer, Alberta, Canada, Dr. K. V. Srivastava, IIT Kanpur and Dr. A. Alphones, NTU Singapore published a paper titled "A review of metasurface-assisted RCS reduction techniques" in Progress in Electromagnetics Research B, vol. 94, pp. 75-103, Nov. 2021.
52. Ms. R. Sriharini (UG/ECE), Dr. N. Edna Elizabeth, Prof., Ms. D. Supriya, Ms. V. S Surenther & Ms. S. Sneha (UG/ECE), "IoT based multi-purpose smart fabric curtain", Australian Journal of Electrical and Electronics Engineering, Taylor and Francis Ltd, pp. 1-9, 2021.
53. Dr. G. Anushiya Rachel, AP, Karunya Univ., S. Sreenidhi (PG CS 2014-16), Dr. P. Vijayalakshmi, Prof., Dr. T. Nagarajan, Prof. & Head, SNU, "Incorporation of Happiness in Neutral Speech by Modifying Time-Domain Parameters of Emotive-Keywords", Circuits, Systems, and Signal Processing, 2021.
54. Ms. K. Mrinalini, RS/ECE, Dr. P. Vijayalakshmi, Prof, Dr. T. Nagarajan, Prof. & Head/SNU, "Feature-weighted AdaBoost classifier for punctuation prediction in Tamil and Hindi NLP systems", Expert Systems, 2021

CONFERENCE PRESENTATIONS:

- Ms. Charu Jain, Ms. S. Indu, UG-ECE 2018-2022 Batch students, Mr. G. V. Surya Sashank, UG-Mech 2018-2022 Batch and Dr. N. Venkateswaran, Prof., "6G with Quantum Technology and Intelligent Reflecting Surfaces" and published in the proceedings of the International Conference on Power of Digital Technologies in Societal Empowerment, IETE CHENCON 2021 held during June 4-5, 2021.
- Dr. C. Vinoth Kumar, Asso. Prof., "Analysis of Reversible Watermarking Techniques and Asymmetric Cryptosystem using DIEC" in International Conference Advancements & Recent Trends on Electronics and Communication organized by Meenakshi Sundararajan College, Chennai on 11.06.2021.
- Mr. Santosh Saranyan & Mr. Srivas Seshadri (UG-ECE 20171-2021 Batch students), Dr. B. Ramani, Asso. Prof., "Real-time Facemask Detection and Analytics" in 2021 International Conference on Automation, Control and Mechatronics for Industry 4.0 (ACMI), organized by Department of Mechatronics Engineering, Rajshahi University of Engineering & Technology (RUET), Rajshahi, Bangladesh on 08.07.2021.
- Ms. S. Swathi, RS/ECE, Dr. S. Sakthivel Murugan, Asso. Prof., "Influence of Various Soil Types and its Properties on Filamentary Planar Coil based Magnetic Induction Communication System" in 27th National Conference on Communications (NCC 2021), organized by IIT Kanpur, Uttar Pradesh, held during 27-30 July 2021.
- Ms. S. Mary Cecilia, RS/ECE, Dr. S. Sakthivel Murugan, Asso. Prof., "Visibility Restoration of Diverse Turbid Underwater Images - Two-Step Approach" in 27th National Conference on Communications (NCC 2021), organized by IIT Kanpur, Uttar Pradesh, held during 27-30 July 2021.
- Dr. P. Kaythry, Asso. Prof., "Hand Cricket game application using Computer Vision" in the Second International Conference on Advances in Physical Sciences and Materials 2021 (ICAPSM 2021) organized by SNS College of Technology, Coimbatore during August 17-18, 2021
- Mr. R. Manjunathan, Ms. V. Krishi Divyadharshini, Mr. G. Bharath Vishal, UG-ECE 2019-2023 Batch students, Dr. N. Venkateswaran, Prof. attended and presented a paper titled "Real-time Ship Detection and Localisation in SAR Images using Artificial Intelligence and Remote Sensing for Maritime Defense applications" in the 5th Innovators-Industry Meet on August 26-27, 2021.

- Ms. P. Kalpana, PT-RS/ECE, Dr. C. Annadurai, Asso. Prof. presented a paper titled "A Performance Analysis Using Fox BAN Architecture in Wireless Body Area Networks" in International Conference on Artificial Intelligence and Smart Computing, conducted by Narasimha Reddy Engineering College, Secunderabad during October 22-23, 2021.
- Sheeba Angel A, RS & Jayaparvathy R, Prof., "Study of Human Factors Contributing to Fatal Injury in a Multi -floor Building during Emergency Using Finite State Machines" in the IEEE Bombay Section 2021 Asian Conference on Innovation in Technology (ASIANCON) conducted during 28th – 29th Aug. 2021
- Dr. P. Kaythry, Asso. Prof. virtually presented two papers titled "Durability studies on concrete with partial replacement of cement and coarse aggregate by seashell waste" & "Monitoring the impact of air quality during Covid -19 in Chennai, India: Using Machine Learning Techniques" in the International Conference on sustainable Technology and Development held at Shenzhen, China during 31.10.2021 to 02.11.2021.
- Dr. P. Kaythry, Asso. Prof. virtually presented a paper titled "Automated Paralysis Patient Monitoring System" in the 1st National Biomedical Engineering Conference (NBEC 2021) organized by University Technology Malaysia, Malaysia during Nov. 09-10, 2021.
- Dr. M. Anbuselvi, Asso. Prof. presented a paper titled "Low Cost and Compact Electrostatic Precipitator Model Controlled by Smoke Detector" in the International Conference on Green Energy and Technologies (GreenTech21) organized by Department of Mechanical Engineering, SSN College of Engineering during Nov. 26-27, 2021.

CONSULTANCY SERVICES:

- Dr. K. T. Selvan, Prof., after several months of discussions, an Offer of Provision of Research Services on "Design of meta-surface based shared aperture phased array antenna operating in S & X bands" was submitted to LRDE Bengaluru. The cost quoted is approximately Rs. 9.7 lakh.
- Dr. B. S. Sreeja, Asso. Prof. received a consultancy project entitled "Auscult- A Vital Signal Recorder" sanctioned for Rs.1.22 Lakh from Yobox Web Services.
- Dr. R. Rajavel, Asso. Prof. got a consultancy project titled "Chimney Testing Kit Development" sanctioned worth of Rs. 13,000/- by Philips Domestic Appliances India Limited, Chennai on 16.11.2021.
- Dr. S. Radha, Dr. M. Gulam Nabi Alsath, Dr. S. Ramprabhu & Dr. S. Esther Florence generated a revenue of Rs. 86,040/- through RF Measurements for various external research scholars.

CLUB REPORTS

TECH CLUB

Hackinfinity:

The 6th edition of Invente, featured Tech Club's flagship event Hackinfinity. Hackinfinity provides a platform for problem solving enthusiasts to tackle real world issues. It encourages them to conceptualize and rapidly prototype a solution that is both practical and economically viable to solve real life problems, all in 24 hours. This year's hackathon saw many projects from Cyber Security, Medical and Healthcare, Women's Safety, Climate Change and Sustainability, Fintech and Agritech. The event's main sponsor was Mr Cooper who also formed the judging panel and GeeksforGeeks was the associate sponsor. The event was organized from 8th October to 9th October 2021.

Hackinifinity

Induction meet

Induction Meets:

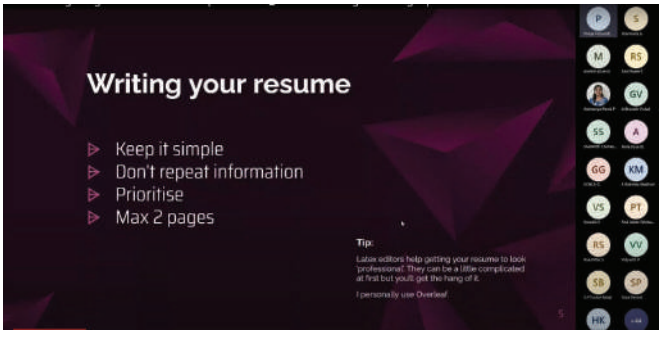
The Tech Club council met with juniors to introduce themselves and the club. The juniors were briefed about the club's activities and also discussed what they would like to see from the club.

Tech Club talks:

A new initiative by Tech Club to organize workshops and seminars on a plethora of topics to help junior and sophomore students. They've recently launched a series titled 'Internships 101' to help students identify useful opportunities for internships and help them with every aspect of the application process. The following three talks are part of this series:

The art of getting a research internship:

This talk was the first of the Internship 101 series conducted on 12th November. Speakers for the talk were Nimisha Pabbichetty, research intern at Polytechnique Montreal and Nanyang Technological University and Bharath Vishal, research intern at Capgemini. This talk focused on the application process of research internships like NTU-India Connect, Summer Research Fellowship

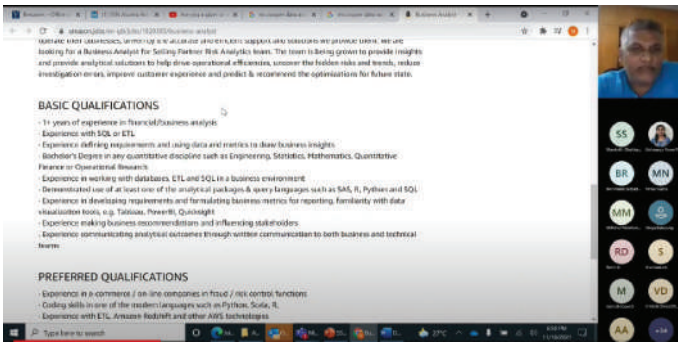


Talk: Research intern

Program (SRFP), Research internship program at Capgemini, Charpak scholarship program and Cold mailing professors. This session was conducted to brief the students about research internship opportunities that help improve the profile for students applying for Masters programs.

Crafting the perfect resume:

We invited Mr. Naren Sundaram, Head of Engineering - Mr Cooper, to talk about resume building, format of the resume, its importance and what institutions expect from a resume. Aishwarya Ponni, who's been placed in Citibank and Shankrith S, the president of Tech Club showed students how to use Latex editors and provided them with some templates and useful tips about resumes. The talk was conducted on 18th November.



Resume workshop

Core Internships:

Akshya from the ECE 2021 batch, who is currently a graduate engineering trainee at Wabco, delivered a talk about interning at companies. She shared her experiences and gave out useful tips to all the students. The talk was conducted on 20th November.

Another talk under the Tech Club talks series is:

Data Science- The insider perspective.

The speaker for the event is Hemanth Gopinath, a Decision scientist from Mu Sigma. He graduated from SSN in 2019 and has worked with Hershey's, Mars, Coca Cola and Pepsi to improve sales through data. The talk was conducted on 21st November.

Talk:Data Science

AECE

The Big Meg

This was a technical event which was open to all departments, conducted on 8th of October, 2021 and sponsored by The SSN Alumni association. The event had a footfall of 41 participants, who were asked to pitch their unique solutions to the event's theme and the top two teams were awarded cash prizes.

IPL Auction

This was a non-technical event which had over 100 participants on the day of the event,with each team comprising of a maximum of three participants.The first round was a quiz entirely on IPL.The top six teams qualified to Round 2, which was an auction where the teams bid players for their team based on a predetermined point allocation for each player.The top two teams with highest points were awarded cash prizes.

Debug-a-circuit:

This technical event consisted of two rounds. The preliminary round was a technical quiz based on topics such as Circuit Analysis, Semiconductor Devices, Analog Electronic Circuits and Digital Electronics. On the basis of the points scored, five teams were selected to the next round. Final round consisted of three levels of increasing difficulty. Each level had a set of questions related to circuit debugging and designing. The top two teams to complete all the three levels in lesser time and with accurate answers were awarded cash prizes worth Rs.4500/-

SketchX

SketchX was a non-technical event conducted on 8th of October, sponsored by SSN alumni association. This event consisted of three rounds and 20 people participated, who were allowed to show their strength in Design, Colour Theory and Graphic design principles through a kahoot quiz. The top eight participants who qualified round one designed posters based on the given theme. Each poster was scored based on pitch, creativity and design. The top two participants were awarded cash prizes

Tinkering Thoughts

Tinkering thoughts is a technical event conducted by AECE. This event consisted of two rounds and 12 teams participated. The preliminary round was a quiz based on micro-controllers. From the first round, 6 were selected for the next round. This round is a simulation round conducted in Tinkercad software where the participant's knowledge on Arduino and sensors were tested. The top two participants were awarded cash prizes.

Data Utopia

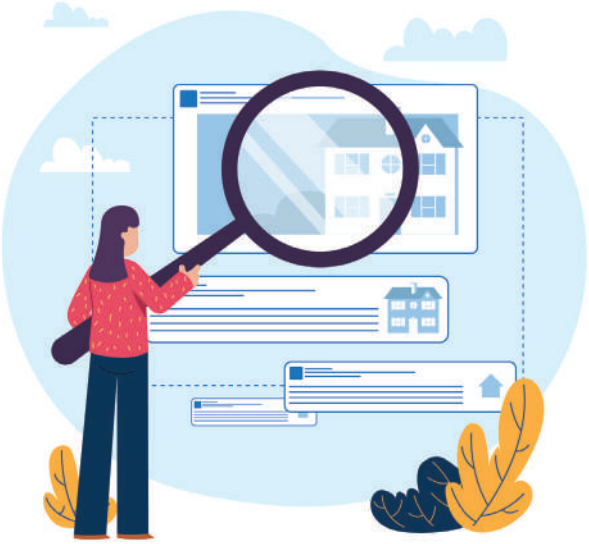
Data Utopia was a technical event, constituted by two rounds of mathematics, statistics and machine learning based questions. The first round was a technical quiz, which filtered the number of participants from the initial 27 participants to the final 4 teams. In the second round, the hands-

on round, the finalists were asked to complete a Machine learning analysis using the Colab starter notebook provided by the event heads. A viva round was also conducted to award some brownie points and to decide tie-breakers. The winners were selected and cash prizes were awarded.

Enigma:

Enigma was a semi-technical event with two rounds of brain teasing puzzles. The event tested the participants' aptitude, time management and skills in cryptography & reasoning. The event had a footfall of 36 participants who participated as lone wolves or in teams of 2 / 3.

Events organised by AECE



IEEE Comsoc

As part of Invente, two events were organized by IEEE Comsoc:

Junkyard Jumble:

Round 1: (Duration: 20 minutes per team)

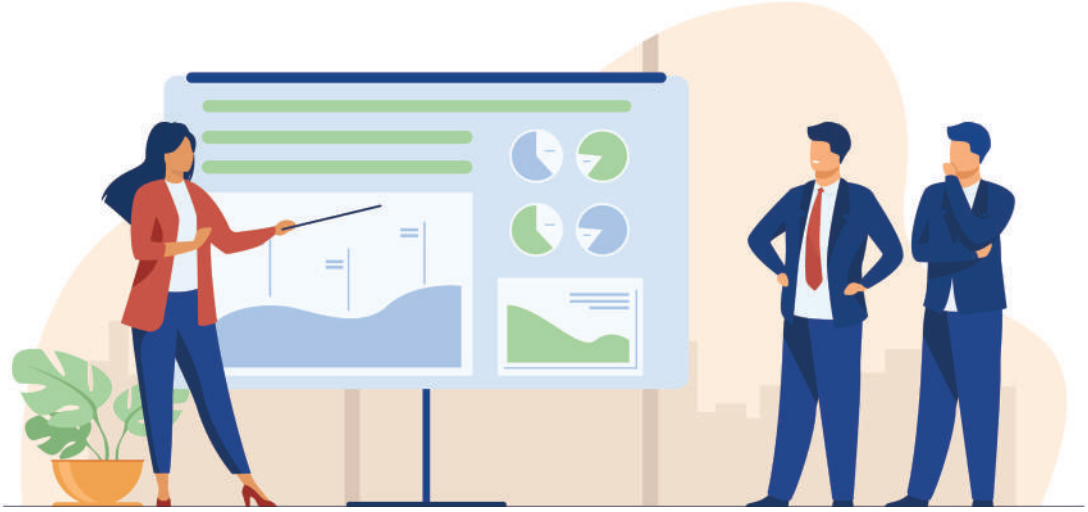
Round 1 had puzzles to identify colored scrambled words from the given word search. The teams used them to crack the physics and/or electronic concept pertaining to that question. This round required quick thinking skills, analytical and mental ability, along with some general aptitude. Basic concepts of physics and electronics were tested. Four teams were selected for the final round. 13 teams participated in this round out of which 5 teams were selected.

Round 2: (Duration: 3 minutes per team)

Round 2 was about Dumb Charades. One member from each team had to act out a basic technical (physics) question to their teammates. The team which guessed the maximum number of questions and after which also answered them correctly won the competition.The skills tested were logical reasoning, general aptitude, basic physics and fundamentals of electronics and semiconductors.

Paper Presentation:

Paper presentation was a purely technical event. 103 students had registered for this event. The participants were given with a wide range of domains and a free will on topics to choose and bring out a relevant and creative solution to the problem they proposed. We had a total of 17 teams (36 participants) submitting their abstracts before the deadline. The top 9 teams were selected for Round 2. They were asked to present their solution to a panel of judges, professors in Round 2. They were judged in a number of criteria, awarded points accordingly and the winner was declared. The entire event was a grand success.The skills tested were presentation/communication, research skills and technical knowledge on the domain chosen.

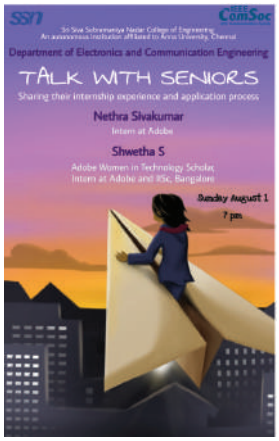


Impact Lecture Series Talk 2: "Innovations and StartUps"

Mr. Ikram Khan S.I, CEO and Director, ISMO Bio-photonics Private Ltd, was invited to give all the students his meaningful insights on innovations and novel ideas. Being an inventor himself, he advised on choosing ideas and making a salable and successful product from it. He also explained his experience and his story to where he is now. This was followed by a brief questions and answers session where the students asked him questions pertaining to his projects and achievements.

As part of the **Talk with Seniors series**, 2 talks were conducted:

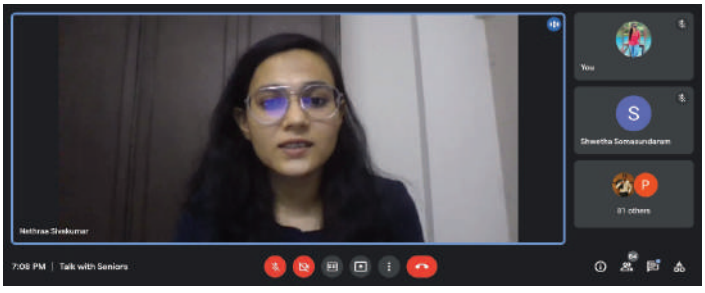
Talk with Seniors 1: Internship Experience and Application process

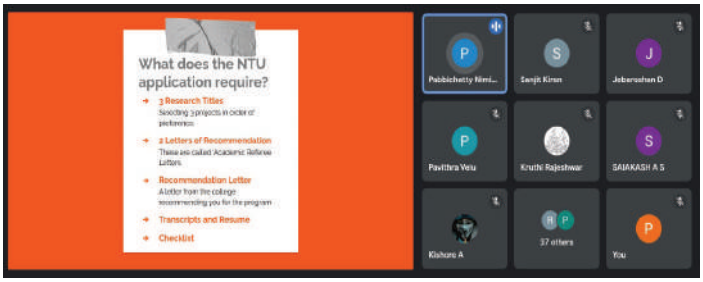


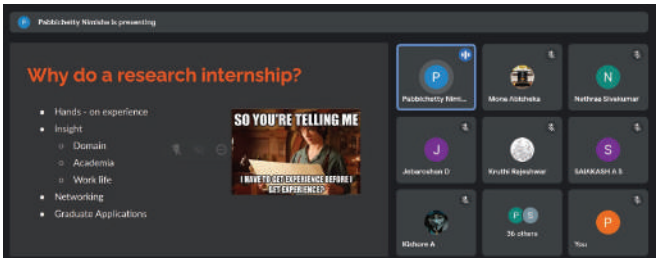
The IEEE Communications Society student branch organized a “Talk With Seniors- 1” by Nethraa Sivakumar and Shwetha S for the students of SSN College of Engineering on 1st August, 2021. Both the speakers spoke about their internship experience at Adobe Systems, Bangalore. The aim of this talk series was focused on applications for internships and industry experience. There were a total of 98 students who actively participated. At the end of the webinar, they answered the questions posed by the participants.

Talk with Seniors 2: Internship Experience and Application process

Two final year students from the Department of Electronics and Communications (ECE) were asked to host an interactive session with the juniors to help them with the internships and projects. Pooja S, Chair of SSN IEEE Comsoc had finished her internship at Western University, Canada, through the MITACS’ 21 program. She had done a project on data science. Nimisha Pabbichetty, Head of Robotics – Tech Club, was a research intern at Polytechnique, Montreal and later at NTU, Singapore. She was also selected in MITACS ’21. Her project was on Robotics. Both of them explained the application process, selection criteria, and also went through the interview process in detail. They explained about their projects and their experience working with the professor from the foreign university and alongside other fellow research interns.







Talk with seniors

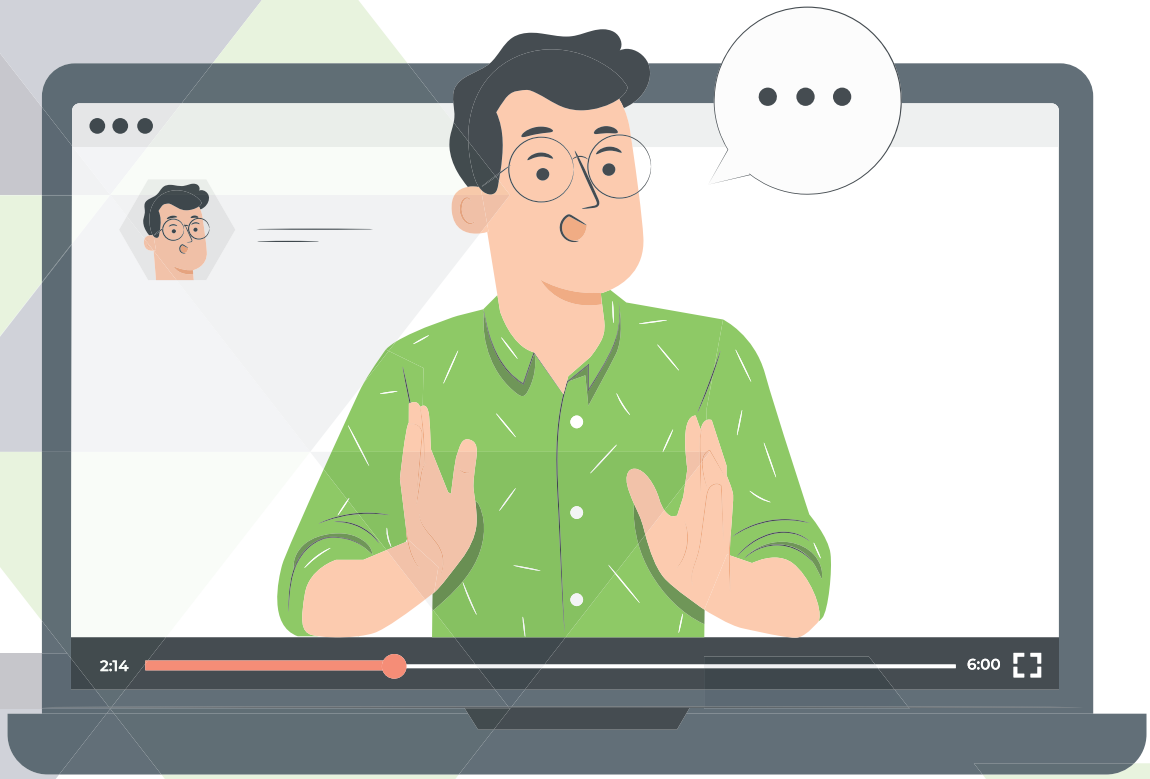
Under the Alumni Talk Series there were two talks conducted:

"Internships and Beyond"

The IEEE Communications Society student branch organized an Alumni talk series 4 - “Internships and Beyond” by Shubashree Baskar, Data Science Engineer for the students of SSN College of Engineering on 14th July, 2021. The aim of this talk series was focused on internship opportunities in sought after domains. There were a total of 75 students who actively participated. At the end of the webinar, Shubashree Baskar answered the questions posed by the participants.

"MS abroad and Career Opportunities"

The IEEE Communications Society Student branch organized an Alumni talk series 3 - “MS in Abroad and Career Opportunities” by Varsha Sankar, Data Scientist, SAP for the students of SSN College of Engineering on 8th July, 2021. The aim of this talk series was focused on applications for studying abroad. There were a total of 99 students who actively participated. At the end of the webinar, Varsha Sankar answered the questions posed by the participants.



-Pabbichetty Nimisha
IV ECE-B

STUDENT PROJECT COMPETITIONS

1. The project proposal was submitted for the 4th AICTE-Chhatra Vishwakarma Awards 2020 by the student team comprising of Mr. R. Adithya, Mr. E. Gunamukhil, Mr. Mopidevi Jayan Sai Venkatesh, UG-ECE 2017-2021 Batch under the mentorship of Dr. K. Muthumeenakshi, Asso. Prof. has been shortlisted for National Convention. The presentation was made to the expert committee for online evaluation on 15.05.2021. A final project video was submitted on 16.06.2021. The project has been selected in one of the winning categories.

STUDENT INTERNALLY FUNDED PROJECTS

1. Ms. Afnan, Ms. S. Anusha, Ms. Anjali Anand, UG-ECE 2019-2023 batch students under the guidance of Dr. B. Ramani, Asso. Prof. submitted a project proposal titled “A Smart wearable device for Alzheimer’s patients supported by an app”.

2. Ms. Shrinidhi Seenivasan, Ms. G. Sharmada, UG-ECE 2020-2024 batch students under the guidance of Dr. B. S. Sreeja, Asso. Prof. submitted a project proposal titled “Camouflaging/ Non-Visible Drone”.

3. Ms. S. Krisha Aarunee, UG-ECE 2020-2024 batch, Ms. Sneha Vikram, UG-BME 2020-2024 batch under the guidance of Dr. B. S Sreeja, Asso. Prof. and Dr. Sachin Asso. Prof./BME submitted a project proposal titled “Designing Lab-On-A-Chip for Medical Diagnostics of Various Parameters through Blood”.

4. Mr. T. Osman and Ms. Sruthi, UG-ECE 2020-2024 batch students under the guidance of Dr. B. S Sreeja, Asso. Prof. submitted a project proposal titled “5GHz/6GHz Receiver”.

5. Mr. D. Jashwanth, UG-ECE 2019-2023 batch, Mr. Putti Mathias Manvith Balraj, UG-Civil 2019-2023 batch, Mr. Harish Ashwin Raj, UG-ECE 2018-2022 batch, Mr. A. Vignesh, UG-ECE 2018-2022 batch under the guidance of Dr. R. Hemalatha, Asso. Prof. and Dr. P. Sangeetha, ASP/Civil submitted a project proposal titled “Defect Detection in Nominal Cement Concrete Structures Using Enhanced U-NET”.

Demystifying Placements: Part 1

Core, Software and Tech-related Roles

The placement season has been incredibly impressive this year. A plethora of companies have visited our campus, offering diverse roles in both core as well as software domains.

Core

Silicon Laboratories, Inc. is a fabless global technology company that desings and manufactures semiconductors, and other silicon devices and software. their main focus is currently in the growing IoT industry. This year, they hired for the Applications Engineer role, Vignesh V, a fourth year student from the ECE Department bagged this marquee offer. His interview experience is explained in detail in the next article.

ComCast Corporation, a Philadelphia based telecommunication conglomerate is one of the core companies that hired in good numbers this time. The role offered was NGAN-Engineer, where NGAN-Next Generation Access Network is an organisation responsible for serving the customers representing over 400,000 miles of the fibre-coax plant. The company was looking for a collaborative and result-oriented developer who has an in-depth knowledge in development, operations technical analysis & development life cycle (Agile & DevOps). The interview process had 3 rounds and the first one was an online assessment that involved aptitude and coding questions apart from fundamental questions from SDLC cycle, Operating Systems, Linux/Unix and Computer Networking. The next round was a Technical interview which revolved around things mentioned in the rsume, apart from which a few puzzles were asked. The third round was a HR/technical round that had questions relevant to the role and projects done.

Next in the lot is MBit Wireless. This company is responsible for developing 4G/5G connectivity and edge computing chipsets, software, and turnkey solutions for mobile broadband and IoT applications. A few students from our department bagged the Associate Engineer Role after clearing a series of elimination rounds. The selection process started with a written assessment that revolved around core subjects, along with aptitude and computer science fundamentals. The next two rounds were face-to-face interviews followed by a final technical-cum-HR round. One must be strong with the basics of Digital Electronics, Linear Integrated Circuits and Digital Signal Processing to be able to crack the interviews.

Software

Software Development Engineer/ Application Developer/ Tech Analyst

This year saw a surge in the number of companies offering developer roles. The onset of the placement season saw marquee companies like Google, Amazon, PayPal and CodeNation followed by fintech companies like Fidelity and Citibank. Citibank, one of the largest financial services firms offered three different roles- Application developer, Software Developer and Analyst. The process consisted of 3 rounds. The first round had around 20 questions that tested quantittive and logical ability, technical aptitude and coding skills. The next round was a technical interview which aimed to

evaluate and understand the candidate's knowledge of basic algorithms and data structures and the projects mentioned in the resume. It was followed by a HR round. On the whole, focusing on one's aptitude while possessing decent coding skills will ensure a fair chance to be a part of Citi. To summarise, decent coding skills and a considerable amount of aptitude practice together are necessary for this process.

Fidelity Investments, an American multinational financial services corporation, is one of the leading asset managers in the world. They visited our campus, offering both internships and full-time offers this year. The interview process had three rounds. The written round had English comprehension, logical analysis, aptitude, technical MCQs related to networking, SQL and C++. Candidates were also expected to solve coding questions of moderate difficulty based on arrays, and write algorithms for two problems. Knowledge in C++, Data Structures and DBMS was tested in the technical round. This was followed by a HR round to check candidates' fit into the company's culture.

Another addition to the list is Optum, an American health services and innovation company that aims at bringing together pharmacy services, data & analytics tools, and care delivery services under one roof. The hiring process started with an online test which consisted of aptitude questions, mathematical reasoning, technical questions and a coding section. The interview process varied from person to person. Questions based on skills, domains and previous work experiences mentioned in the resume were asked, along with a few coding problems. Expertise in OOP concepts, along with critical thinking skills to answer behavioural questions, is expected. Thorough research about the company would also help. PrepInsta and guru99 are a few good sites to learn technical concepts.

PayPal, a fintech company, rolled out internships plus full-time offers this year. Initial shortlisting was done on the basis of a 2-hour coding round conducted on Hackerrank. The questions were of medium to hard difficulty from Graphs and Arrays. This was followed by two technical interviews. Both the rounds had discussions around the projects and experiences mentioned in the resume along with medium-level coding problems from Trees, Strings, Arrays in addition to real-time use case-based problems that test critical thinking skills. The final round is a Hiring Manager round that focussed on assessing the strengths and weaknesses of the candidates.The ideal way to prepare would be to practice problems on any of the coding platforms like LeetCode and GeeksForGeeks regularly and take part in coding contests to improve the speed of problem solving. One can also benefit from interview experience articles available online.
Companies like Oracle, Accolite Digital, Mr. Cooper, and many more visited our campus this year, offering similar roles. Major Consulting firms like McKinsey and Deloitte too offered technical roles to students from our department

IT Services

Major IT service providers, such as Infosys, Tata Consultancy Services, Wipro, Cognizant, L&T Infotech also visited our campus and rolled out offers in large numbers. Aptitude and Coding were tested in the initial online rounds which was followed by Technical and HR interviews. Technical interviews revolved around one's resume, projects and basic technical questions.

Compiled with inputs from Ajay A (IV A), Aishwarya Ponni (IV A), Sai Surya L, (IV C), Sulekhsha P (IV C), Sandhiya S (IV C), Saikrishnan K (IV C) and Andrea Solomon (IV A)

- Sainithya S, IV C

Demystifying Placements: Part 2

Business Analytics and Consulting - What is it all about?

Introduction

Everyone knows the phrase "Mind your own business" Well, what if you don't? What if you get paid for analyzing and offering advice to someone else's business? That is what business analysis and consultancy is all about. Most of the placements in this domain are from companies like Thorogood, Deloitte, McKinsey & Company, and Zoom RX. One point to note is that all of these companies have an above average pay package. Given below is a synopsis of the placement process for Business Analytics and Consulting. Before getting to know about the interview process and other preparation tips, let's break down the roles and the responsibilities that come with it.

What are the roles?

The names of these roles are quite a mouthful. Business Intelligence and Data Analytics Consultant in Thorogood, Junior Research Analyst in McKinsey, and Analyst USI Consulting in Deloitte are the roles offered, to name a few. Unlike the name of the roles, the responsibilities are similar. The recruit will use the data given by the company to perform market analysis, find key insights and assemble a fact base. Based on the research done, they will comprehensively advise their clients on the scope of business and economic trends. Other specific responsibilities of a Consultant/ Business Analyst is to perform primary, secondary research, and various analyses like market analysis, stakeholder interviews, and trend identification for the issue/ project.

Eligibility and interview process

No standing arrears and a decent CGPA in college and highschool are considered the prerequisites for applying to these companies. The candidate must possess excellent critical thinking,problem-solving, and communication skills. Furthermore, a learning mindset is indispensable in these jobs. Knowledge about businesses and markets is preferred, but is not mandatory.After filtering candidates on the basis of the eligibility criterion, there are at least two rounds of tests and interviews. Each company has its own, unique selection process. The first round is most likely a test that evaluates a candidate based on their data interpretation, qualitative and quantitative aptitude. It can also be different from a conventional test. For instance, McKinsey & company's first round is McKinsey's proprietary game: 'SOLVE Game', which they use to assess a candidate's problem-solving, and analytical skills. There were a couple of mini-games like building an ecosystem and defending a plant from its predators. The key is to play logically and foresee outcomes. Selected students from this round move on to the next round.

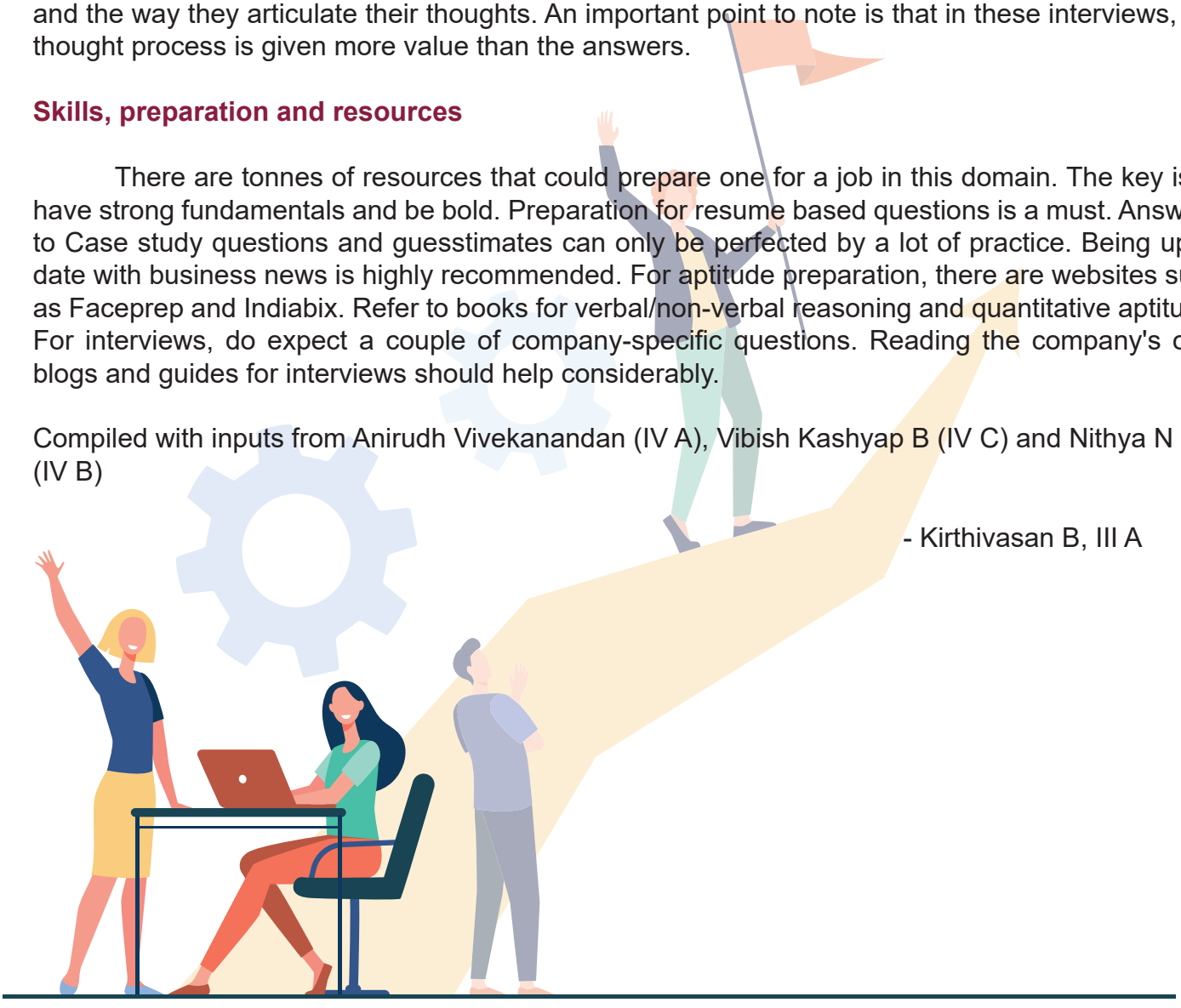
The following rounds are usually technical and HR interviews. In the technical interview, the questions asked are based on the candidate's resume. These include questions from core subjects, projects, competitions, and internships. Companies ask questions in the form of case studies, group discussions, and guesstimates to test the thinking and time management of the candidates. The last interview is mostly a HR interview. Here the candidates are judged on their communication skills and the way they articulate their thoughts. An important point to note is that in these interviews, the thought process is given more value than the answers.

Skills, preparation and resources

There are tonnes of resources that could prepare one for a job in this domain. The key is to have strong fundamentals and be bold. Preparation for resume based questions is a must. Answers to Case study questions and guesstimates can only be perfected by a lot of practice. Being up to date with business news is highly recommended. For aptitude preparation, there are websites such as Faceprep and Indiabix. Refer to books for verbal/non-verbal reasoning and quantitative aptitude. For interviews, do expect a couple of company-specific questions. Reading the company's own blogs and guides for interviews should help considerably.

Compiled with inputs from Anirudh Vivekanandan (IV A), Vibish Kashyap B (IV C) and Nithya N (IV B)

- Kirthivasan B, III A



Silicon Labs : Interview Experience

Vignesh V, a final year student from our department has bagged a Marquee offer from a core company, Silicon Labs! He has graciously agreed to share his interview experience in this article, read on to know more!

About the company and eligibility criteria

Silicon Laboratories, Inc. is a fabless global technology company that designs and manufactures semiconductors, other silicon devices and software. Their main focus is currently in the growing IoT industry. This year, they hired for the Applications Engineer role, with a strong possibility that they might return for Applications Engineer as well as Design Engineer role next year. The eligibility criteria to attend the process was fairly standard CGPA and backlog requirements. Only students of the ECE Department were eligible to attend the process.

Interview process

The hiring process had 3 stages. The first one, which occurred after the pre-placement talk, was a rigorous online test for around 1hr 45 min, a mix of MCQs and numerical problems. The questions were from a broad set of concepts, ranging from Digital and Analog Electronics, Communications and Signal Processing, Python and C++ programming, Microprocessors and Computer Architecture, Communication Networks, and some aptitude and logic questions. Despite the vast breadth of topics, the main purpose of this test was to gauge the candidate's confidence in fundamental concepts and how well they understand and apply them. The questions were not really hard.The second stage involved 2 technical interviews. The first one was a very conventional interview, in which the interviewer got to know the candidate's interests and asked questions on topics including C++ programming, Microprocessors , Communication Networks and some aptitude questions. The selection of topics may vary upon the candidate's interests and resume to some degree, but the overall structure and process for this stage is the same for all candidates. The interview lasted around 35-40 minutes.

The second technical interview was the more challenging and exciting round. The interview process for this round was highly dependent on the candidate's resume, skills and interests. This round involved a wide range of topics, testing the candidate's ability to think, understand and apply fundamental concepts in real world problems, from both a system level perspective as well as the specifics. Both the breadth and depth of the candidate's knowledge is tested. To clear this round you need to truly understand fundamental concepts and what they really mean, instead of just knowing the definitions and formulas. The mindset of the candidate is also important.The third stage was a very easy going HR interview, which was a respite after the gruelling second round. Here, the interviewer just tried to understand the candidate's state of mind, and whether they will fit into the company. Discussions about how the candidate approached various problems and planned the projects mentioned in the resume occurred. Apart from that the interview was really fun, and I got to know more about the company's future vision and where they are headed.

Preparation and Resources

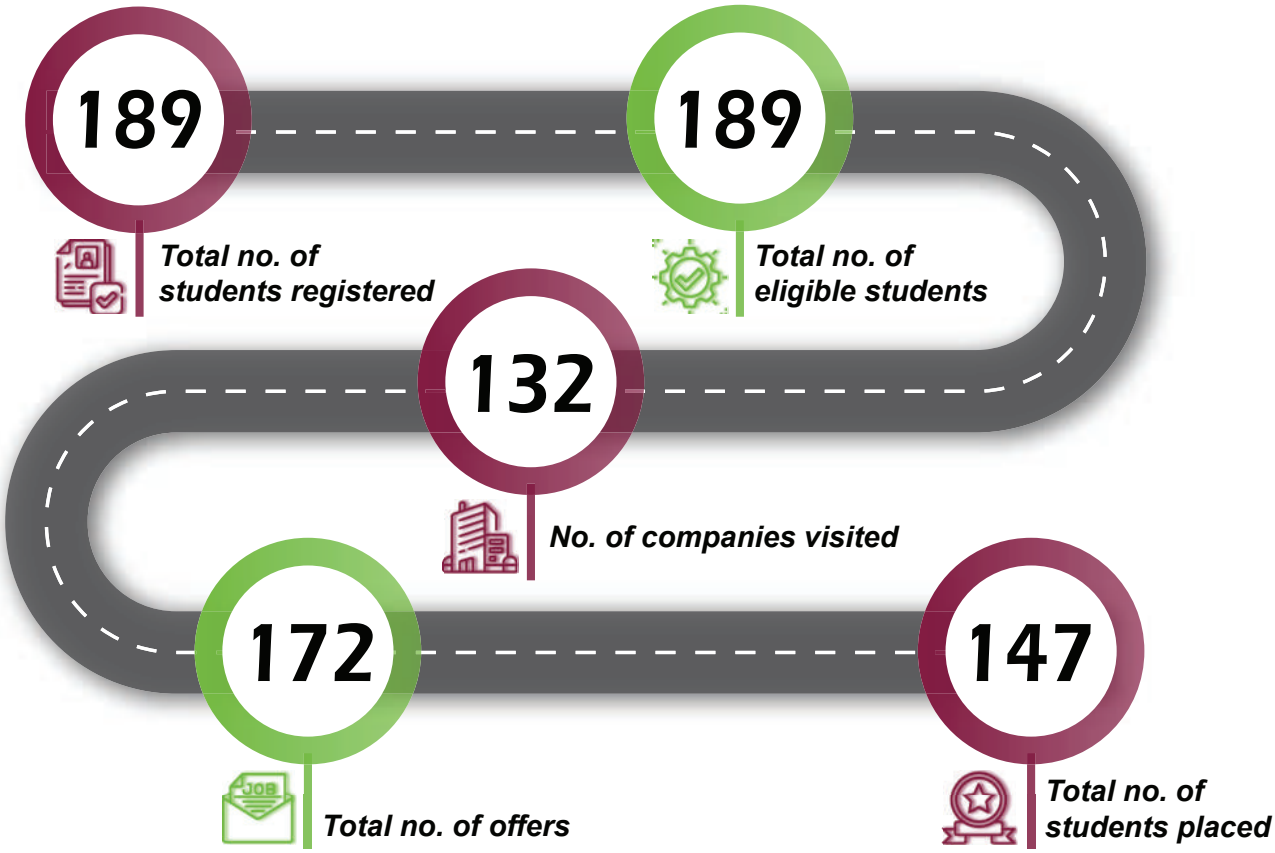
Since the company is hiring at a Bachelors level, there will be more of a focus on breadth of knowledge and ability to learn and apply them. Depth of knowledge in any one field (wireless communications and signal processing for me) is also helpful to demonstrate your capabilities. I have to emphasize again on how important a true understanding of the underlying fundamentals is, even if you are not really confident on the specifics. There must be a suitable ratio in your profile of breadth and depth. Build your resume, do projects (doing an IFP was a great boost for me) and do VAC and NPTEL courses to reinforce your knowledge and gain depth and perspective in a field of your interest.

For the first online test alone I would suggest that practicing GATE questions might be helpful. But for the interview process, I can't think of any specific preparation material or process, and I didn't have the time either to prepare for them, as the tests and interviews happened in quick succession. Finally, I would say if you have the right state of mind, regardless of whether your focus is in communications or electronics, you are adequately prepared. The rest is luck. If you are building your profile, I would suggest you do what interests you the most and understand what you are doing, and try to maintain a good ratio of breadth and depth. All the best!!

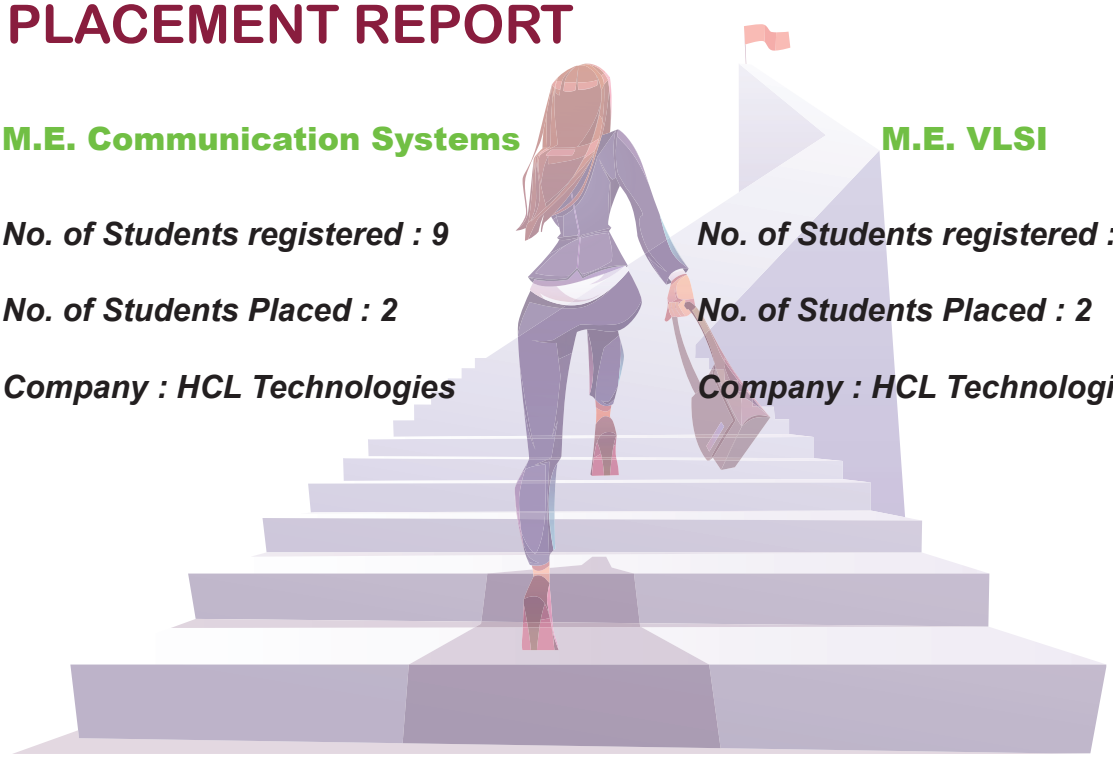
Vignesh V, IV ECE C

PLACEMENT REPORT

UG PLACEMENT REPORT



PG PLACEMENT REPORT



M.E. Communication Systems

No. of Students registered : 9

No. of Students Placed : 2

Company : HCL Technologies

M.E. VLSI

No. of Students registered : 4

No. of Students Placed : 2

Company : HCL Technologies

MARQUEE AND SUPER DREAM COMPANY PLACEMENTS (UG)

Shwetha S
Research Associate,
Adobe Systems
84.24 CTC

Nethraa Sivakumar
MTS (Member of Technical Staff),
Adobe Systems
41 CTC

Sainithya S
SDE,PayPal
23.45 CTC

Vignesh V
Applications Engineer,
Silicon Labs
21.18 CTC

Leela Devi Devendran
Software Engineer,
Optum
13.81 CTC

Manusree Ramaraajan
Software Engineer,
Optum Global
13.81 CTC

Nivetha S
Software Engineer,
Optum
13.81 CTC

Rishabh R
Software Engineer,
Optum
13.81 CTC

Shruthi B
Software Engineer,
Optum
13.81 CTC

Yasmin M.A.K
Software Engineer,
Optum
13.81 CTC

Challa Venkata Srividya Gayatri
Software Engineer,Optum
13.81 CTC

Afnitha S Grace
Software Engineer,
Optum
13.81 CTC

Andrea Celestine Solomon
Software Engineer,
Optum
13.81 CTC

Bhavya K Shah
Software Engineer,
Optum
13.81 CTC

Harshavardhini Parthiban
Software Engineer,
Optum - UHG
13.81 CTC

Javed Roshan
Software Engineer,
Optum Global
13.81 CTC

MUTHU BHARATHWAJ S
Technology analyst ,
Citibank
13.75 CTC

Sandhiya S
Technology analyst,
Citibank
13.75 CTC

Aishwarya Ponni P
Technology analyst ,
Citibank
13.75 CTC

Agasya Xavier Micheal
Technology analyst,
Citibank
13.75 CTC

Saikrishnan K
Full time Engineer
Software Engineering,
Fidelity
12.93 CTC

Manne Amrutha
Executive Graduate Trainee,
Fidelity
12.93 CTC

START

R AKILANDESHWARI
Executive Graduate Trainee,
aligned to Software Engineering,
Fidelity
12.93 CTC

Sriram J
SDE
Maximl
12 CTC

Harini Shree V
Software Developer,
Accolite Digital
11 CTC

M Palani
Software Engineer,
Gain Credit
10.67 CTC

Srirama Charan Medicherla S S
Software Engineer - Backend,
Lynk Logistics
10 CTC

Harish Ashwin Raj Subramani
Associate Software
Development Engineer ,Sapient
10 CTC

Vibish Kashyap B
Junior Capabilities & Insights Analyst
McKinsey & Company
10 CTC

Deepakkumar S
MSS Software Engineer,
McKinsey & Company
10 CTC

Jashanth Balu Rajkumar Packialakshmi
Digital analyst,
McKinsey & Company
10 CTC

Josh Susinth J
Software Engineer Trainee,
Mr.Cooper
10 CTC

Vignesh Mohan
Associate Software Development Engineer,
Publicis Sapient
10 CTC

Nithya N
Business Intelligence and
Analytics Consultant,
Thorogood Associates
10 CTC

INTERNSHIPS

What, Why and How?

An internship is a professional learning experience that offers meaningful, practical work related to one's field of study or career interest. In a broader sense, it's essentially symbiotic as it provides an intern, the opportunity for career exploration and development, and the employer, with the opportunity to bring fresh ideas and energy into the workplace, develop talent, and potentially build a pipeline for future full-time employees. A college degree adds strength to your resume, but as the professional world becomes more competitive, many businesses are looking for real-world experience as well.

Internships have been hailed as powerful career boosters. Compared to no such experience, internships are associated with a greater perceived attractiveness of job applicants to recruiters, with graduates obtaining a job more quickly and easily, with higher salary levels and increased job satisfaction. There are various internship opportunities- salaried, freelance, paid for training, virtual, onsite, research, each bearing its own set of benefits. Furthermore, internships hone technical and transferable skills by giving a brief glimpse of a professional workspace. They also provide a unique chance to network with industry experts.

Getting an internship in itself requires a great deal of diligence. However, with consistent efforts and proper planning, one stands a very good possibility of benefit. A sound resume broadens the margin further, along with good communication skills. Participating in Hackathons, relevant certifications, projects pertaining to one's interests, and active networking on platforms such as LinkedIn are some foolproof methods of making the odds in your favor. Being aware of the opportunities in the current job market and a clear understanding of emerging demands are the two key factors for success.

- ***Shweatha J***
III, B

The Internship Experience – Fidelity and Adobe

Fidelity Investments: It is an American multinational financial company which is based in Boston, Massachusetts. Unlike most finance firms, Fidelity leads in investing while pioneering in financial technology. Three students from our department, namely Akilandeshwari R, Sainithya S, Amrutha Manne, did their Summer Internship at Fidelity.

Adobe: It is an American multinational computer software company headquartered in San Jose, California. The company specializes in creating a wide range of content, including graphics, photography, illustration, animation, and many more! Two students from our department, namely Nethraa Sivakumar and Shwetha S, did their Summer Internship at Adobe.

We asked them a few questions about their Summer Internship at these companies and compiled this section of 'The Internship Experience' for your perusal!

1) What are the subjects/ domains that students need to focus on to crack these internships?

In a broad sense, practicing programming and revising concepts of data structures and algorithms will help in cracking any software-based internship assessment. For research internships, focusing on Deep Learning, Natural Language Processing, and Computer Vision while doing relevant projects and publications will enhance one's chances of getting selected.

But, in today's fast pacing world, there's no dearth for internships in any domain that one selects. Working honestly and providing one's complete effort can pave the way for internships as there are umpteen opportunities available in almost any domain that one chooses.

2) What were the different rounds of selection for the internship, and how to prepare for them?

For Fidelity internship (On Campus) – ***Akilandeshwari R, Sainithya S, Amrutha Manne***

They had three rounds of selection. An assessment test followed by Technical and HR interviews.

Round 1 (Online Aptitude and Coding Test): Questions were asked from English, Aptitude, Technical MCQs, Coding, and Algorithms. All the sections were quite easy for them, and they had enough time to attempt. Technical MCQs had basic OOP and input/output-based questions apart from SQL queries. The coding section had two problems based on arrays and math. In the algorithms section, two questions based on graph and dynamic programming were given for which pseudo-code was expected. Covering the basics of data structures and algorithms, computer fundamentals, and aptitude helped them in this round.

Round 2 (Technical Interview): The round began with a short introduction of themselves, followed by some questions based on their skillset and projects mentioned on their resume. There were questions based on OOPs concepts, sorting and searching algorithms, and data structures. They were asked to live code a solution to a given problem statement, and some questions were asked based on it. A quick revision of the concepts taught in the OOP and Data Structures course, coupled with solving problems on platforms like Hackerrank, helped them to go through this round.

Round 3 (HR interview): The interviewer asked them questions to assess their personalities better. They were asked about their experience of working in a team, why they wanted to join the company, and a few situation-based questions were asked. They suggested that knowing one's strengths and weaknesses and being prepared to convey one's plan of action given situations that test the leadership skills will help in performing better and basic knowledge about the company is a must. Paying careful attention to Fidelity's Pre-Placement talk and going through their social handles helped them in this round.

For Adobe internship (On Campus) – ***Nethraa Sivakumar***

This internship was a part of the #SheCodes campaign, and only women candidates were allowed to participate in the rounds of selection for the internship.

Round 1 (Online Aptitude and Coding Test): This round consisted of basic questions testing English language proficiency, logical and analytical questions, along two simple coding questions. One can solve sample questions asked in GRE and other similar aptitude exam questions to get an idea of what to expect in this round.

Round 2 (Research Profile Test): The selected candidates from round 1 were divided into two subcategories, namely, Research Profile and Product Profile. For the Research Profile that she was selected, they asked questions based on mathematics – especially from Linear Algebra and matrices. There was also a Gamified Assessment Test in which some analytical questions in puzzle form were shown, which had to be solved. There was also a coding round in this test which was more challenging than the previous round. Preparation for this round basically involved brushing up concepts of mathematics and practicing coding in coding platforms.

Round 3 (Interview): In the interview, they tested her ability to solve puzzles. The interviewer was expecting her to explain her approach to solve a given puzzle. There was some discussion about her projects mentioned on her resume, and some questions were based on them. Her preparation involved practicing some sample puzzle questions before the interview to get an idea.

For Adobe internship (Through Adobe Women in Technology Scholarship)
– Shwetha S

There were three rounds of interviews for the Women in Technology (WIT) scholarship. After selection for the scholarship, she was interviewed for a research internship. So, the total number of interviews was four.

All the interviews for the scholarship were based on the essays and the resume that she had submitted. The interviews went into detail about the projects and achievements that she had mentioned on her resume, and she was also tested with standard behavioral questions. The interviewers also asked questions about her experience (as a woman in STEM) and how she dealt with the issues that came up because of being a woman in STEM.

In the interview for the research internship, she was asked to discuss all her projects in detail. There was a long discussion on how she could integrate more sophisticated techniques into her projects. They also discussed her previous research internship in detail.

3) What makes one stand out from the rest of the candidates?

While for some, having prior experience in web and app development helped them in their selection, for others, their relevant research exposure due to previous internships at reputed institutions, projects, and winning in national level hackathons made their profile stand out from the rest of the candidates.

Also, being in some responsible roles as being heads of some societies and clubs both within and outside college created an impact as it showed how they made use of opportunities and reflected positive personality traits.

4) How important is programming for the role as an intern at the respective company?

All of them stressed that programming played a very crucial role in their position as an intern. For working as a Full Stack intern, one is expected to write production-level code for a web application. Even for research internships, being familiar with at least one deep learning framework such as Pytorch is much needed. Later, one can learn how to use specific libraries on the go.

And, even if one knows the concept or the logic by which something works, be it even if one's idea is extremely good, yet implementing the idea is crucial when it comes to an industrial internship. The implementation is done in the form of programming to perform the execution of the given task. So, programming undeniably played quite a significant role in all these internships.

5) What role did projects and previous internships play in the interview process?

Projects create a huge impact in the way that they show the attitude of the person towards learning new things, taking up new challenges, and by quoting several instances, one will be able to justify how they worked as a team player in overcoming the challenges at hand. They also show how well one can implement concepts and contribute to one's best ability.

To this question, all of them unanimously answered YES! They all agreed that some extra skill is required in order to make good use of one's internship period and give our best.
Additionally, projects help in convincing the interviewer that they are proficient in their areas of interest. Understanding the motive behind a project is more important than its scale when it comes to interviews.

If one had proper prior internships, they were asked to justify why they went ahead with a specific solution for a particular problem encountered. If asked about it, one had to explain in detail the experiences and skills gained from past internships.

6) Were there any prerequisites that one had to know before joining as an intern? If yes, what are they?

For the product internship role, knowing Java and Web concepts was much sought after. In most cases, they were given a list of frameworks and tools to be familiar with before their internship period. Some of them included JavaScript frameworks, Spring, Angular, Eclipse IDE, Bootstrap, etc. But, the frameworks and tools used differ across various business units and specific projects assigned to them.

On the other hand, for the research internship, they were asked to be familiar with Linear Algebra, Statistics, Probability, Machine Learning, Deep Learning, Generative Modelling, among other prerequisites. They were directed to read research papers and articles on Use-Case thinking. Being familiar with one or more of the Deep Learning Frameworks, Git and Python was also expected.

7) What is the company looking for in a candidate?

The companies generally prefer candidates who have good coding and interpersonal skills and those who can communicate their ideas better with the team they are working with. They expect the interns to have an open mind to accepting challenges while being eager enough to understand how the company works. They believe that dedicated and responsible individuals with a growth mindset are good fits for their organization.

Specifically, for the research internship, they consider students with a high CGPA, strong technical skills, and aptitude. It is, however, best to have relevant projects and internships on one's profile to boost the chances of getting selected.

In short, anyone having the willingness to learn and implement procedures will be the traits that companies look out for in a candidate.

8) Something meaningful/ interesting/ something gained out of the internship!

All of them agreed that the internship had taught them some valuable soft skills which would be very much useful in a real-world work environment. Their mentors made them feel at ease and comfortable, and their self-confidence and morale were boosted with their constant encouragement and support.

It has shaped their attitude towards problem-solving and time management. Learning how to work effectively in a team was one of the most fundamental things gained. They feel that the remote internship experience was at par with the physical internship otherwise held if not for COVID-19 restrictions. They learnt about the corporate culture and gained a lot of leadership address sessions conducted during the internship.

Properly communicating one's ideas makes a huge difference when it comes to team projects. Clear Presentations about one's approach and well-documented code are crucial in helping the supervisors understand the solution that one is proposing.

Although they felt that the internship was a bit fast-paced and stressful at times, it taught them to manage time efficiently and was an awesome experience on the whole!

9) Some tips for juniors who are aspiring to do internships!

Having an open mind in the first year by trying out different things that the clubs have to offer will help in exposing oneself to different fields and technologies. They asked to never go behind something just because many are doing it, and it's talked about a lot as everyone has different strengths and capabilities.

Also, it's never too late to do an internship. Doing internships can make one gain hands-on experience and has relatively less competition than full-time roles. It is always better not to give too much information on one's resume. Mention only the relevant ones and the information that one wants to be questioned on.

If applying for off-campus internships, one can keep track of them by checking the career section of a company's website and also by setting job alerts on LinkedIn. Their most important suggestion is not to be deterred by rejections when searching for internships. It all becomes a number game once our profile becomes suited to the internship one is aiming for.

So, have an optimistic mind, take sufficient breaks, and just keep trying!
Email IDs and contact numbers of the students who interned at these companies:

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Internships in Canada – MITACS Globalink Research Internship

MITACS Globalink Research Internship is an international research internship opportunity at premier Canadian Universities for undergraduate students from various disciplines from 12 different countries. Students get full funding to travel and stay in Canada to work with the professor on a research project for 12 weeks.

Nimisha Pabbichetty, Pooja S, Charu Jain, Nithin GR, and Indu S are meritorious students from the ECE Department, SSN College of Engineering. They were chosen to participate in this internship program over a period of 3 months each. Their internship experience is documented in the following article so if you're interested in research internships, especially in Canada, read on!!

What is the MITACS research internship? How did you come to know about it?

MITACS, as mentioned, is a global research internship is an international, fully-funded research opportunity at over 70 prestigious Canadian universities for UG students from across the world. Selected candidates get to work with a professor for 12 weeks on a research project in a variety of academic disciplines, from science, engineering, and mathematics to the humanities and social sciences.

Interns from our college got to know about the program through an AICTE webinar, an email about which was sent out to students. Students are encouraged to keep an eye out for this email and closely track the official MITACS website for updates.

How does the application for this program work, and how did you prepare? Is the application committee looking for anything in particular?

The application process for the program is pretty elaborate and is available on the global MITACS website. However, our student respondents did have some varying experiences here and there.

Preliminary application forms seek general personal details, passport validity information, and enclosures of transcripts for all the completed semesters.

In addition to producing at least 2 LORs and a couple of technical essays, students can apply to work on seven different projects, each having a professor as a supervisor, at Canadian universities from 3 different provinces. The students will rank their projects in descending order of their preference.

The essays elaborating the students' experiences in domains relevant to the projects chosen, fields of interest, research projects done at college, and the SOP play a crucial role in the credibility of the candidate. The process is very clear, and there is no need for students to panic or do something extra in order to secure an internship. The second level of selection is done by the professors of the various projects that you had applied for. Some students had interviews, some had assignments and courses to be done.

How do courses and projects enhance applications to the internship?

Courses and projects will help you establish your profile and get noticed by professors. Applicants are encouraged to have a handful of projects that showcase their passion or interest in the same domain as the projects they apply for.

Courses enhance your knowledge in a particular field, but they don't necessarily guarantee selection for the internship. Professors use these credentials to gauge your interests and skill levels and try to match them with what's required for the project.

But students without any projects to their name can also give it a shot; you never know what exactly they are looking for.

Apart from projects, do include all your achievements and your GPA. Professors love a good GPA and will even bring it up during the application interview if there is one.

Can you describe your internship experience? What did you work on during the internship?

Nimisha worked as a part of the MIST Lab at Polytechnique Montreal. Though remote, she got to interact with everyone at the lab and learnt a lot about robotics as she worked on a path planning module of adaptive autonomous swarm robots for space exploration using ROS Melodic and Gazebo. This was the lab's entry for the IGLUNA competition.

Pooja's project, 'Probabilistic flood forecasting using teleconnection signals' at Western University, Canada, lasted around 3-4 months. With the first month consisting heavily of literary review, she gained enough understanding of the concepts to analyse real-time data in an international environment and develop a model that predicts the concurrent wet and dry events all over Canada, with the ultimate goal of predicting floods.

Charu developed a cross-layer protocol and a MAC protocol for routing and transmission scheduling in highly dynamic energy-harvesting sensor networks. She simulated the algorithms she created on a software called OMNET++, used by academicians all over who are in the networking domain. In fact, Charu is still carrying out research with other graduate students under her mentor's wings, and she's enjoying every bit of it.

Nithin interned at the CS dept of Western University, Ontario, where he collaborated with another Ph.D. student at McMaster University to work on Learning Invariant Features for Sensor-Based Human Activity Recognition, which comes under the field of Deep Learning. They even published a paper on their work at an IEEE/ACM CHASE Conference.

Indu's project focused on gait angle measurements, for which she worked with a student under the physiology department of the University of Alberta for the data.

Although all these interns worked remotely from India, they had great fun and an unparalleled learning experience with professors, mentors, and other interns interacting and helping very regularly, keeping each other updated and coming together often to bond over their interests and even movie nights!

Do interns get the opportunity to publish their work?

It depends on the professor and the project. Some professors provide their students with research freedom and central roles in the project and encourage them to publish the results at conferences. If the work is novel enough, mentors will assist students with the paper writing process. Some professors take interns to serve a very particular, miniature role, like data preprocessing or validation, in their own project, which may not end in a publication within the period of the internship.

Though most internships do not result in publications, this internship requires the intern to submit a final report which is similar to that of a research paper.

What are the benefits of doing a research internship with MITACs?

MITACS is a fully-funded research internship with a stipend and is a great opportunity if research interests you.

The international exposure and the understanding of the North Americans' approach to research and solving any problem at hand is invaluable. They delve very deep into a topic and look at the problem from all angles. And this will stay with you even after the internship and set you apart from the crowd. You will also learn the state-of-art and current trends in your domain of interest from world-renowned experts and make connections that you will value and cherish forever.

Further, Globalink Research Internship alumni interested in returning to Canada for graduate studies are eligible for the Globalink Graduate Fellowship. It is an initiative that provides $15,000 in financial support to former Globalink Research Interns for full master's or Ph.D. programs or Postdoctoral fellowships at any MITACS partner institution.

What is your advice for students taking up internships?

Internships are a great source for the kind of exposure and knowledge that universities and companies are looking for and honestly impart many life skills and lessons. Research and industry internships are opportunities to meet people from different backgrounds and broaden your horizons.
SSN provides students with a wide range of opportunities throughout their degree, avail them and learn consistently. Find a domain that you're fascinated with and explore it. No one expects a BE student in their 2nd or 3rd year to have multiple projects or know everything in a domain. But internship programs do covet students who show a tangible interest in learning.

Patience, hard work, and perseverance are all one needs to achieve any dream. Do not hesitate to ask any doubts, make sure you know what you are doing and make complete use of your time here in SSN. You can approach them anytime for any help, and they'll be most welcome to help you. And remember, it is the combination of success and failure that always makes you a better person and takes you to the next level.

- Shruti Jeyaraman
II, B

Internship at Nanyang Technological University

Bharath Vishal G,
III ECE A

Nimisha Pabbichetty, a fourth-year student from ECE, is amiable, fun, and interesting to talk to. Last year, during her summer break, she completed an online internship at Nanyang Technological University through India Connect@NTU. By working under the supervision of NTU faculty, this program helps students develop strong research expertise in specific research areas, experience a multicultural life, create a strong network of friends, and better understand Singapore. We got in touch with her to know more about her exciting experience!

Can you tell us about your internship? How did you come to know about this internship?

There's a program called India Connect@NTU that offers Indian students the opportunity to intern at NTU. I applied and got a summer research internship there. It's for eight weeks, but it can be extended if your Professor approves, so I did mine for twelve weeks.

How does the application for this program work? Is there anything that the application committee is looking for in particular?

You'll have to select three project titles from the ones offered and provide two letters of recommendation. They look for talented students with a solid academic background, and having a good GPA improves your chance of getting selected. Demonstrate that you're a driven individual and choose project titles in the domain you have experience working in (through Projects, Hackathons). It's not advisable to go for all new domains as the chances of being selected are less.

Can you describe your internship experience? What did you work on during the internship?

I worked on Iterative Template Matching. The internship was a challenging experience as I had to work independently. My NTU Professor believed that students should get into the mindset of a researcher, so he would not give us a problem statement or help us formulate one. He encouraged us to do everything on our own. Interns can team up with other interns, but I started the internship late, so I couldn't do the same. I think the internship experience would have been even better in offline mode.

Do interns get the opportunity to publish their work?

Yes, the interns get to publish their work, but they have to do the publication by themselves. Essentially you are given permission to publish your work.

What are the benefits of doing a research internship?

It gives students a great insight into the domain they're working on, academia, and work-life, and it's also a great networking opportunity. Students who are planning on doing a master's need to do at least one research internship.

What is your advice for students taking up internships?

Internships are a must-have experience. Everyone should try to do at least one internship during their college time. On top of boosting your profile, it's a fantastic learning experience.

Nanyang Technological University

Internship at the University of Catania, Italy

- Bharath Vishal G, III ECE A

Nevhedhithaa J is a final year student at the ECE department. She interned at the University of Catania, Italy. Collaborative relations have existed between the University of Catania, Italy, and our college for the better part of a decade. Every year several third-year students opt to go to the University of Catania to gain better experience in their fields of interest, including IoT, microwave imaging, wireless communication (although this year, due to COVID-19 restrictions, they had done the internship in online mode). Nevhedhithaa was enthusiastic in sharing her experiences with juniors who would like to pursue an internship at this university.

Can you tell us about your internship? How did you come to know about this internship?

I got to know about this internship from an ECE department senior Harinee (Batch of 2020) who later guided me to Dr N Prabagarane - Associate Professor, ECE department. He has direct contact with the professors of various universities in different places. So he connected us with a professor, and the work started from there.

How does the application for this program work? Is there anything that the application committee is looking for in particular?

There is no application for this internship program, students have to identify their domain of interest and approach the professors accordingly. The only necessity is a passion for doing research work.

How do courses and projects enhance applications to the internship?

At first, I just knew that my field of interest was antennas. This internship gave me an opportunity to work more on it. What we learn in our college curriculum is just the basics, but to apply it and take it to the next level, we need to have an in-depth knowledge and understanding of the field, and in order to get that knowledge, reading papers is necessary. So definitely, reading more and more gave me more knowledge and helped me with my application

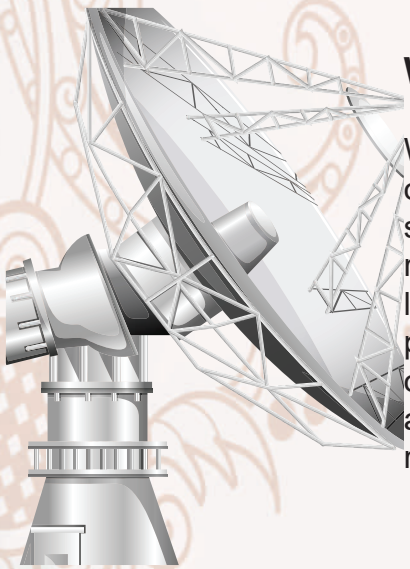
University of Catania, Italy

Can you describe your internship experience? What was the research you undertook?

My joining process was hassle-free, and I started my internship right away. When my internship began, I was asked to identify my area of interest, and based on my area of interest, my fellow interns and I were given a bunch of problem statements to work with. We chose to work on a Machine Learning based-2D metasurface Luneberg lens. We used machine learning algorithms to optimize the lens which is of metasurface.

At the beginning, we had so many questions while understanding the problem statement and how to start our work, but the professors of the university made it easier by having a couple of meetings to explain the topic in a detailed manner and how to proceed.

They let us know what they expect from us and had monthly deadlines. We learnt the basics in a slow-paced manner and that helped us get a better insight of the concepts. We were given research papers to study and learn about previous work done. All of this wouldn't have been possible without proper guidance, and this is indeed the best platform to learn, develop and master skills in the domain area we are interested in. On the whole, it was a great learning experience and gave us students great exposure.



What are the benefits of doing a research internship?

While I interned, I saw myself gradually develop a solid understanding of the topic, and I have since learnt how to approach any problem statement systematically. Research internships, particularly foreign research internships, provide you with invaluable experience, as you learn their method of research and you learn how to approach a problem statement. It is a truly different learning experience from that of learning in a classroom. On the whole, it was a great experience, and I would definitely recommend any interested juniors to take up research internships if given the opportunity.

What is your advice for students taking up internships?

Do not panic even if you do not exactly understand topics at first. It will take time, so learn incrementally with patience. I would encourage you to focus on the journey rather than look for an outcome at the beginning. Just put in your hard work, effort, and dedication, eventually you will end up with good results.

ALUMNA SECTION

It's no surprise that the high cost associated with studying abroad is a deterrent for students from modest financial backgrounds. This is especially the case when applying to colleges in the USA, UK, and Canada. An alternate route to academia is to pursue higher studies in European countries that offer the same educational rigour and quality of life for a much lower price tag. The Netherlands is one of the best countries to live in, and it is slowly gaining popularity as a prime location for higher studies. I got in touch with Sampath Kumar of the 2021 ECE batch, who is currently pursuing his Masters in Electrical Engineering specialising in Integrated Circuit Design at the University of Twente. Here is the transcript of the interview

1. Only a handful of students are actively pursuing a career in a core area of electronics like Analog and IC Design. How were you able to pin down your area of study?

This is very true. Very few students pick Electronics oriented courses compared to fields like Artificial Intelligence.I can code well now and I have spent a considerable amount of time coding in VHDL. But in my case, it was my initial aversion to coding that pulled me towards the hardware side of Electronics. As someone who believes that interest in any field is developed with an understanding of the subject, I started my search early on in my 3rd semester at the library. I borrowed books on different subjects - from Embedded to Communications, and spent time studying them Incidentally, I was introduced to a senior of mine who got me interested in his area of work - Analog IC Design. As I learnt more, my interest grew and knowing someone who knew the field gave me the confidence to pursue it. My desire to make a unique standing as an Electronics Engineer was a driving force in my efforts and decisions.

2. How did you decide to pursue a Masters Degree in Europe?

Initially, I didn't think Masters was in my cards. I was under the impression that the US was the only option for pursuing Masters and I was sure I wouldn't be able to bear the cost of higher education in the US. In due course, I became aware of Germany's free education. That's when Europe came into the picture and I looked more into the option of Masters outside of the US. It cannot be denied that the US has a massive market for Analog IC Design and is still the most sought destination. However, for me, the cost-effective education in Europe outweighed the benefits of studying elsewhere. Also, I could see myself pursuing a long-term career in Europe.

3. Which countries did you apply to and how did you make your selection in the end?

I applied to universities in Germany, Netherlands, Sweden and Finland. Developing contacts through LinkedIn and interacting with people from the Industry helped me in my selection of Universities. In the end, I decided to go to the University of Twente in the Netherlands. The main influencing factor in my decision was Professor Bram Nauta. He is a leading expert in the field and extremely well connected to the industries here. So my employment and a good career in the field is essentially guaranteed. The specialization is top-notch with an excellent course structure. Also, the city where I live in the Netherlands is relatively cheaper to live in compared to my other options.

4. When is the right time to decide between placements and higher studies?

In my opinion, the sooner the better. It is not uncommon for students to have trouble deciding till the very end. However, my advice is to start your research early. In my case, starting my decision-making process from the 3rd semester turned out to be a good advantage. It gave me time to understand and shift my options. If you want to keep your options open, pin down your domain in the 3rd semester and continue with your search on career options. Utilize the 4th and 5th semesters to build a strong foundation of the basics of your domain and perhaps complete a minor internship. Complete writing GRE and TOEFL in your 6th semester and work on a major internship before starting the 7th semester. This will make it easier to apply to universities in your 7th semester while simultaneously doing your industry search with placements.It is important to stick to a plan and put in the effort. Things will eventually fall into place.

5. What are some Dos and Don'ts for students applying for Highers?

One. Know your profile. Know which universities you have a chance of getting into when applying. For example, having a lower CGPA makes it very difficult to apply to Germany. Universities in Germany are extremely competitive with tens of thousands of applications competing for tens of openings.

Two. Organize your University search. Split the university list as Ambitious, Moderate and Safe. Make sure to have a safety plan to fall back on. In my case, I knew I would get selected at Lund University in Sweden. This gave me the confidence to pursue other options knowing I always had a safe option. I applied to the University of Twente and received my admit in under a week. That was also fortunate in my case. Having a placement in a company can also be a good backup.

Three. Have patience. Universities in the US and Germany especially can take a long time to give their results. Do not panic when others are receiving admits. Things take time. Trust the process and things will fall into place.

6. What are the main criteria that Universities in Europe look for when selecting students?

When applying for Europe, your Bachelor curriculum makes a big difference. They look for a strong foundation in the basics of the subject. Migrating to a Masters in Computer Science from a Bachelors in Electronics is nearly impossible in Europe. It's possible to pick a masters in Electronics and pick your elective from CS.

7. What are the language requirements when pursuing Masters in Europe?

As far as the Netherlands goes, language is not a problem. I would call the Netherlands the second US. Everyone speaks English and I haven't felt the need to learn Dutch or had any problems communicating. The people here do not expect you to know their language and feel very comfortable speaking in English.

However, in Germany, there might be some need to learn German. I still don't think language should be a barrier in your decision to pursue education in Europe.

8. On average, how much does it cost to complete your Master's degree in the Netherlands?

It costs around 30,000 Euros for two years of study. The living costs are considerably cheap as well. The majority of my expenses are for paying house rent and overall it is a very cost-effective option.

9. How are the research and job prospects post Masters in the Netherlands?

There is plenty of scope for both research as well as jobs after your masters. There is great infrastructure to support continuing research. However, the stipend for research is not going to match the salary you will get in the industry. The job market is great here. And if your professor is well connected, they can help you find jobs in other countries like the US as well.

10. How do you go about getting a Research Assistant or a Teaching Assistant position at your University? Do they pay well?

There are definitely TA and RA positions available. Here they get paid 11 Euros per hour Often your assignments and courses can be time-intensive and you might not find time to take up additional positions. So it depends on how much time you can find in addition to your fast-paced coursework.

11. What's the timeline for applying to Universities in Europe?

Most German Universities don't have early deadlines. I know Stuttgart and Hamburg had deadlines in January and March respectively. But most universities have deadlines in May and others in June or July. If you're applying to German universities, you should have your admits before applying for Visas. If you apply for Visa in July, you won't be receiving your Visa before September when classes begin. So, do not push your application to the deadline and get it done as early as possible. The University of Twente has slots open till May. But again, applying sooner is better.

12. Are there scholarships that students can target when studying?

There are a couple of scholarships here - the UT Twente Scholarship and the Holland scholarship. Sometimes the scholarships are in the form of deductions in your tuition fee. Otherwise, they give them in the form of money for living expenses. Having a higher CGPA makes you eligible for scholarships.

13. Any tips for students that can help ease the transition of moving to and studying in another country?

Honestly, I didn't think I could live alone in a completely different country. I had self-doubts about learning to cook and adapting to the weather. But after coming here I found my way around. I feel that when you find yourself in a new situation, you just automatically learn to adapt.

My biggest tip is to move to your new place a few weeks ahead of your classes. That way you can get a hang of the place and make friends before your courses begin. I have also found that keeping your room clean and getting good sleep also goes a long way in staying clear-headed.

It will be an entirely different experience. But not to worry, you'll get used to all this on your own!

You can reach out to Sampath Kumar for further clarifications and his contact details are:

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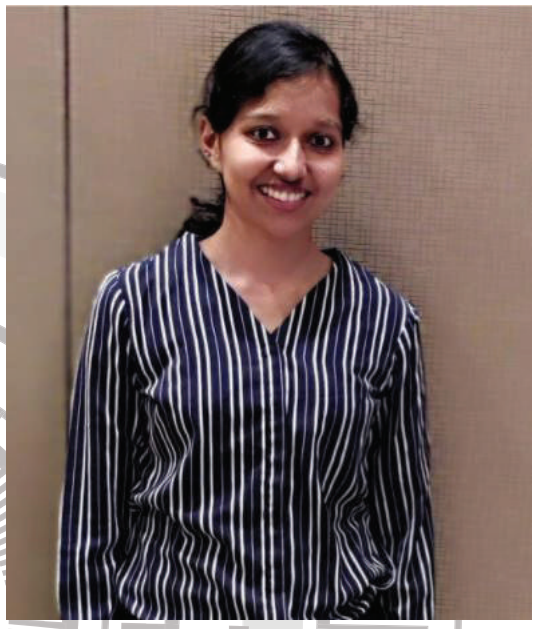
- Ritika Mugundan (IV C)

INDUSTRY INSIGHT

As a part of the content writing team of Impulse we got the opportunity to interview Ms Janani Ramaswamy, an alumnus of SSN (CSE - batch of 2017) who further went on to pursue MS(by research) in computer science in IIT Madras. She currently works as a Data and Applied Scientist at Microsoft, Bangalore.



Microsoft is a global leading vendor of computer software, hardware for computer, mobile and gaming systems and cloud services with its headquarters in Redmond, Washington.

As an undergraduate student, Janani recalls being pretty chill for the first two years. Her first exposure to the field of machine learning, particularly computer vision was when she was doing her final year project on "Emotion Recognition using Facial Expressions". She talked about how intrigued she was by the computer vision domain while working on her final year project and how this led her to pursue this as her domain for her masters research programme.

In her third year she mentioned joining GateForum, a coaching centre for GATE to assist her with her preparation for the exam. Since Janani was not very particular about going abroad she chose to write GATE. It was the peer group and the coaching centre she says, that kept her motivated through the duration of her preparation. However, as learning usually goes, she referred to multiple sources and that helped her ace the exam.

When talking about how she got placed in Microsoft, she said she opted for off-campus placement because her thesis was still in the works. She said, "I had three choices -

1. Focus on both thesis and placement.
2. Prepare for placements,
3. Focus on research work".

She also talked about how it was common for MS students to face this dilemma. She decided to pick her research because that's what her degree was all about and also because she felt that she would surely fail in both if she decided to focus on both. After completing her research, she did an internship at Sony and subsequently got a job in Microsoft. Janani notes that LinkedIn played a critical role in getting her both of these opportunities.

When asked about the selection process at Microsoft, she explains that it consisted of 6 rounds and that all of those rounds involved coding in different levels. The first round was mostly based on her resume, where she was asked to explain one of her projects in detail and questions on linear algebra, statistics and probability were asked.

In the second round, concepts of machine learning such as classification, regression and algorithms were tested. She was also asked to design a feasible algorithm for a given problem statement. The third round was a live coding round on data structures and algorithms.

The fourth round consisted of more questions on machine learning. Additionally she was also asked to derive proofs for a given problem. The fifth round included questions based on recent research literature. The final round was with the hiring manager where she was asked more questions on machine learning like plotting ROC curves, evaluation of classification models, etcetera.

When asked about her role at Microsoft, Janani said she is part of the click prediction team of the Bing Advertisement division. Her team's role is to retrieve the most relevant advertisements that match the user's query in Bing. This helps meet customer satisfaction, consequently increasing click rate, thereby, maximising the company and advertiser revenue. There are two parts to Janani's day to day work: firstly, to maintain existing pipelines and secondly, to come up with new features that can be employed to improve user experience using vision-language based models.

When asked about her experience in the industry so far, she says, "It's been pretty great. So far, you learn. But when you apply and see the real life impact, it feels really good. It feels really good when you contribute to a product and (you) see people using it. It makes you really happy".Upon entering the industry, she had no expectations and she feels that it is due to that reason she is happy and at a good place in life at the moment.

Janani's advice to juniors, "Don't follow the advice of other people (laughs). Frankly speaking, whatever I say may not always be applicable to other people. It's very important to accept that every single person has their own journey. So, struggle, face it and learn your own way out of it. Listen to other people's advice but don't take it very seriously to the level of trying to implement the same because you get disappointed when the same results don't happen in your case. So just listen (to people), you might get a lot of good feedback and good input but finally listen to your heart and pursue whatever you feel is right."

- Shanmukha Priya C (II B) and R Dhivyaharshini (II A)

STUDY CORNER

NANO SENSORS

Dr.Kirubaveni, Associate Professor
Department of Electronics and Communication Engineering

Dr. S. Kirubaveni is an active life member of IETE and IEEE. Her fields of interest include MEMS and NEMS device design, VLSI design and Transparent antennas. She has over 25 research publications in national / international conferences and fifteen international journals and has guided over 25 projects for undergraduate and postgraduate students. Anusharaj S, a second year student from ECE dept and a part of Team Impulse caught up with Dr. Kirubaveni to get her insights on “Nanosensors”. Here’s the transcript of the same

1.What are nanosensors? Can you give us a brief introduction to the field?

Nanosensors are sensing devices with at least one of their dimensions on nanometre scale. Nanotechnology deals with the physical or chemical properties of matter at nanoscale, which can be different from their bulk properties. Nanosensors can take advantage of these phenomena. Therefore, important chara cteristics and quality parameters of nanosensors can be improved over the case of classically modeled sensors with merely reduced sensing parts.Therefore, nanosensors are not necessarily reduced in size to the nanoscale but could make use of the unique properties of nanomaterials to detect and measure events at nanoscale. For instance, in noble metals such as silver or gold, nanostructures of sizes smaller than the de Broglie wavelength of electrons lead to an intense absorption in the visible/near-UV region that is absent in the spectrum of the bulk material.

2. Are nanosensors showing good prospects in recent times?

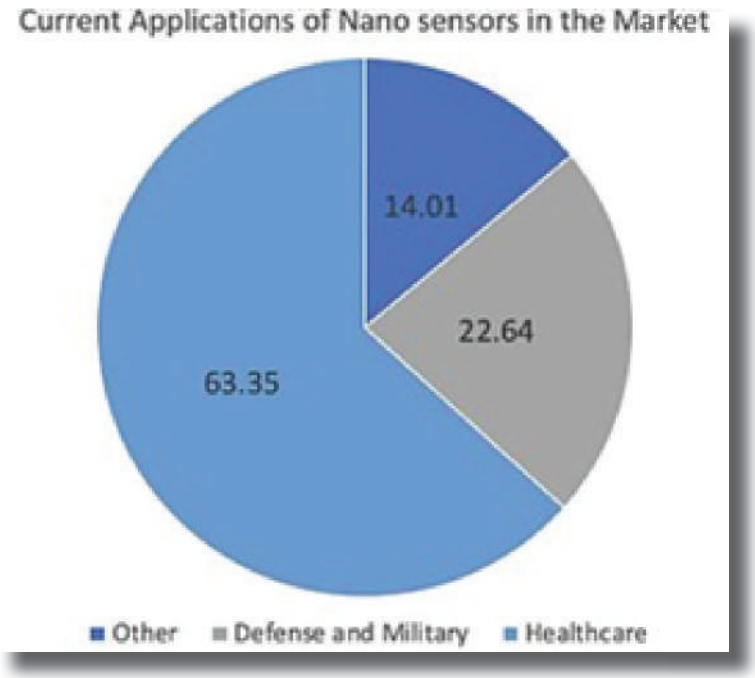
The most inevitable need for any domain is the role of sensors. Nowadays, in the most commonly used applications like mobile phones, automobiles, satellite communications, military, medical field, etc the requirement for the number of sensors is increasing rapidly. Nanosensors are characterized by higher sensitivity along with their capability to address space constraints. In recent times, many nanomaterials are explored, which have a wide scope in finding their way to play the role of sensing.

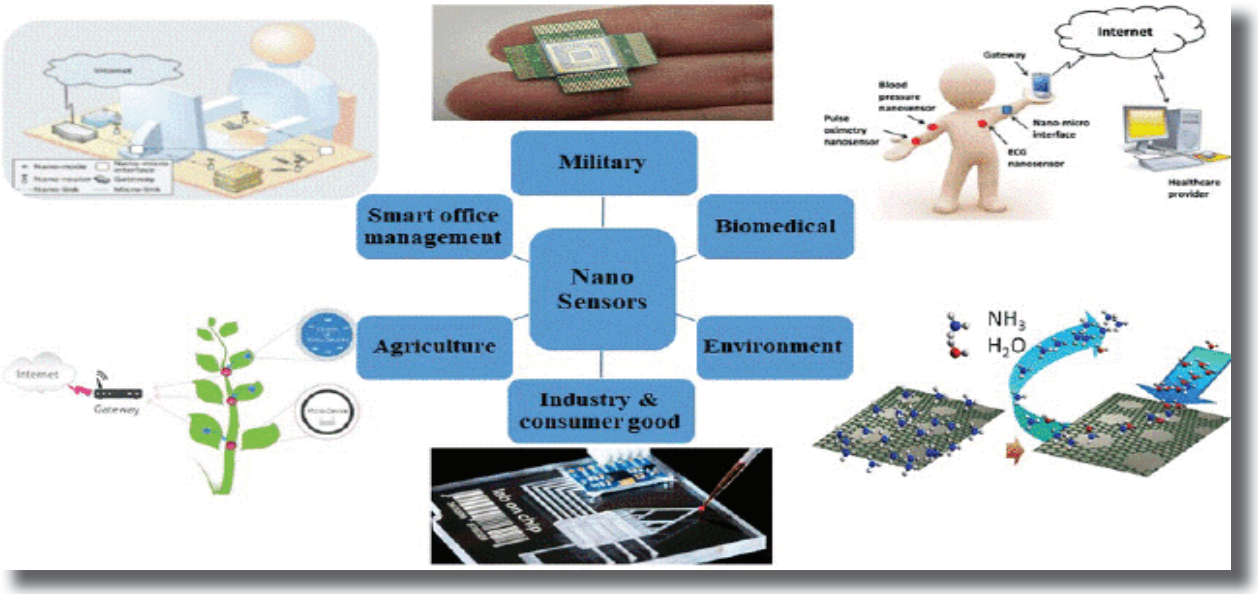
3. What motivated you to work with nanosensors?

In the Research centre of our college, a lot of intense research about the synthesis and development of different nanomaterials are going on. The sensors developed by using such newly evolved materials with better electrical, mechanical and optical properties have a wide scope in the research. This motivated me to work with nanosensors.

4. Can you point out the various day to day applications and industrial applications of nanosensors?

The first nanosensor that came to the market is a gyroscope. Starting from that till now nanosensors are paving the way for the development of different applications. Specifically,in health care to measure vitals and to diagnose different diseases, in the military to forensicand detect explosives, in food and environment domain to find adulterants, in agriculture to detect water level, crop diseases, seed quality and in automobiles for sensing different parameters.





5. Could you describe your research/projects in this field?

I am currently working on nanogas and acceleration sensors. To explain in brief, I am working with ZnO nanomaterials to improve the performance of CO and methane gas sensors. The sample fabricated device is shown below.

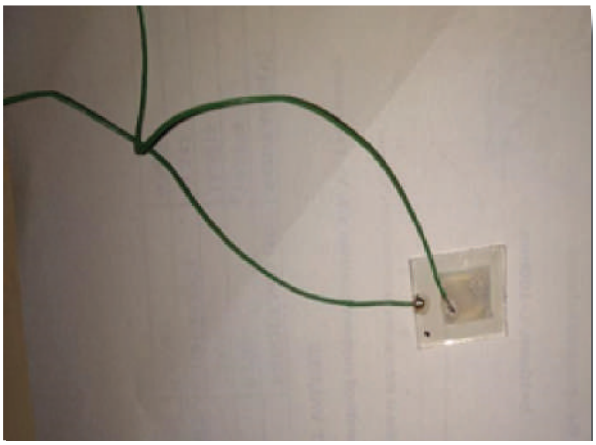
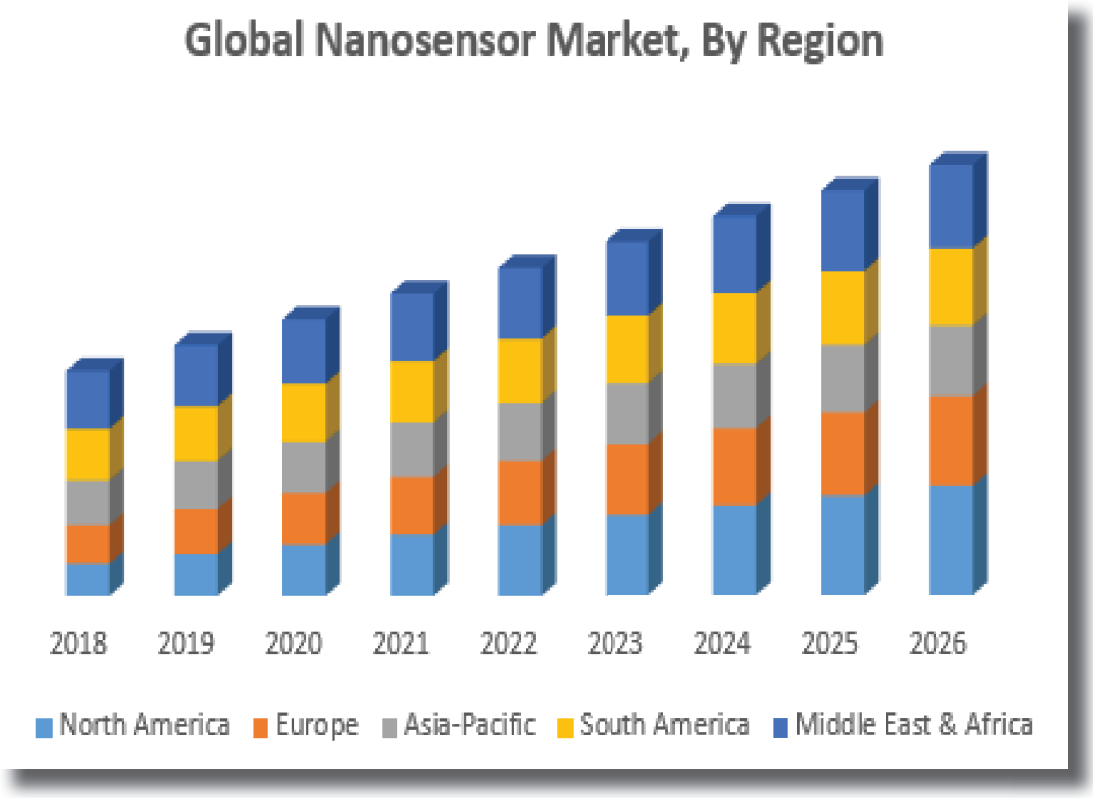


Fig.: Fabricated Sample

Recently, a multifunctional sensor employing undoped and Fe doped ZnO nanorods as active sensing layers using an uncomplicated fabrication methodology has been accomplished. The varying concentrations of the dopant effect in the structural, morphological, optical and electrical properties are meticulously investigated. The sensors fabricated are subjected to the experimental acceleration and gas test system. A maximum voltage at the respective resonant frequency and 1 g acceleration was recorded under acceleration sensing analysis.The resistance change, when exposed to different ppm of target gases, is also analyzed. Concisely, the research I am currently involved in demonstrates the need for practical and feasible implementations of multifunctional sensors fabricated for attaining upgraded performance parameters for appreciable low-cost applications in the multiple parameter monitoring systems.

6. Is our future going to be entirely based on nanosensors? Could you please share your point of view on it?

Undoubtedly. Since the research on nanomaterials is booming to a greater extent, there is a good opportunity for the development of nanosensors across different applications. Nanosensors could be relatively expensive in the immediate future, with high manufacturing costs for sensors and actuators. If we can achieve high volumes and low-cost products, the markets could be huge.



7. What books/sources would you suggest for a student who wishes to work in this enthralling domain?

- Vinod Kumar Khanna Nanosensors: Physical, Chemical, and Biological, CRC press, 2012.
- Sergey Edward Lyshevski, MEMS and NEMS: Systems, Devices, and Structures, CRC Press, 2002.
- Fluker M.H, Nanotechnology: Importance and Applications, IK International Publishing, 2010

8. Are there any elective options available in our college curriculum related to nanosensors?

The following are the subjects available for the students to learn about nanosensors:

- Introduction to **MEMS** and **NEMS**
- Nanoelectronics

INTRIGUE

"I think music in itself is healing. It's an explosive expression of humanity. It's something we are all touched by. No matter what culture we're from, everyone loves music."- Billy Joel

Music has been a part of us since we entered this world, omnipresent. To honour the sentiment and the people who are the source of it, we recently reached out to talk with Meghna Govind who is known amongst her peers for her singing. She is currently the head of the SSN Music Club and the treasurer of AECE .

Meghna has won in a lot of competitions. Last year during the lockdown, she placed second in a competition conducted by TBD Entertainment. She placed first in "La'Dual" and second in "Record Your Chord", both events hosted by the SSN Music Club. Meghna also recently got the opportunity to sing the Tamil version of the "Ya Yaa" from the movie "A AA", which is now officially out on multiple streaming platforms.

She was kind enough and excited to share her thoughts, experiences and perspectives as a singer. Here are some of the excerpts from the interview :

Where did your musical journey begin?

"I was trained in Carnatic music from UKG . I used to sing along or atleast hum all the time when I was young, and I think that was what encouraged my parents to make me pursue singing". She also expressed her gratitude to her mentors, Guru Dr. Shyamala Vinod, a Voxologist who always supported and encouraged her, and Guru Reshmi Aravind, who trained her.

What are a few skills or important traits that you think a singer should possess?

"A person who has a sense of Thalam and Shruthi in them, and is willing to try out different genres of music and practices hard can definitely increase their skill to become a better singer." "It is definitely not important for one to have a sweet voice. It is not stereotypical anymore as there are different types of genre available today.", she added. She mentioned that it is important for a singer to be able to feel the emotion in the music. She firmly believed that for each person they have their own unique voice which suits different genres.

Who is your inspiration as a singer?

“Since I started off with carnatic music , I am more inclined towards Indian music. I am always in awe with A.R. Rahman sir’s composition. I will never be able to pick out a song that I don’t like. I like all Indian language songs that come up. I also like listening to ColdPlay, Maroon 5, Shawn Mendes, Taylor Swift and Ariana Grande songs“. She also added that she loves the music genre and emotion that Indian songs provide.

Are there any memorable moments/ achievements along your journey?

The first thing that came to her mind was that the SSN Music Club had a tie up with Ashwin Maharaj Foundation, which provided the members an opportunity to perform musical therapy sessions for the residents in the Adyar Cancer Institution. “I felt really emotional whenever I saw them. They were on cloud nine when they saw us and thanked us for coming there. We just sang different songs for them but it was something huge in their lives. I think it was really rewarding for us to see them enjoy our songs “, she said, fondly recalling her time there.

How do you manage music, studies and other aspects of your life?

“I am a day scholar . I have this psychological thing where I work more efficiently when I am jam packed . I mostly finish the club activities first as it requires me to talk to different people and bring them together . As for the academic work, I finish it off late at night or wake up early.” She was more excited to get work done rather than overwhelmed by it, which she attributed her tenacity and will to power through challenges.

The pandemic has disturbed everyone’s way of life . How did you foster your passion for music during those hard times?

“I think it was because of music that I was able to keep myself together during the pandemic. This was the reason that I participated in a lot of different online competitions conducted during the lockdown. I tried to be more productive to not let myself become lazy. It really helped me improve my singing.“

Tips for those who want to achieve in singing?

“Passion, hardwork and practice are most important. If you have the musical interest in you, one will definitely achieve great things in due time.” She values beyond most other things the role passion plays in one’s career in the musical field, and we don’t need to look anywhere else to find a living example of her statement.

IEEE COMSOC

CATALYST IDEA

This event will be conducted in the month of January for students of all departments. Each team will consist of 1-3 members to the maximum and they will be asked to choose a particular field from the manifold of fields given.The team can take 120 seconds for brainstorming and to come up with a final solution. The decided solution must be *practically feasible and viable for any real world*.
The solution can be presented in the following ways:

- A video explaining their solution.
- Explanation using audio with a PPT.
- Explanation using a model.

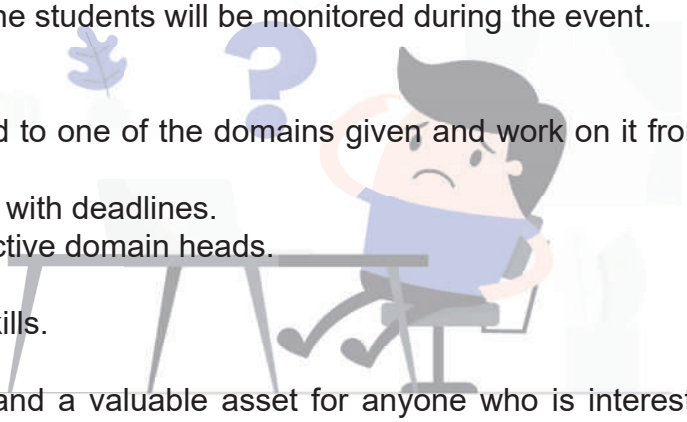
The teams are also supposed to submit an abstract of 100 words.

TECH CLUB

Events of Tech Club which will be taking place in the month of January, 2022.

ZENITH

Zenith is an event based on machine learning. This is an amazing opportunity for the students to identify and build their technical skills.This is an event conducted especially for the 2nd and 3rd year students of ECE department. Besides this, the students will be monitored during the event.



How does the event work?

Students will take up a project related to one of the domains given and work on it from the basics.
Regular assignments will be provided with deadlines.
Meetings will be held with their respective domain heads.

What will they learn ?

Improve technical and professional skills.
Learn to optimize the resources.
Draft an excellent Curriculum Vitae and a valuable asset for anyone who is interested in pursuing their masters abroad .

CORONA

CORONA is a technical fest of ECE conducted by the Tech Club and AECE.
A number of five events will be conducted. This is an event where all departments can participate.
The list of events:

- KRYPTOS
- SOLDER IT
- ONE MINUTE PLEASE
- DISPRO
- RISC IT

KRYPTOS

This event is a mind bending virtual treasure hunt, masquerading as an Android App, with a digital twist. There will be four exciting levels and each will consist of an interesting challenge and on whose completion, the participants will move to the next level. The levels are engineered to test the logical ability, critical thinking, information analysis and problem solving capability.

SOLDER IT

This is an event where the prelims will consist of 20 questions. Clearing the prelims will take the participants to the final round. Final round will contain two questions based on application. Participants will be accessed on accuracy and feasibility of the answer given to the problem statement.

ONE MINUTE PLEASE

This is an exciting event of one minute with certain number of rounds where the participants will be provided with technical terms. They will be asked to give three clues for each term to their partner for them to guess the term.

DISPRO

This is an event conducted after being inspired from Shipwreck and Block&Tackle.This will make the participants to think outside the box and present their ideas on the given theme.The participants will have to block their product based on the questions asked by the judges and tackle their way through to get the green signal.

RISC IT

This event will test the skills regarding building basic circuits.The participants will be assessed on the circuits created and the time taken to solve the task.

- Sruti K A
ECE-B, 2nd Year

ENERGY HAREVESTING WIRELESS SENSOR

INTRODUCTION

Wireless sensor networks (WSN) have gained a lot of attention due to their extensive deployment in the emerging fields of the Internet of Things (IoT's) and self-driven devices. A WSN comprises of a number of deployed sensor nodes which are utilized for detecting environmental conditions like motion, temperature, humidity, sound, pressure, wind etc. Additionally, the gathered data are collectively delivered to the intended user involving public, industrial, strategic requirements. Recent advancements in miniaturization have led to discovery of compact sensor nodes. WSNs which are usually powered by batteries, have an issue of limited energy and hence requires frequent replacement. Energy harvesting technology as shown in Fig. 1 can be a sustainable solution for the above-mentioned issue, by creating Energy harvesting wireless sensor network (EHWSN).

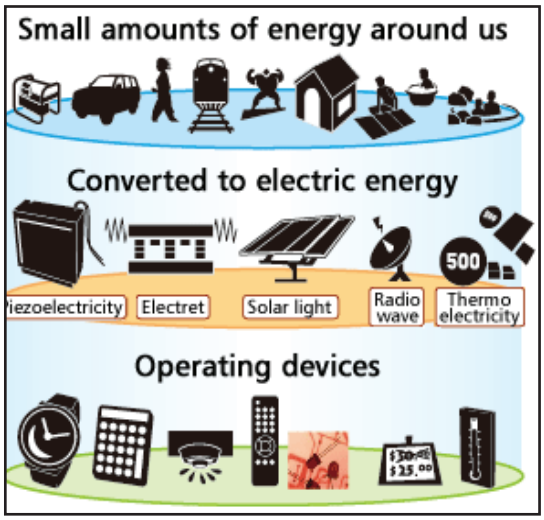


Fig. 1. *Schematic of Energy Harvesting Wireless Sensor Network (EHWSN) for sustainable operation of gadgets*

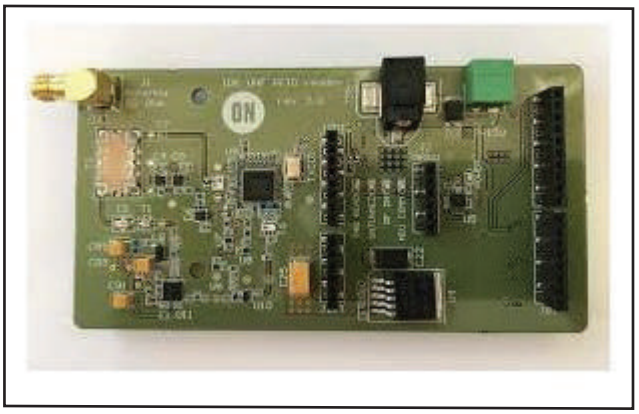
In EHWSN, wireless sensor nodes scavenge energy from environmental sources that include radio frequency (RF) sources, solar, thermal energy, vibrations and wind. Energy conservation is one of the major challenges towards the successful implementation of WSNs since the tiny sensor nodes are constrained with resources such as energy, memory and processing capacities.

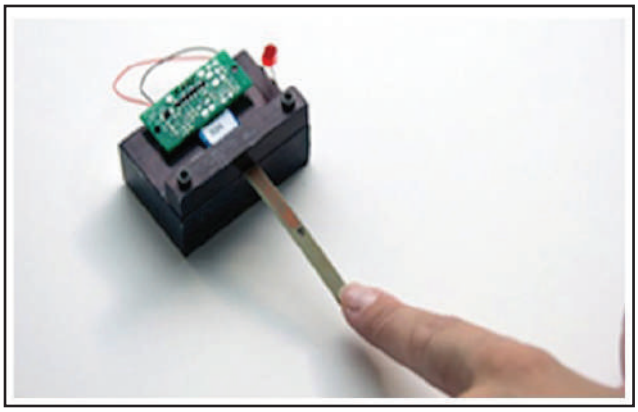
In WSN, wireless communication is used to deliver information among mobile sensor nodes. Mobile nodes cause rapid and dynamic change in network topology. WSN usually operates in a random environment under dynamic uncertainties. Therefore, these nodes are not always aware of the route to a destination. The wireless communication between the nodes may experience frequent failures and recoveries due to node mobility, additional signal propagation problems and energy constraints. There are several techniques for minimizing energy consumption in a specific WSN.However, the availability and quantity of energy required for uninterrupted network performance of WSN remains a challenge. Communication between mobile sensor nodes is one of the major processes responsible for high energy consumption. In WSN, routing is a very important task that has to be handled carefully. Hence, proper routing between the mobile nodes is critical to avoid network failure. The greater the distance between the source nodes and the destination node, the greater the quantity of energy consumed during transmission. Hence, the choice of energy harvesting technology should be optimally designed, and enabled to meet the operational requirements of WSN. The following section gives an overview of the available energy harvesting technologies.

CLASSIFICATION OF ENERGY HARVESTING SYSTEMS

There are different ways through which energy can be harvested, and accordingly, the energy harvesting system can be categorized as follows:

- Mechanical energy harvesting system (from vibration in typical car engine compartment, compressors, mechanical stress, and strain)
- Electromagnetic energy harvesting system (from wireless communication, microwaves, infrared, cell phones, inductors, transformers, and coils)
- Wind energy harvesting system (from wind, air flow)
- Hydropower energy harvesting system (from flowing water, tides)
- Geothermal energy harvesting system (from the internal heat of the earth)
- Light energy harvesting system (captured from room light or sunlight through photo sensor, photo-diodes or solar panels).
- Thermal energy harvesting system (from Sun radiation, waste energy from furnaces, heater, vehicle exhausts, and friction sources)





PROBLEMS TO OVERCOME IN THE NEAR FUTURE

- Use of a single energy harvesting source for powering WSN is unreliable. For instance, availability of solar energy varies according to time of the day, season, location, and so forth. RF energy is available almost everywhere but the major challenges are its low power density and fluctuations. Utilization of a hybrid of energy harvesting systems significantly contributes towards achieving perpetual network operation of self-powered WSN.
- Designing of prediction models for energy harvesting in WSN is still a challenge due to the random nature of the energy harnessed from the environment. Implementation of energy-aware duty cycling mechanisms also remains difficult if the energy source for the tiny sensor nodes is uncontrollable.

- Another important aspect is connected with power management calculations covering the energy source, energy-harvesting design and energy—consuming activity. Harvest—Store – Use kind of architectures are preferred over Harvest – Use architectures which also involves implementation of suitable energy storage devices

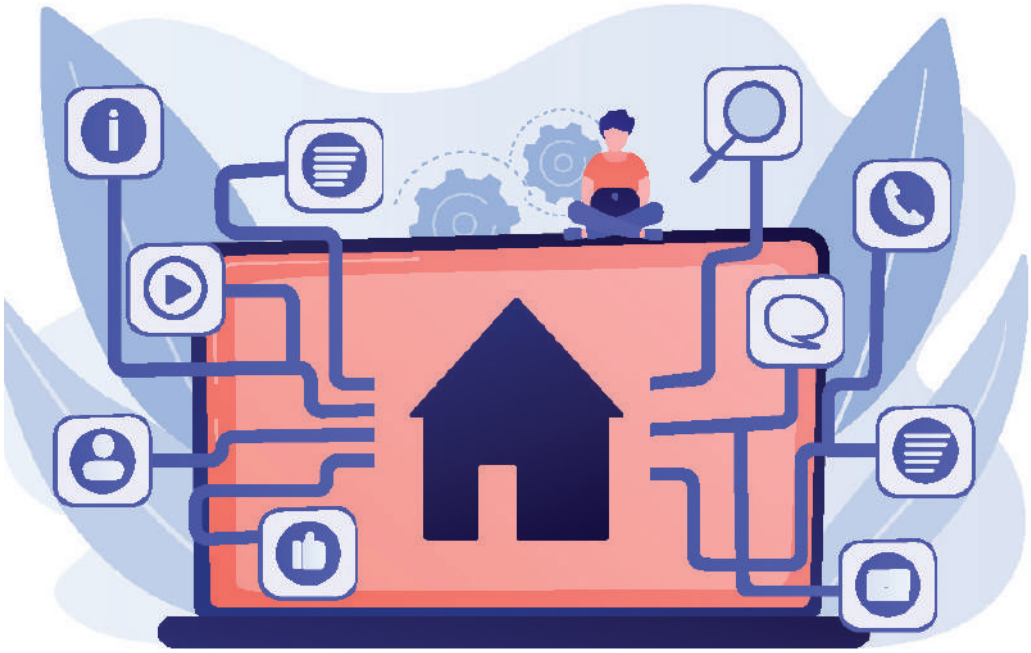
- In inaccessible, remote and hazardous environments where sensor nodes are randomly dropped from high altitudes, the existing protocols need to consider node failure probability. The deployment process itself may result in hardware failure. The functionality of the nodes may also be affected by changes in temperature, pressure and humidity.

- Most research conducted over the past years focused mainly on simulations and theoretical aspects without real world implementation of EHWSN. Moreover, the few experimental evaluations of the proposed protocols were mostly implemented at small scales. Hence, large-scale practical evaluation of the already existing and new protocols for EHWSN remains an open research area

CONCLUSION

Since the past decade, EHWSN have gained more attraction leading to wide ranging applications. EHWSN have made ultra-low power-based sensor techniques more feasible for diverse applications. Though unlimited energy harvesting from the abundant source available around us still remain an unsolved problem, careful implementation of concepts such as Harvest – Store – Use or hybrid energy harvesting approach could comprehend more reliability in the near future.

Krisha Aarunee. S
2nd year, ECE A



E-Skins – The new electronic frontier

Ever wondered how powerful your brain is? Try this simple experiment. Lift a fully filled water bottle that's near you. Good, now try picking up an apple or an orange. If the fruit in your hand hasn't been turned into a pulp, that is proof of how powerful your brain is. Just relying on eyesight, your brain has actually estimated, with almost unerring precision, the weights of the objects and actuated your muscles to apply the exact amount of pressure. And this is ridiculously and childishly simple for us. Robots, on the other hand, find picking up two different objects with different masses computationally expensive. Though we may have life-sized robots at present, they cannot distinguish between squeezing the hand and a firm handshake. Or can they?

Back in 2004, a talented team of engineers at the University of Tokyo, led by Takao Someya devised the first prototype of a robot skin. They grafted an array of tiny pressure sensors on an active matrix that consisted of a pressure-sensing polyimide plastic, a few layers of electrodes and an organic semiconductor. Even when it was wound tightly on a cylindrical bar, the sensors still worked and allowed current to pass through, unimpeded. This mimicked the human skin, in the sense that its flexibility did not affect its performance. It wasn't stretchy and it conformed only to a specially crafted surface, but it was the first time brittle electronic components were etched on a malleable surface. And thus began the journey of electronic skins (or e-skins in the technical lingo).

E-skins require a harmonious union of the minds of electronics engineers and material scientists. Put simply, an e-skin requires two things – electronic components that can respond to stimuli and a flexible sheet holding them together, thus acting like a surface. Electronic engineers have to deal with the brittle-ness of classical components whereas material scientists need to develop chemically active matrices which are electrically conductive and have a long lifetime before losing their skin-like properties. Ionic liquids such as 1-ethyl-3-methylimidazolium ethyl sulfate developed by George Malliaras and his team at Cambridge University, are good contenders as they are slow to evaporate. However, the team reported that the compound maintained its electrical properties for only three days, indicating that a lot more research has to be done before a functional product can be released. Another contender is polydimethylsiloxane (PDMS), a rubbery and elastic organic polymer, which can be used to bind single crystals of silicon. Engineers can then work out a way to dope the crystals appropriately and fabricate transistors – the building blocks of all electronic components. However, unlike skin, such components have very low tolerance to sweat and can, frankly, be annoying if worn for long periods of time.

A polymer chemist at Stanford University, Zhenan Bao, has a rather unique perspective to approach the problem. Instead of creating methods for inflexible transistors to stick on pliable surfaces, she is developing electronic components with inherent flexibility. The final e-skin would need several such components, but the choice of the active matrix now is much more varied. In her prototype, Bao etched out an array of small pyramids from a PDMS substrate, which in turn acted as capacitors. As the e-skin's shape is distorted, the capacitance is also subsequently modified, which can be measured and construed as the electrical equivalent of a touch. Bao says that, once the technology matures, its shape can be modified and injected into the bloodstream of people to act as a "butler" of the human body, or maybe even as our first line of defence. It may be used to detect the onset of diseases by monitoring bio-markers while also morphing itself to mend damaged tissues.

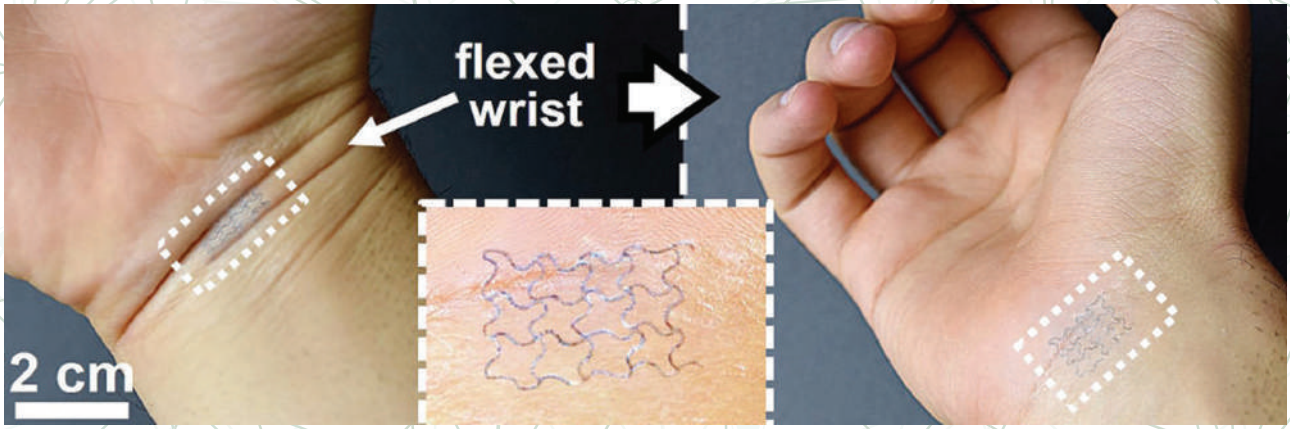
The potential applications of a fully functional e-skin are virtually limitless in the domain of robotics and in the field of healthcare. Tired after a long day at work and craving a massage? A robot could be your masseuse – and you wouldn't be able to tell the difference. Does your doctor want you to take an ECG? Why not send him the data from the heart rate monitor that is etched on your chest? Want to take a picture, but don't have your phone with you? Just blink twice, and the camera lens attached to your eye can take a snapshot of what you see and send it directly to the cloud. This may sound taken from a realm of science fiction, but e-skins are currently commercially available. A team from Northwestern University, Illinois, has created a finger-foldable sensor which is currently used to monitor babies in neonatal ICUs.

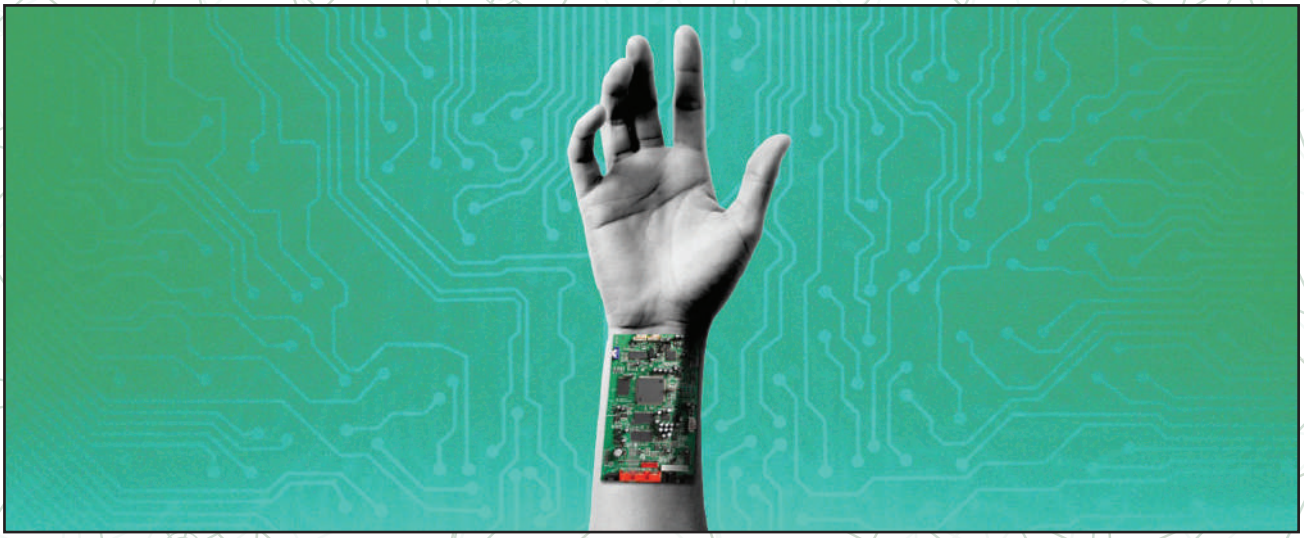
Emotionally enough, parents can now hold their babies as opposed to it being placed on a bed under a maze of wires to monitor its vitals. Such sensors also have the potential to sense "pain" as a particular stimulus exceeds a certain threshold. Someya's company, Xenoma, has a prototype of an e-skin based sensor in clothes, which can be used to alert emergency services if it detects signs of stroke in the wearer. Perhaps the most lucrative use of e-skin yet may be in prosthetics, potentially allowing the wearer to "feel" his/her artificial limbs.

While advancements in e-skin technology are certainly beneficial, it must be treated with caution. With the large-scale penetration of IoT in our everyday lives, it is very likely that e-skin devices will also be developed with an intention to sync with the internet. Thus, any device designed to interact with the human body must follow the highest standards of safety, not just in its operation but also in its management of data. Moreover, pain thresholds must be carefully calibrated into robots which don e-skins in the future, to ensure that it does not hurt humans who come in contact with it. Full body e-skins, for those who may just put it on for amusement, must be breathable, while also having a high tolerance to sweat.

Electronic skins are a potentially disruptive technology. Granted, e-skins may have a few issues to be ironed out and it is still in its inchoate stage of research, but it has already generated a lot of buzz among the electronics community and material scientists alike. For all we know, in 20 years, fashion designers may be called upon to collaborate with scientists to create a fully functional, human-sized skin – draping not only robots, but our bodies as well.

Aakash Murugan
4th year ECE





WRITER'S ENCLAVE

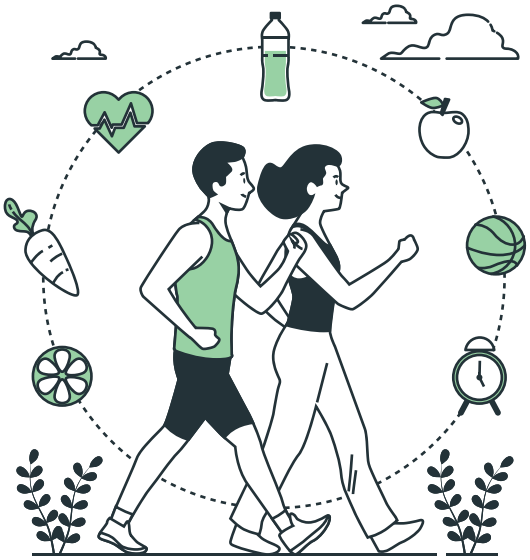
What does it take to stay on top?

Everyone in this world wants to be successful and be the centre of attention. People crave for recognition and want to establish themselves in the society in one way or the other. Being in that position might seem to be the ultimate dream, but most people don't care about the price that comes along with it. Generally, people only think about getting to the top, but hardly pay attention to what it takes to stay on top. This is the basic difference between successful and ordinary people.

Receiving criticisms well is one important aspect that one must have in order to stay on top. Different people have different opinions and preferences. So, being approved by everyone is practically impossible. Generally, when we get to know that someone doesn't like us or doesn't like what we do, we tend to over think about the reason behind it and we start to question ourselves. This won't do any good to us and we often end up wasting our time thinking about it. Instead, one must learn to take only the positives from such criticisms and try to work on that. By doing so, we are not only working on our personal growth, but also use our time efficiently. So, maintaining a positive frame of mind and ignoring negativity is crucial.

Another important quality is consistency. Once we reach the top, we don't work as hard as we did to reach that position. We take things lightly and often end up wasting our potential. The reason behind this is that, once we attain the topmost rank in any field, we won't have anyone to compete with and thus, we won't feel like pushing our limits further or utilising our full potential. In order to overcome this, we need to remind ourselves that being in the highest rank in any field is not permanent and we have to keep working harder to maintain that spot. We should never let success get to our head and keep things as simple as possible.

The last but the most important feature is maintaining good health. It is very important to prioritise our health over any other aspects. Pushing our limits obviously yields results, but at the expense of deteriorating health conditions is totally unacceptable. One has to find a routine that is flexible enough to monitor both our mental and physical health because it is scientifically proven that a person who is both physically and mentally fit would be able to utilise his potential to a larger extent than a person who is physically or mentally unfit.



To sum it up, if getting to the top is hard, then staying on the top is harder. Most of us have a universal mindset of attaining the top rank in any field. But in my opinion, every one of us must focus on staying on the top, instead of just getting there. The world is becoming more and more competitive every day. People remember only the ones who succeed and keep working hard to maintain that spot. So, if you are one such person who loves to be the centre of attention or want to be recognised by people, focus on staying on top instead of just getting there.

- R. Rahul
2nd year, B

JUST TAKE A CHILL PILL!

Stress is a ubiquitous word that is used in our daily life. But what is stress? Stress is the condition created when one's mind overrides the body's basic desire to choke the living daylights out of someone who desperately deserves it (I'm being sarcastic). The current pandemic has added fuel to the fire. Covid-19 has made us sit at home for God knows how long, and everyone is getting restless. This restlessness is a key factor causing stress.

Online has become the new normal. Things we thought could never be done remotely are being done online almost every day. I remember I had a lesson on online schooling in English in my 7th or 8th grade, and I always wondered how lonely it would be to learn without anyone around me. No wonder it is causing stress in innumerable ways. Online classes have made it hard to understand our peers and to make contacts. It's upsetting that I don't know even 20 people from my class after two years of college. It's hard to listen to classes and to pay attention as there is easy access to distractions.

Office goers are also finding it hard to sit at home and work. It's not easy to create a workspace when the entire family has stayed home for the last two years. The lack of a proper work environment is affecting efficiency, which in turn is leading to stress. It's hard to coordinate between subordinates to deliver the required results. They are being contacted at any time of the day due to work-from-home; therefore, the day never really ends. Sitting in front of the computer all day long is tiring and leads to other health complications as well.

Homemakers are finding it challenging to deal with the entire family staying at home the whole day. They are unable to take a break and are required to cater to the family's needs the whole day. Working the entire day causes a lot of stress and leads to many other health problems as well.

Unfortunately, some people, even if they're stressed out, are unable to say so or find out that they're stressed. Depression and anxiety are huge indicators of stress. Anger, irritability, and lack of focus and attention are also due to stress. Problems with sleep, constant tiredness, and lack of concentration are some other causes of stress.

There are various ways in which one can overcome stress. I get that everyone has a standard excuse: “I have no time to do all this!” (Even me!), and this is a terrible excuse (although I shouldn’t say that). But when we can make time for the entire world, why can’t we make time for ourselves?
To start with, physical activity helps in improving sleep, and better sleep means better stress management. Exercise induces a “slow-wave” sleep which helps in renewing the brain and body. It also enhances our mood as exercise makes our brain release various hormones, which help in blocking pain and improving sleep.

Diet is also a significant factor that helps in overcoming stress. Eating healthy food not only helps us become fit but also benefits mental health. Stress makes us eat junk food. During the quarantine, I started baking, which led to eating a lot of junk food, but I felt much more active, fresh, and happy once I stopped.

Try to be optimistic and believe that whatever happens in life is for your good, even if it’s hard. Practice gratitude. Being grateful makes us feel happy and relieves stress. Smile as much as you can, as said by Mother Teresa, *“Peace begins with a smile. Every time you smile at someone, it is an action of love, a gift to that person, a beautiful thing.”* Believe me, this helps in reducing stress in ways you can’t imagine.

One thing that helped me overcome stress was taking a long walk. I know that due to the pandemic, it’s hard to step outside but trying to take some time for yourself and taking a walk is beneficial. You can listen to music or talk to your close ones when you do this. Everyone is stressed; try to come up with a schedule with your friend and find out when they are going for a walk; call them and talk to them, it helps immensely!

Laughter is also a very efficient way of reducing stress, and you know what they say, *“Laughter is the best medicine!”.* Try watching comedy movies and series, and most importantly, scroll through memes!

Maintaining a positive attitude helps reduce stress. Learn to accept that there are certain aspects in life that you cannot control. Be assertive instead of being aggressive. Learn to manage time effectively.

Try reaching out to people close to you, talk to them, and tell them how you feel. In my opinion, parents are the best counsellors. They have come a long way and have gone through a lot in life and will surely help you out. You can always reach out to counsellors and seek professional help to deal with stress effectively.

This pandemic has been a hard time for all of us, and it has shown us that all age groups are prone to stress. I was stressed during the beginning of this year, and then I started to cheer myself up. Now I wouldn't say I'm stress-free, but I certainly am feeling better. As Dumbledore said,*" Happiness can be found even in the darkest of times if one only remembers to turn on the light."* Just like peace, stress is also a state of mind; we can overcome stress by being optimistic and seeing the good things in life.

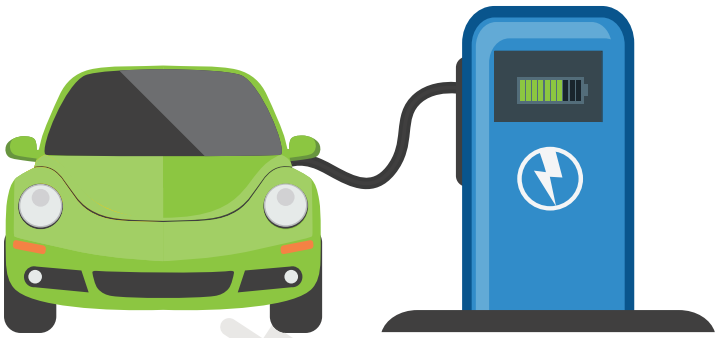
Covid-19 has brought us close together, and by opening up to our loved ones, we can certainly overcome this hurdle together!
As Aman Mathur once said, *"Jiyo musukrao, kya pata kal ho na ho!" (Live laugh, who knows if there will be a tomorrow!).*

- KRUTHI R
3rd year, A

Let's Talk EVs

Hey guys, EVs have suddenly risen in popularity thanks to the rise of Tesla and have become the talk of town, so I decided to write an article about it. So, let's just get on with it, shall we?

For a start, EVs (Electric Vehicles) are not a new concept, in fact, it was invented even before the first ICE (Internal Combustion Engine) based vehicle. So then, why did it take so long for it to draw our attention? Well, they weren't very affordable. The reason why ICEs took off in the first place was because of several advancements made in manufacturing that made it affordable for people to buy. To be honest, it's still too expensive for many people to justify investing in it, and there are two arguments based around it.



One argument is that the initial investment alone is far too much for some people to afford. The other is that despite the rather high initial investment, the cost of operation and maintenance are much lower, meaning over time, it will break even or end up being cheaper. I will be going over these arguments separately as they both have valid points.

So, when talking about EVs being expensive for the average person, we need context, namely who is the most likely person to buy one? For the purposes of this discussion, we'll consider the people who are barely able to afford a car and its fuel prices. Some of the most popular cars that also happen to be cheap cost around 2-4 lakh rupees. The cheapest EVs (in India) cost anywhere between 12-14 lakhs. And this increase is massive, and gives valid financial concerns to the people of the first category.

As for the second argument, the operating costs of EVs per kilometre averages at around 2 rupees (Petrol cars cost about 9-10 rupees per kilometre), making it much cheaper to use than any other mode of communication. The question then becomes, can this low operating price really help break even in the long run? Well, yes, it can over a period of 3-4 years depending on the car and how much it is used. Given that car owners hold onto their cars for around 10 years, this is a very compelling argument for buying an EV.

Now, the question remains, which argument is more accurate? It's actually the second one as the first ignores a rather important detail. Most people who buy cars do not belong to that category and are actually able to afford EVs albeit with some constraints. That said, this only talks about the low end of EVs and ignores other factors that I am unable to cover here such as quality, performance etc. It is true that both arguments are correct, however, they are in conflict with each other and makes the question of EV adoption difficult to answer.

Now, we can talk about what the cheap operating costs mean in the grand scheme of things. Electricity is easy to produce, virtually infinite when using renewable sources, easy to transport and cheaper than petrol or diesel. This means shifting to EV's reduces dependency on petrol, and in turn, on our reliance on oil imports.

It is also significantly more economical for many people to shift to EV's given the ever-increasing price of fossil fuels. It also helps preserve fossil fuel for the future as it wouldn't be as heavily relied upon.

EV's also produce far fewer emissions when using renewable sources. That last part is important as currently, only 20% of India's electricity is obtained through natural resources. This means that currently, EV's would produce just as much emissions as an ICE based vehicle. However, when we look at where the emissions are made, it is wherever electricity is generated and not locally. This means that the local region won't be as polluted as before.

Now, EV's are also heavily reliant on electronics, even more so than non EV's. These electronics make technologies like self-driving possible amongst many others. Actually, EV's use so many technologies from so many fields of engineering, making it relevant to almost everyone. Companies like Qualcomm, MediaTek, AMD amongst many others, are heavily invested in EV's. We must therefore be aware of EV's and the direction it is heading towards as it presents many opportunities to us as it is currently a growing field of interest.

Speaking of self-driving, let's talk about it for a bit. Now, for those unaware, self-driving is a technology that allows vehicles to be operated by a system without the driver having to control it. There are 6 levels of self-driving and they are classified based on the amount of control they have over the vehicle. They are as follows:

- Level 0: Here, the system has no control over the vehicle, but is aware of the surroundings and is able to inform the driver about it.
- Level 1: Both the driver and the system share a degree of control over the vehicle in this level, however, the system is not capable of completely
- Level 2: Now, the system if fully capable of taking complete control of the vehicle, but cannot always detect a hazard. In short, the driver must be ready to take control of the vehicle at any time
- Level 3: The system can now fully control the vehicle in a safe manner but the driver must be able to intervene
- Level 4: Within certain "Safe Regions", driver attention or intervention is not needed and the system can safely manoeuvre the vehicle
- Level 5: The system is now advanced enough to safely control the vehicle under any circumstance and does not require human intervention at any point.

Self-driving has now become a massive field of interest for many companies and more and more people are pursuing jobs related to EVs. Actually, EVs as a whole have gathered widespread interest amongst big tech as well as start-ups. EVs use various technologies such as sensors, processors, AI, ML, Wireless Communications, electric motors, batteries and many more. It is for this reason that we must be aware of the current state of EVs and the technology that goes behind it as EV's are pretty much directly related to our fields.

Shridhar Sriram
ECE B
Year: II

PARADOXICAL MYTHOLOGY

Ever since I was a kid, I have always tried to imagine impossible situations and what would happen if they occur. What if my maths ma'am doesn't come to class? It would be a treat and we would all go for sports. Obviously, we would go swagging our way through the corridor, much to the envy of the other classes. What if I had chappati and paneer butter masala for lunch? Certainly, I would need to sneak it away from the eyes of my friends who are ever so eager to snatch my lunch. Even if they catch a whiff, I lose the game (and three-quarters of my lunch). All these scenarios had one thing in common – they were impossible events, but it was delightful to think about them, think about what could have been.

Mythological stories seem to share similar traits. They are interesting to read and listen to, but too far-fetched to be true. I mean, was Atlantis really that technologically advanced if they couldn't solve a simple flooding problem? Did the warriors sent to defeat Medusa never hear of a mirror? It was really hard to discern the element of truth in all these stories, but for some reason, I kept asking myself – Why would people go to such great lengths to keep a record of them? I'm guessing it must have been a more valid reason than to just flaunt their writing skills. Fortunately, I stumbled upon a possible answer in the unlikeliest of places – science.

In the interdisciplinary study of physics and astronomy, scientists have long pondered over the dimensions of the universe. Initially, it was hypothesized that the universe had to be shrinking as all the massive objects were inside it. Our trusted friend, gravity, was relied upon to do the one thing it always does – pull things together. Surprisingly, it was empirically observed that the universe was not shrinking, but expanding. What's even more interesting was that the expansion appeared to accelerate. The only plausible conclusion was the existence of a certain type of matter (dark matter) which repelled objects essentially the opposite of what conventional gravity does. It almost seems like gravity has done an Uno reverse on all of us.

This mysterious dark matter is what covers seventy percent of the observable universe. It probably doesn't make any impact in our lives now. But given enough time, it can push stars and planets away to huge distances. In about a million years from now, assuming that the human population still exists on Earth, the night-sky on a new moon day would be pitch black. Stars, as we see them today, would be non-existent then. They would be oblivious to the fact that, a million years ago, we navigated the seas with nothing but the location of these bright, shiny objects. At such a time, even though there may be documented evidence of stars in the night-sky, people would be tempted to classify it as a myth. It is human nature. If it were me in the future, I certainly would believe what I can actually see rather than an archaic piece of evidence.

This takes me back to mythology. Analogously, what if Atlantis, Medusa and several other mythical places, people and entities actually existed? If they did exist, what happened to them? Or rather, where are they now?

- Aakash Murugan
ECE-A, 4th Year

Universe's Message to Humanity

I'm a magnificent and complicated cosmos with mysteries.
I'm an unimaginable universe, not confined with boundaries.
I came to existence from an immeasurably small entity.
Now, I'm home to innumerable substances including humanity.

I emerged at the bigbang and continuously expanding even today,
I have persistence to expand, until I reach my limit in space.
Have determination to handle the hurdles choking your way.
Make progress with perseverance until you reach your destined place.

You're not similar to how you were a few years back.
I'm not the same as I was in the past and will be altered in future.
To sustain, think about the unalterable aspect of life you lack,
Have the thirst to acquire knowledge to endure.

Every problem in the universe has a solution,
Have the desire to quest and procure the key.
No innovation will be possible without interrogation.
Your understanding will be chaotic without raising a query.

Look at the sky and stare at the stars' twinkling.
Think how small you're compared to my majesty and complexity,
Stop your ego, vanity and inequity from harming your fellow earthling,
Spread knowledge through love and harmony to humanity.
Remember, I'm you and you're within me.

Pavithra V,
Second Year,
ECE 'B' Section.