# RedEEEm

## Highlights

- ICEES '20
- IEI Student Chapter
- SATRACK

Volume 8
Issue 4

# INDEX

# From HOD's Desk

As this difficult lockdown continues, it is a matter of great importance that we all stay safe and take care of ourselves. At the same time, we can look forward to good things happening at the end of this tunnel period. Towards this goal, we continue our effort in teaching by zoom meeting, faculty development by attending webinars and pursuing research by thinking with creative ideas.

I am happy that we could successfully conduct the IAC meeting which is a vital ground work for the NBA documentation. We have identified 6 domain group experts in the department and by periodic interaction with Dr Ganesh Samudra, we have strengthened the course outcome with program outcome mapping. The department organised one international conference and three research level workshops successfully.

The proposal submitted to AICTE by Dr.Seyezhai under the scheme of MODROB (Modernisation & Removal of Obsolescence) for institutes was approved and subsequently AICTE sanctioned Rs 11L.

The department also submitted a proposal under ATAL-Academic FDP 2020-21 Scheme and a project proposal to DST under SERB-CORE scheme.

I congratulate and appreciate the efforts of all the faculty members and students who have contributed to the department.

# Editorial

The only way to live a happy and successful life is to stop being busy and start being selective. Selectivity is the gateway to productivity—and productive people live long, healthy, and fulfilling lives. Busy people who passively fill up their lives with distractions, on the other hand, live short, stressful, and exhausting lives. Busy people have mental breakdowns, become emotionally burntout, and are routinely manipulated by others. The reason busy people suffer so much is that busyness is a gateway to mediocrity, reduced expectations, and reduced willpower. Busyness leads to giving up on your dreams, following others, and wasting your valuable mental energy levels

Life is much simpler than most people want you to believe. You do ‘x’, and you get ‘y’. That's it. It's a simple math equation. The problem is the average person thinks he deserves y just because he wants it. This person has been taught to believe that he can achieve y just by talking about it, just by being a good person, or just by being born. This is nonsense. You certainly can't achieve y without doing x. You cannot deserve something you have not earned. When you believe you deserve something you have not earned, you're evading reality. You're trying to reverse the law of causality. You're trying to have your cake and eat it too. Fake friends want unearned respect, as if respect—the effect—could give them personal value—the cause. They want unearned admiration, as if admiration—the effect—could give them virtue—the cause.. They turn to you to give them these things.

Effectiveness is your priority, but efficiency is still important. Efficiency allows for effectiveness. To be efficient, you must start systemizing your internal and external environments. But before you can systemize anything, you need to organize it. You need to determine which parts of your would be system stay and which parts go. Creative ownership relieves you of dependence. Everything in your life can be taken away from you except for your knowledge, network, and ability. Gaining ownership over these three things will accelerate your progress on the path to Intelligent Achievement Employees who use creative problem solving skills to find new solutions for unexpected hurdles are more likely to thrive in challenging work environments, and employers know it. That is why many of the world's top organizations, such as Google, Apple and 3M allow employees to spend up to 20% of their work hours doing whatever they want

A pragmatic mind set will ensure that you stay in touch with reality while always maintaining a sense of personal responsibility in your life. A pragmatic mind set will also increase your resilience, which is the key to overcoming the pain associated with trauma, tragedy, or adversity. Our brain has a negativity bias—it has a preference for negative information over positive information. Studies show that negative information is quickly routed

through your amygdala and into your long term memory banks while positive information has to be held in your awareness for more than 12 seconds to be stored in your long term memory banks. This is why you will remember forever the one negative comment your boss made during your performance review, but will instantly forget the fifteen positive comments he made before and after. This is also why a small negative thing will spoil your mood for the entire day. After corona people will have different way of thinking and they will get transformed into realized one. Things they strived hard seems to be irrelevant and there will be some change in the way they look their life. Like A.C and B.C their life can be divided into before and after corona.

People are better able to point out cognitive blind spots or perceptual biases in others, but struggle to identify those same blind spots in themselves and so they actively chose to evade reality and live in ignorance. The only way to prevent this reckoning is to look directly at your failures, your shortcomings, your secrets, your vices…everything. Be pragmatic and take personal responsibility for everything in your life because it's all your fault. These sounds harsh, but only by taking responsibility can you start improving your situation. It doesn't matter what contributed to any of your pitfalls—you get to decide how you use them (or let them use you), moving forward. Own up to the bad mistakes and poor judgments you've made in your life. Accept accountability for your actions and their ripple effect on yourself, your progress, and people around you.

A mini habit is just like a full habit except the routine is much smaller, or is merely a portion of a whole routine. If a full habit is going to the gym after work to perform 30 sets of exercises, a mini habit is going to the gym to do just one set of exercises. After a few one set exercise sessions, move up to two sets, then four sets, then eight, and so on. Studies show that mini habits are not only easier to create and follow, but can quickly lead to full habits. The trick is to grow your mini habits into full habits slowly. Like that any complex process can be made habitual one by this mini habit method and you can make excellency as a habit rather than striving always and get disappointed.

*“To be yourself in a world that is constantly trying to make you something else is the greatest accomplishment”. —Ralph Waldo Emerson*

# Paper Presentation

1. Dr.R.Seyezhai, ASSP/EEE and Dr.A.Bharathi Sankar presented a paper titled, “Piezo electric driven charging supercpacitors for biomedical sensors applications” in the International conference on advanced materials chemistry at the interfaces of energy, environment and medicine, AMCI-2020 held at M.S. University, Tirunelveli. This paper received the best paper award.

2. Rama Porselvi (Part time Research Scholar) and Dr Mrunal Deshpande ASSP/EEE presented a paper titled, Genetic Algorithm Inspired Series TCSC Location For Congestion Management In Deregulated Power System ” in the International Conference on Electrical energy systems- ICEES -2020 organized by the department of EEE at SSNCE.

3. E. Oliviya Joselin Komagal and R. Ramaprabha, presented a paper titled “Diode Assisted Extended Boost Quasi Z-Source Inverter for Photovoltaic Interface”, 6th International Conference on Electrical Energy Systems (ICEES 2020), Feb 20-21, 2020 at SSN College of Engineering, India presented on 20.02.2020 by Oliviya Joselin Komagal & Ramaprabha.

4. V. Kowsalya and R. Ramaprabha, presented a paper titled“Development of Low Cost PV Panel Characterization Kit using Arduino”, 6th International Conference on Electrical Energy Systems (ICEES 2020), Feb 20-21, 2020 at SSN College of Engineering, India presented on 20.02.2020 by Kowsalya & Ramaprabha.

5. Dr.V.Rajini, K.Kanchana, A. Anoop, presented a paper titled," Experimental invesitigation on the distribution of voltage at the stator winding of induction motor" at ICEES2020 , held at SSN College of Engg, during 20,21-2-2020.

6. K.Indhumathi (IIYear M.E.(PED) and Dr.R.Seyezhai, ASSP/EEE presented a paper titled, “Multi-Phase High Step-Up Interleaved Boost Converter For Auxiliary Applications” in the International Conference on Electrical energy systems- ICEES -2020 organized by the department of EEE at SSNCE.

7. S.Devi ( Full-time research scholar) and Dr.R.Seyezhai, ASSP/EEE presented a paper titled, “Hardware Implementation of Single - Phase T- type inverter for Photovoltaic Applications” in the International Conference on Electrical energy systems- ICEES -2020 organized by the department of EEE at SSNCE.

8. M.Sridhar ( Full-time research scholar) and Dr.R.Seyezhai, ASSP/EEE presented a paper titled, “Investigation on Single Stage Integrated SEPIC-Buck Boost Converter With Minimal Output Capacitance For LED Applications” in the International Conference on Electrical energy systems- ICEES -2020 organized by the department of EEE at SSNCE.

9. Dr.R.Seyezhai, ASSP/EEE, S.Harika ( Full-time research scholar) and Dr.A.Jawahar Prof./EEE presented a paper titled, “Investigation of Switched Capacitor Quasi Z-Source DC-DC Converter for E-Trike Battery “ in the International Conference on Automation, Signal Processing, Instrumentation and Control (iCASIC 2020), Vellore Institute of Technology Vellore, Tamilnadu.

# Paper Presentation

10. Dr. V. Thiyagarajan, ASSP/EEE has presented the paper titled " Optimal design and Techno-economic analysis of hybrid renewable energy system with flywheel energy storage" in the 6th International Conference on Electrical Energy Systems - 2020 (ICEES 2020) organized by the department of EEE, SSN College of Engineering, Chennai.

11. G. Ramya and Dr. R. Ramaprabha ASSP/EEE ,published a paper titled “Analysis of photovoltaic fed modular multilevel converter with reduced switch count under source failure condition”, Journal of Electrical Systems (JES) (ISSN: 1112-5209), Vol. 16, No. 1, pp. 65-81, March 2020. Indexed in Scopus & Web of Science (Thomson Reuters).

12. K. Shanmugha Vadivu, FT Research Scholar/EEE and Dr. R. Ramaprabha ASSP/EEE,published a paper titled “Investigation on Performance of Controllers for Three Level PFC Converter for Wide Operating Range”, International Journal on Advances in Electrical and Computer Engineering, Vol. 20, No. 1, pp. 91-98, 2020, (Print ISSN: 1582-7445, Online ISSN: 1844-7600), SJR Impact factor 0.26. (DOI: 10.4316/AECE.2020.01012), Scopus Index 0.2 Indexed in Scopus & Web of Science (Thomson Reuters).

13. T. Divya, FT-RS/EEE and Dr. R. Ramaprabha, ASSP/EEE, presented a paper titled “Comparative topological study of Embedded based Switched boost inverter”, International Conference on Emerging Current Trends in COMputing and Expert Technology (COMET 2020), pp. 37-43, March 06-07, 2020 at Panimalar Engineering College, India presented on 16.03.2020 by Divya & Ramaprabha.

14. Dr.R.Seyezhai, ASSP/EEE and R.Sasikala, Part-time Research scholar published a paper titled, “Interleaved Sepic Bridgeless AC-DC Converter for PFC Applications” in the Journal of Advanced Research in Dynamical and Control Systems – JARDCS, 2020 (Indexed in SCOPUS).

# Projects

1.The team with the student members, Saiprasanna, Sai easwari, Sakthipraneetha, santhosh and Vikram mentored by Dr.V.Rajini Participated in internal hackathon for two project statements namely smart irrigation and Active harmonic filters.

2. Ms.S.Harika, full-time research scholar under the guidance of Dr.R.Seyezhai presented her work in SSN Doctorates' day held at SSNCE.

3. Madhusudan Saranathan, R. Adhitya, Deekshitha Sriraman, Pa. Harikrishna Achuthan, D. B. Koupendra and N. Pavan Kumar Reddy (II Year) submitted a project idea titled "Solar Powered Smart Irrigation System" for Internal Smart India Hackathon 2020 under the guidance of Dr. R. Ramaprabha, ASSP/EEE on 08.01.2020.

4. M.Sridhar, full-time research scholar under the guidance of Dr.R.Seyezhai presented his work in poster session at SSN Doctorates' day, SSNCE.

5. The team with the student members, Saiprasanna, Sai easwari, Sakthipraneetha, santhosh and Vikram mentored by Dr.V.Rajini presented their wok in the internal hackathon for the project on Active harmonic filters.

6. The students, saiprasanna, vyshnav menon, shridhana, rathish , presented their work on SST based FESS system on the Innovation day.

7. K. R. Shanmuga Vadivu and T. Divya, FT Research scholars presented their research work (Poster) at SSN Doctorate's day on 23.01.2020.

8. Ms.S.Vijayalakshmi, (Full time research scholar) of Dr.R.Deepalaxmi, ASSP/EEE participated and presented her research work titled "Investigations on Effect of Gamma irradiation on Titanium dioxide filled SiR-EPDM blends" in SSN Doctorate Scholars day at SSNCE . She won Best Poster Presentation award .

9. Participated in Chatta Vishwakarma awards 2019 national convention at AICTE, Delhi with two teams of IIIrd year EEE students.

10. S. Swetha, S. Sridhar &S.Srikirthi ( III Year EEE, B) under the guidance of Dr.R.Seyezhai received the second prize in the project competition held at SVCE, Chennai.

11. AICTE MODROBS project submitted for the Renewable Energy Lab by Dr.V.Kamaraj, Dr.R.Seyezhai & Dr.D.Umarani was sanctioned by AICTE.

12. Dr V Rajini Prof/EEE Submitted a proposal to TNSCST under ' Project related grant".

13. S. Swetha, S. Sridhar &S.Srikirthi ( III Year EEE, B) under the guidance of Dr.R.Seyezhai received the second prize in the project competition held during KURUSHETRA at College of engineering, Anna University, Guindy,Chennai.

# Projects

14. Project titled, “Implementation of a solar powered electric bicycle employing a power electronic converter” under the guidance of Dr.R.Seyezhai, ASSP/EEE carried out by K.J. Vignesh B. Selvaganapathy, Vasantha Selvam & Sridhar ( IV Year EEE) got the first prize in the project display contest held on SSN innovation Day 2020.

15. Project titled, “Development of single-stage electrolytic capacitorless AC-DC LED driver” under the guidance of Dr.R.Seyezhai, ASSP/EEE carried out by S. Swetha, S. Sridhar & S. Srikirthi ( III Year EEE) got the second prize in the project display contest held on SSN innovation Day 2020.

16. Project titled, “Solar powered electric fence energizer for green farming” under the guidance of Dr.R.Seyezhai, ASSP/EEE carried out by Palagani Meghana Pelluru Manaswini R. Ramya S. Shanmughapriya ( III Year EEE) got the Third prize in the project display contest held on SSN innovation Day 2020.

17. The following student batches under the guidance of Dr. R. Ramaprabha, ASSP/EEE showcased their projects in SSN-Innovation day held on 07.02.2020 held at CDC-SSNCE.

- M. Aishwarya, N. Divyasri & S. J. Indhra Pooja, (B.E. IV EEE), “Solar Powered Trash Compactor”.
- R. Aswinkumar and G. Balaji, “Effect of super capacitors in solar PV system for rural electrification”.


# Reviews

1. Dr. R. Ramaprabha ASSP/EEE has been assigned as a reviewer for EECSI 2020 (2020 7th International Conference on Electrical Engineering, Computer Science and Informatics (EECSI) which will be held on Yogyakarta, Indonesia during 23-25 September 2020. https://edas.info/Tyn.php?tpc=1000409854.
2. Dr. R. Ramaprabha ASSP/EEE reviewed papers for 1 paper for IEEE Transactions on Energy Conversion, 1 paper for International Journal of Emerging Electric Power Systems, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects Editorial Office (T&F), 1 paper for Journal of Cleaner Production, 1 paper for IJEPES (Elsevier) – March 19, 2020.
3. Dr.V.Rajini, evaluated and submitted the thesis Report of a PHD thesis as Indian examiner to VIT university
4. Dr. R. Ramaprabha, ASSP/EEE reviewed 1 paper for IEEE access review – 22.02.2020.

# Industry Advisory Committee Meeting

Industrial Advisory Committee meeting was held on March 14 in our Department with Industrial Advisory committee members to discuss the necessary modification of Program Outcomes(PO) and Program Educational Objectives(PEO) of UG,PG programs and to get suggestions from the industry representatives for the improvement of curriculum from the perspective of emerging technologies in accordance with the industrial trends .

The following members were present along with UG, PG Programme Coordinators, Autonomous Coordinator and various Domain group coordinators of EEE Department.

Mr.K.Narayanan, General Manager, Advanced Engineering, Lucas TVS, Chennai, V. Ramakrishnan, Managing Director,TORP Systems Pvt Ltd. Chennai,Mr.Ganesh Nagarajan, Director and Country Manager of ePropelled Systems, Chennai and Dr. Ganesh Samudra, Honorary Fellow, NUS, Singapore.


EVENTS
SSN
ICEES 2020
SSN COLLEGE OF ENGINEERING
(An Autonomous Institution, Affiliated to Anna University, Chennai)
Kalavakkam - 603 110
6th INTERNATIONAL CONFERENCE ON
ELECTRICAL ENERGY SYSTEMS
ICEES - 2020
20-21 FEBRUARY 2020
Organized by
Department of Electrical and Electronics Engineering

# Events

1. Dr.V.Rajini attended the discussion meeting with M/S Dow chemicals, on industry institute partnership.
2. Dr. V. Thiyagarajan, ASSP/EEE and Dr. R. Anantharaj, Associate Professor/Chemical has organized the National Conference on Fuel Cell and Electric Vehicle Technology (FCEVT - 2020) on January 24, 2020.
3. Dr. V. Thiyagarajan, ASSP/EEE has organized the National Level Workshop on INDUSTRIAL AUTOMATION USING PLC & SCADA.
4. Dr. V. Thiyagarajan, ASSP/EEE has organized the 6th International Conference on Electrical Energy Systems - 2020 (ICEES 2020).
5. Dr. R. Ramaprabha, Dr. R. Seyezhai, Dr. M. Balaji (ASSPs/EEE) & Dr. V. Kamaraj (HoD/EEE) applied a proposal to conduct FDP under ATAL - FDP on March 04, 2020.
6. Dr. R. Ramaprabha, ASSP/EEE attended DC meeting at Dr. M. G. R. Educational and Research Institute University, Chennai on 06.03.2020 as DC member.
7. Dr.R.Seyezhai, ASSP/EEE attended the patent selection committee meeting for scrutinizing the patents.
8. Dr. M. Balaji (PI), Dr. R. Ramaprabha & Dr. V. Kamaraj (Co-PIs) submitted a proposal for Rs. 41.38 Lakhs to DST under SERB-CORE scheme on March 09, 2020.
9. Dr. V. Thiyagarajan, ASSP/EEE and Dr. R. Anantharaj, ASSP/Chemical Engineering, has jointly organized the National Level Workshop on “Molecular Simulation: From Chemical Structure to Green Separation Process”.
10. Dr.R.Seyezhai, ASSP/EEE attended the Zoom trial meeting for conducting online classes organized by Dr.C.Aravindan.
11. Dr Mrunal Deshpande, ASSP/EEE attended the Zoom trial meeting for conducting online classes organized by Dr.C.Aravindan.
12. Dr.Mrunal Deshpande, ASSP/EEE attended the Zoom meeting for conducting online classes for I Year M.E. hosted by Dr.V.Kamaraj, HOD/EEE.
13. Dr.R.Seyezhai, ASSP/EEE attended the Zoom meeting for conducting online classes for I Year M.E. hosted by Dr.V.Kamaraj, HOD/EEE.
14. Dr.R.Seyezhai, ASSP/EEE attended the Zoom meeting for finalizing the PEO, PO & Cos preparation for various courses hosted by Dr.V.Kamaraj, HOD/EEE.
15. Dr. R. Ramaprabha ASSP/EEE delivered a Keynote talk on “Building Integrated Photovoltaics – A Brief View & Technical Challenges” and acted as panel member for a session in a National Conference on Social, Economic and Technological Impact of Alternate Energy Sources.-NCSETAS2020, held on March 13, 2020 at Meenakshi Sundararajan Engineering College, Chennai
16. Dr.R.Seyezhai submitted the proposal for setting up Atal Community Innovation Centre for a grant of Rs.2.5 Crores.The proposal was scrutinized by Principal, SSNCE & Mr.B.Vaidyanathan, Consultant, SSN Incubation Centre.
17. Dr.R.Seyezhai, ASSP/EEE attended the BOS meeting at Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya, Kanchipuram for EEE Dept.

# Events

18. Published a book titled "*நாவீன சிந்தனை வடிவாக்கம்- ஓர் அறிவியல் பார்வை*" by *ச.சாலிவாகனன், சு. சுரேஷ்குமார், கு.முருகேசன்.*

    Publisher: Mc Graw Hill

    Funded by Tamilnadu State Council for science and Technology to promote the technical writing in regional language.

19. Dr.V.Rajini interacted with Dr. Ganesh Samudra, Visiting Prof , regarding the NBA activities of the department.
20. Our college Tamil club Saaral Won the Tamiz Viruthu 2020 (*தமிழ் விருது*-2020) from MIT Chromepet, Chennai. Dr K Murugesan ASSP/EEE Motivated and send students to participate in that event.
21. Dr.V.Rajini Prof/EEE have been appointed as a PEER REVIEWER for 2021 IEEE International Conference on Electrical, Information and Communication Technology (2021 IEEE ICEICT) is scheduled during 17 - 19, March 2021 at K.Ramakrishna College of Engineering, Tiruchirappalli, Tamil Nadu, India.
22. Dr M Senthil Kumaran ASSP/EEE delivered a guest lecture on Dynamics and Control in ECE Department SSNCE.
23. Dr.R.Seyezhai, ASSP/EEE attended the meeting at SSN Innovation Centre regarding the arrangements for SSN innovation day, 2020.
24. Dr.R.Seyezhai, ASSP/EEE attended the DC meeting for the scholar Ms.Sasikala at Satyabama University, Chennai.

# Honours

1. K.Murugesan, ASSP/EEE Introduced the Chief guest honorable Chief minister of Tamilnadu on graduation day held on 21-02-2020 in our college campus.
2. Dr.V.Rajini Prof/EEE Received a letter of appreciation from International Transactions on Electrical energy systems iTEES, wiley publications for reviewing two manuscripts.
3. Dr. R. Ramaprabha, ASSP/EEE has been assigned as Outreach committee member for an “International Conference on Technology, Entrepreneurship, Management, and Social science (ICRTEMS-2020)” which will be held during 03 -04 April 2020 in Saveetha School of Management, Chennai organized by Institute for Engineering Research and Publication (IFERP) – 25. 02. 2020
4. Dr. R. Ramaprabha, ASSP/EEE has been assigned as Panel Member for National Conference on 'Social, Economic and Technological Impacts of Alternate Energy Sources (NCSETAS2020)' which will be held on 13th March, 2020 conducted by Department of EEE, Meenakshi Sundararajan Engineering College, Chennai – 07.02.2020
5. Dr. R. Ramaprabha ASSP/EEE has been rewarding as an International Advisory Board Member in "ICMDRSE-2020" Conference which will be held during April 29-30,2020 at Kuala Lumpur, Malaysia https://www.icmdrse.com/international-advisory-committee.php
6. Dr. R. Ramaprabha, Asso. Prof./EEE acted as one of the Programme Chairs for 6th International Conference on Electrical Energy Systems (ICEES-2020) during Feb 19-20, 2020 at SSN College of Engineering, Kalavakkam.
7. Dr.R.Seyezhai, ASSP/EEE chaired a session in the International Conference on Electrical energy systems- ICEES -2020 organized by the Department of EEE at SSNCE.
8. Dr Mrunal Deshpande ASSP/EEE chaired a session in the International Conference on Electrical energy systems- ICEES -2020 organized by the Department of EEE at SSNCE.
9. Dr M Senthil Kumaran ASSP/EEE chaired a session in the International Conference on Electrical energy Dr. V. Thiyagarajan, ASSP/EEE has been approved as Research Supervisor by Anna University, Chennai.
10. Dr. R. Ramaprabha, ASSP/EEE acted as one of the Programme Chairs for a National Conference on Fuel Cell and Electric Vehicle Technology – 2020, Jan 24 2020 conducted by Department of EEE & Chemical Engineering – SSNCE-Jan 24 2020.
11. Dr.V.Rajini attended the discussion meeting wit M/S Dow chemicals, on industry institute partnership.
12. Tata Motors has sent two nos of curtis controller, the motor controller units . The cost of the controller is approximately 4 lakhs.
13. Two E cycles were given for BMS development to Dr.V.Rajini by M/S. Parama e mobility.

# Honours

14. Dr.V.Rajini Prof/EEE have been appointed as a PEER REVIEWER for 2021 IEEE International Conference on Electrical, Information and Communication Technology (2021 IEEE ICEICT) is scheduled during 17 - 19, March 2021 at K.Ramakrishna College of Engineering, Tiruchirappalli, Tamil Nadu, India.

15. Dr.R.Seyezhai, ASSP/EEE conducted the viva-voce examination for the part- time scholar Ms.D.Umarani and she defended her thesis.

16. Mr.G.R.Venkatakrishnan, Assistant Professor, has completed his viva - voce examination for his thesis titled " Investigations on optimization algorithms for real power dispatch incorporating renewable energy sources" under the guidance of Dr.R.Rengaraj, Associate professor.

# INTERNATIONAL CONFERENCE

## 6th International Conference on Electrical Energy Systems (ICEES 2020)

### Conference Chair

Dr. V Kamaraj,
HOD/EEE, SSNCE

### Conveners

Dr. R Leo,
Associate Professor

Dr. P Saravanan,
Associate Professor

Dr. V Thiyagarajan,
Associate Professor


Electrical energy is the foundation of all the technological growth. A major energy transition is under way, creating opportunities and developing the need to ensure sustainability, affordability, inclusiveness and security. In these lines, Department of Electrical and Electronics Engineering organized Sixth International Conference on Electrical Energy Systems (ICEES 2020)" on 20th and 21st February, 2020. This conference offered a unique platform for interaction among students, faculty, from various universities across the world and Industrial fraternity The inaugural function was presided over by Our Principal, Dr.S Salivahanan, Dr.V Kamaraj, HOD, EEE, Dr. Kenneth Okedu, Fellow, MIT USA, Dr.Natachote R from Thailand and Dr.Ganesh Samudhra, Honorary fellow NUS. Following the inauguration the keynote talk was given by Dr. Kenneth Okedu, Fellow, MIT USA, Associate Professor, National University of Science and technology, Muscat, Oman on "Wind farms - Stability analysis and Application" .

# 6th International Conference on Electrical Energy Systems (ICEES 2020)

The second keynote talk was given by Dr.Natachote R, Associate Professor from Rajamangala University of Technology Phra Nakhon (RUTPN) Thailand on the topic "Technical and Economic impact of Distributed Generated Systems". The third keynote talk was given by Mr.Ganesh Nagarajan, Director and Country Manager of ePropelled Systems on the topic Electric Motor design for Tracking Application. The theme of the conference covered the latest trends in Electrical Energy Systems with specific focus on smart grids, embedded systems, renewable energy and Electrical Vehicles.

The conference attracted 80 submissions from various institutions across India and abroad. The deliberations of the conference were very much useful for the participants. The participants had a great learning and social networking experiences for the two days. As the conveners of this conference, we heartily express deep sense of gratitude to our Management, Principal, Head of Department, Keynote Speakers, Participants, and all those who helped us to make this International Conference (ICEES2020) a grand success.

# NATIONAL CONFERENCE

## National Conference on Fuel Cell and Electric Vehicle Technology (FCEVT - 2020)

### Conference Chairs

Dr. V Kamaraj,
HOD/EEE, SSNCE

Dr. R Parthiban
HOD/Chemical, SSNCE

### Conveners

Dr. R Anantharaj,
Associate Professor/Chemical

Dr. V Thiyagarajan,
Associate Professor/EEE

### Co-Convener

Dr. K Sathish Kumar,
Associate Professor/Chemical


Department of Electrical and Electronics Engineering and Department of Chemical Engineering has jointly organized "National Conference on Fuel Cell and Electric Vehicle Technology (FCEVT-2020)", January 24, 2020. FCEVT - 2020 is the premier interdisciplinary platform to deliver the latest developments and innovative research results in Fuel Cell and Electric Vehicle Technology for all professionals, researchers and engineers. The conference will serve as a forum to discuss high level scientific issues, exchange state of the knowledge in pure and applied sciences, and initiate collaborative research among various scientific groups.

# National Conference on Fuel Cell and Electric Vehicle Technology (FCEVT - 2020)

The inaugural function was followed by keynote talk on "Fuel Cell Applications in E-Vehicle Technology" by Dr. D. Kalpana, Principal Scientist, CSIR - CECRI. The theme of the conference attracted 35 submissions from various institutions including NIT Warangal, Government College of Engineering -Tirunelveli, K.Ramakrishnan College of Engineering, Bannari Amman Institute of Technology, Agni College of Technology, PSN College of Engineering and Technology, Sri Krishna College of Technology, Vel Tech and SSN College of Engineering. As the conveners of this conference, we heartily express deep sense of gratitude to our Management, Principal, Head of Department, Keynote Speaker, Participants, and all those who helped us to organize this National Conference and made it a grand success.

# The Institution of Engineers (India)

## Inauguration of SSNCE's Student Chapter

The IEI students' chapter of Sri Sivasubramaniya Nadar College of Engineering (SSNCE) was formally inaugurated on 26th February 2020.

SSNCE was awarded students' chapter for the following six engineering disciplines: Electrical and Electronics, Electronics and Communication, Computer Science, Mechanical, Civil and Chemical Engineering. The Chief Guest of the day was Er. R. Ramadoss, Chairman IEI, Tamilnadu State Centre. The Principal of the college Dr. S. Salivahanan, presided over the function and delivered the welcome address.

The Chief Guest Er. R. Ramadoss spoke on History of The Institution of Engineers. He also enlightened the students regarding various opportunities available for career development through IEI. The Chief Guest also distributed the student's certificates of various departments to the respective Head of the Departments.

Dr. Muthu Selvan N B, Associate Professor, EEE department has organized this function.

Finally, Dr. C. Annadurai, Associate Professor, ECE department delivered the Vote of Thanks. Totally 183 students from different departments attended this inaugural function.

# WORKSHOP

## National Level Workshop on “Molecular Simulation: From Chemical Structure to Green Separation Process”

### COORDINATORS

Dr. R Anantharaj,
Associate Professor/Chemical

Dr. V Thiyagarajan,
Associate Professor/EEE

### CO-COORDINATORS

Dr. K Sathish Kumar,
Associate Professor/Chemical

Dr. D. Gnana Prakash,
Associate Professor/Chemical


**Department of Chemical Engineering and Department of Electrical and Electronics Engineering** has jointly organized National Level Workshop on "Molecular Simulation: From Chemical Structure to Green Separation Process” on March 16, 2020.

The main objective of this workshop is to introduce the participants to various molecular simulation techniques with special emphasis on current engineering problems. Molecular Simulation is an indispensable tool, not only for physicists and chemists but also for a wide spectrum of researchers working in a variety of engineering fields including chemical, energy, electrical, mechanical, environmental and its allied engineering courses. About 35 participants from various institutions including IIT Madras, AC Tech, Agni College of Technology, Paavai Engineering College, Vel Tech,

# National Level Workshop on "Molecular Simulation: From Chemical Structure to Green Separation Process"

Sathyabama University, Dhanalakshmi Srinivasan College of Engineering, Global Institute of Technology and SSN College of Engineering had participated in the workshop. During the workshop, the participants are trained with the following software:

- Molden- Visualization Software
- ChemDraw – Molecule Editor
- Gaussian Software
- COSMOthermX Software

All the technical session was very interactive and the participants gained much knowledge about the above-mentioned software. Finally, the event coordinators handed-over the participation certificates to all the participants and the event ended successfully. We thank all the participants of the workshop.

# WORKSHOP

## Simulation of Power Electronic Systems using PSIM, MATLAB & Magnet

### CONVENERS

Dr. V Kamaraj,
HOD/EEE, SSNCE

Dr. R Seyezhai,
Associate Professor

Dr. R Ramaprabha,
Associate Professor

Dr. M Balaji,
Associate Professor

Department of EEE Organized a Workshop on "Simulation of Power Electronic Systems using PSIM, MATLAB& Magnet" during March 16-17, 2020.

**Number of Participants:** 30

**Speakers:**

- **Session I:** "Introduction to POWERSIM Simulation Package by Dr. R. Seyezhai, Asso. Prof./EEE
- **Session II:** "Hands on Session in PSIM for Power Electronics & Drives" by Dr. R. Seyezhai, Asso. Prof./EEE
- **Session III:** "Hands on Session in MAGNET for Electrical Machines" by Dr. M. Balaji, Asso. Prof./EEE

# Simulation of Power Electronic Systems using PSIM, MATLAB & Magnet

- **Session IV:** “Introduction to MATLAB/SIMULINK” by Dr. R. Ramaprabha, Asso. Prof./EEE
- **Session V:** “Hands on Session in MATLAB for Power Electronics & Drives” by Dr. R. Ramaprabha, Asso. Prof./EEE
- **Session VI:** “Hands on Session in MATLAB for Power Electronics & Drives” by Dr. R. Seyezhai, Asso. Prof./EEE.
- **Session VII**: “Exercises to participants & solving the issues” by Dr. R. Seyezhai, Dr. R. Ramaprabha & Dr. M. Balaji, Asso. Profs./EEE.

# WORKSHOP

## National level workshop on Industrial Automation using PLC and SCADA

### Convener

Dr. V Kamaraj,
HOD/EEE, SSNCE

### Organizing Chairs

Dr. R Rengaraj,
Associate Professor

Dr. VS Nagarajan,
Associate Professor

Dr. V Thiyagarajan,
Associate Professor

Dr. GR Venkatakrishnan,
Assistant Professor


Department of EEE organized a National level workshop on "Industrial Automation using PLC and SCADA", during February 13 and 14, 2020. The main aim of this workshop is to make familiar with the practical knowledge of the Industrial Automation and recent technologies being utilized to accomplish modern Industrial Automation. Organizing this workshop is to impart the basics of electrical automation in the understudies and give them a stage to deal with, in the near future. The most utilized guiding force behind a computerized modern plant is a "Programmable Logic Controller" also known as a PLC. PLCs alongside certain other essential fixings like Sensors, Motors, Actuators, Valves, Conveyors, Boilers, SCADA Systems, Computers and some more, makes a genuine computerized producing plant. This workshop helps students from every engineering background to develop the basics of engineering and expand their logic. This workshop gives a brief exposure to industrial and process automation, introduction to PLC and SCADA and hands on experience on PLC. The theme of the workshop attracted around 30 participants from different colleges in Tamil Nadu.

# National level workshop on Industrial Automation using PLC and SCADA

Course contents covered during the workshop:

- Recent Trends in Industrial Automation & PLC- SCADA
- Evolution in Industrial Automation
- Different type of Industrial Control Mechanisms
- Introduction to PLCs
- Applications of PLCs
- Ladder Diagram Basics
- DATA Flow During Automation
- Motor Drives - Introduction & Their Need
- Sensors - Introduction & Their Need
- HMI - Introduction & Its Need
- SCADA – Introduction& Its Need



Student
Achievements
RedEEEm | Jan-Mar '20

# Student Achievements

## 1. Nirmal Kumar, 2nd year:

Member of N2K (College's Western Dance team). The Team had a wonderful semester and bagged titles in the following college's cultural events.

- VIT VELLORE
- CIT
- HINDUSTAN
- SAVEETHA
- MIT
- SRM (KTR)

## 2. Srivatsan G,3rd year:

- Member of the band STAVE which won First place in Band Hunt in culturals conducted by Ethiraj College for Women.

-Won 1st place in Solo Instrumental in SRM IST's culturals.

## 3. Soorya S, 2nd year:

- Member of the college band 120 db.
- The band won 2nd place in Taarang (light music event) in IITM's culturals.

-The band won 1st place in light music competition hosted by VIT.

## 4. Vignesh G, 3rd year:

Men's Badminton Team.

- Runner's Up, Parisutham Institute of technology, Thanjavur.

-Winners, Inter-Zonals at KSR College, Nammakal. (Anna University Zonals)

# Student Achievements

## 4. Kaavya Shri, 2nd year:

Women's Tennis Team.

- Runner's Up in SASTRA's sports fest Colosseum.
- Winner, SSN Trophy,
- Semi – Finals, BITS, Hyderabad,
- Semi – Finals, Manipal Institute of Technology.

## 5. Keerthi Chidamparanathan, 2nd year:

Men's Tennis Team.

- Winner, SASTRA's colosseum,
- Winner, SA trophy,
- Winner, VIT Vellore,
- Runner's Up, Manipal Institute of Technology.

## 6. KK Karthick, 3rd year:

Men's Tennis Team.

- Winner, VIT Vellore,
- Runner's Up, Manipal Institute of technology.

## 7. Satish Kumar C, 2nd year:

Men's Badminton Team.

- Winners, Inter-Zonals at KSR College, Nammakal. (Anna University Zonals).
- Runner's Up, Parisutham Institute of technology, Thanjavur.

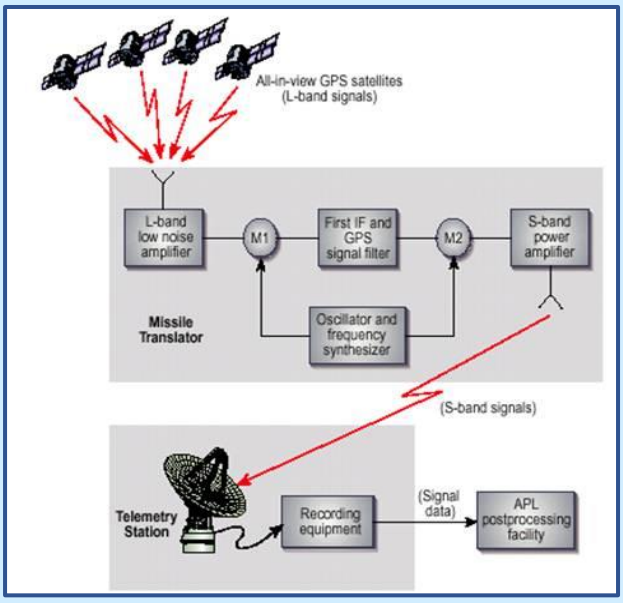
# Student Articles

# SATRACK - The technology behind ballistic missiles

- Krithika R, 2nd year

## What is SATRACK?

SATRACK is the Satellite tracking system which uses GPS for sending the signals to the missile launched in the space. It tracks the path of an object towards a given point. This point may be moving. If the target is moving relative to the guided object then the process of guidance is dependent upon the position and velocity of the moving target. The present day ballistic missiles are all guided using GPS. GPS uses satellites as instruments for sending signals to the missile and to guide it to the target.




## Why is it used?

SATRACK has been a significant contributor to the development and operational success of present day ballistic missiles. It is basically used to provide a unique monitoring function for evaluating the error model of any weapon system. SATRACK basically validates and monitors the missile guidance error model in the flight test program. The reason behind using the SATRACK for evaluating and validating the error model is its ability to receive record, rebroadcast and track the satellite signal. It identifies the major error contributors that are responsible to miss the track of the missile from its predetermined path.

## How does it work?

The signals for the GPS satellite navigation are two L-band frequency signals (L1 AND L2).L1 is at 1575.42 MHz and L2 at 1227.60 MHz . The modulations used for these GPS signals are:

1. Narrow band clear/acquisition code with 2MHz bandwidth.

2. Wide band encrypted P code with 20MHz bandwidth.

o L1 is modulated using the narrow band C/A code only. This signal will give an
accuracy of close to a 100m only.
o L2 is modulated using the P code. This code gives a higher accuracy close to 10m that is why they are encrypted.

The parameters that a GPS signal carries are latitude, longitude, altitude and time. Tracking of the dual frequency GPS signals provides a way to correct measurements
from the effect of refraction through the ionosphere. An alternate frequency L3 at 1381.05MHz was also used to compensate for the Ionospheric effects.

The missile receives the signals from the GPS satellites. They are translated to another frequency and relayed to the ground telemetry stations. The telemetry stations
records the data for playback and for post processing.

The satellite signals received at the missile are translated to S-band frequencies for the telemetry station using the missile hardware called translators. The ground based
telemetry station records the data after reception through the antenna after digitising the signals. Some ground sites use L1 C/A signals to provide real time tracking solutions.

## GPS TRANSLATOR

This flight hardware is fixed in the missile. The translator receives the GPS signals and they are amplified, shifted to an intermediate frequency, filtered to cover the satellite
signal modulation bandwidth, shifted to an output frequency. Then they are amplified for transmission to one or more ground stations.

The evolution of the SATRACK is as follows:
SATRACK 1- A technology project to develop the processing system using Trident 1 missile
(1973-1983).

SATRACK 2- The operational system designed to meet system requirements of Trident 2
missile (1983-present).

SATRACK 3- Current system upgrade and future applications.

## APPLICATIONS:

o The best flight path for the aircrafts during post flight processing.
o Vehicle tracking
o The spot Satellite GPS Messenger

This helps to identify the major error contributors responsible for the misalignment of
the missile paths. The development of SATRACK looks forward to the implementation of the Low Cost Missile Test Kit. This technology also developed sophisticated tools for optimal target perception and the use of expensive flight tests assets was also born out of the SATRACK research.

# MOORE'S LAW: Achievements and Its Impending end

- Madhusudhan S, 2nd year

Moore' law is named after Intel co-founder Gordon Moore, who observed that transistors were shrinking so fast that every year, twice as many could fit onto a chip, and later adjusted the pace to doubling every two years. The continual stuffing of more silicon transistors onto chips has been the feedstock of vibrant innovation in computing.

Practically every facet of a high-tech society benefits from Moore's Law in action. Mobile devices such as smart phones and tabs wouldn't work without tiny microprocessors; neither would weather forecasting and gps. As the number of transistors in the microchip doubles every two years, the cost of computers has observed to be halved.

# Student Article

Father of semiconductors, Chenming Hu, has succeeded in fabricating transistors with size as low as 25nm. He named them finfets and worked hard to fabricate them so that he could keep Moore's law going. Even though finfets had their dormant years initially, later it gained back its momentum when the semiconductor industries moved to sub-25-nm geometries. FinFet technology has swept the industry and Moore's law did not come to an end at 25nm. Later in 2012, Intel, with its 22nm processor, fabricated the world's smallest and most advanced transistors in a mass produced product.

Only because of the computational advances described by Moore's law, a list of technologies, almost without an exception, were possible.

## IMPENDING END TO MOORE'S

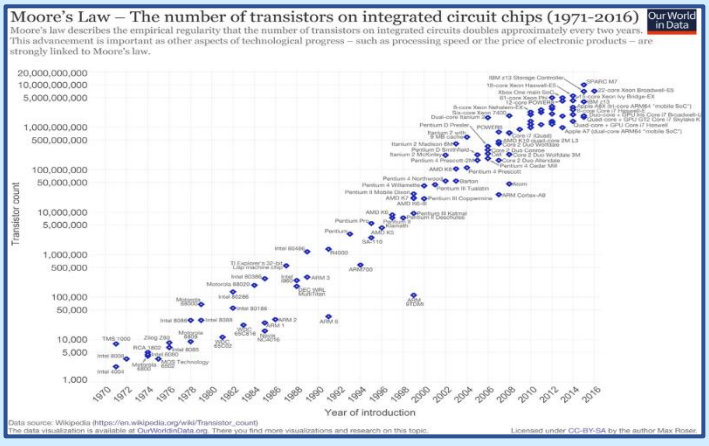
Many researchers state that Moore's law eventually will end because of some future technological or scientific barrier.

Moore himself admitted that his law "can't continue forever.

It is the nature of exponential functions," he said, "they eventually hit a wall." later in 2015. Whether there is an ultimate limit to Moore's law is an open question dependent upon future electronic innovation and physics. A persuasive argument from quantum mechanics is that Heisenberg uncertainty defines the eventual limit to the miniaturization we can achieve in physics and engineering.

Also, the high temperatures of transistors eventually would make it impossible to create smaller circuits. This is because cooling down the transistors takes more energy than the amount of energy that already passes through the transistors.

Moore's Law might be coming to an end, but its legacy will keep us moving forward for a long time to come.



# What does it mean to be an Electrical & Electronic Engineer?

- Vishalini, 2nd year

EE Engineers focus on the analysis, design, development and manufacture of electrical equipment, electronic devices, Mechatronics technologies, and automation and control systems

- Electrical Engineers deal with power generation and transmission systems.
- EEE engineers, design circuits for electrically operated vehicles, computers, digital devices, electronic memory storage devices, industrial robots and CNC machines.
- EEE Engineers setup & operate the telecommunication, wireless and internet networks.

### Duties of Electrical and Electronics Engineers

Electrical and Electronics engineers typically do the following:

- Design new ways to use electrical power to develop or improve products.
- Perform detailed calculations to develop manufacturing, construction, and installation standards and specifications.
- Investigate complaints from customers or the public, evaluate problems, and recommend solutions.
- Work with project managers on production efforts to ensure that projects are completed satisfactorily, on time, and within budget.
- Analyze customer needs and determine the requirements, capacity, and cost for developing an electrical system plan.
- Develop maintenance and testing procedures for electronic components and equipment.
- Evaluate systems and recommend design modifications or equipment repair.

## Engineering Major Career Paths

- Electrical Engineer Internship- >Electrical Engineer- > Senior Electrical Engineer - > Principal Electrical Engineer
- Hardware Engineer - >Design Engineer- > Electrical Design Engineer- > Senior Electrical Design Engineer
- Avionics Technician- > Electronics Technician - >Electronics Engineer - >Senior Electronic Engineer
- Software Engineering Internship - >Software Engineer- > Test Engineer - >Test & Development Engineer

- Electrical Technician - >Controls Engineer- > Electrical Design Engineer - >Staff Electrical Engineer
- Technical Support Engineer- > Engineer- > Senior Electrical Engineer - >Manager Of Electrical Engineering
- Electrical Engineer Internship- > Electrical Design Engineer- > Senior Electrical Engineer - >Electrical Engineering Project Manager
- Hardware Engineer - >Senior Hardware Engineer
- Test Technician- > Test Engineer Electrical Engineer - >Electrical Project Engineer
- Hardware Engineering Internship- > Hardware Design Engineer- > Asic Design Engineer - >Verification Engineer
- Software Development Engineer- > Software Engineer- > Application Engineer- > Field Applications Engineer
- Technical Support Engineer- > Engineer Senior- > Design Engineer - >Staff Design Engineer
- Electrical Technician- > Instrument Technician Instrumentation- > Engineer Instrumentation & Control Engineer
- Avionics Technician- > Electronics Technician- > Electrical Engineer - >Electrical Engineer Lead
- Repair Technician - >Technician Test Technician - >Technical Testing Engineer
- Repair Technician- > Field Service Technician- > Controls Engineer - >Systems Integrator
- Maintenance Electrician- > Maintenance Technician - >Electronics Technician - >Senior Electronics Technician
- NET Developer - >Senior .NET Developer
- NET Developer- > Software Developer- > Senior Software Engineer - >Lead Technician

## Job Outlook for Electrical and Electronics Engineers

Overall employment of electrical and electronics engineers is projected to grow 2 percent over the next ten years, slower than the average for all occupations. Employment growth is expected to be tempered by slow growth or decline in most manufacturing industries and in telecommunications.

Job growth for electrical and electronics engineers is projected to occur largely in professional, scientific, and technical services firms, as more companies are expected to tap the expertise of engineers for projects involving electronic devices and systems. These engineers also will remain in demand to develop sophisticated consumer electronics.

The rapid pace of technological innovation will likely drive demand for electrical and electronics engineers in research and development, an area in which engineering expertise will be needed to design distribution systems related to new technologies. These engineers will play key roles in new developments with solar arrays, semiconductors, and communications technologies. The need to upgrade the nation's power grids will also create demand for electrical engineering services. Additionally, these engineers may play a role in assisting with the automation of various production processes.

# Are Hydrogen Cars More Sustainable?

- Tharun R Prakash, 2nd year

The struggle is genuine with climate change and as the world grapples to eliminate fossil fuels to reduce carbon emissions, electric cars have seen an enormous boom over the past few years. Last year over 2.2 million plug-in cars were sold around the globe. Tesla proved to be a massive game-changer in the automotive industry. Though they are several brands from Nissan Leaf to Tesla, the choices are limited when we consider what's powering them. It's either Fuel Cells or Batteries. They are pretty much similar. Both produce electricity to drive the motors, eliminating carbon emissions and inefficiencies of internal combustion engines on the whole. One stores energy in a battery and stores fuel which reacts to produce energy and the fuel here being Hydrogen.

Both hydrogen and Electricity can be produced from low to zero-carbon sources which also includes renewable energy like solar and wind and therefore both are being pursued as the possible future of Electric Vehicles. But the debate that is being waged here is about the superiority of these two technologies. Elon Musk, CEO of Tesla has called the hydrogen fuel cell technology as 'Mind-bogglingly stupid' claiming it to be a plot for marketing. On contrast, Japan has announced its intention to become the world's first hydrogen society by 2022 allying with 11 Japanese firms. So, which is better? Hydrogen seems like a clever solution at first glance. So, Let's bring in some numbers, shall we?

**The Comparison:**

Compressed Hydrogen has a specific energy of nearly 142 MJ/kg (~ 40 KWh/kg) whereas Lithium-Ion batteries at best have a specific energy of just 0.875 MJ/Kg (~ 265 Wh/Kg) but most fall around 0.6 MJ/Kg (~165 Wh/Kg). That's more than 200 times as much energy per kg for hydrogen. This overcomes a gigantic roadblock in the automotive industry. Due to their lightweight and specific energy, the fuel cells

can power cars for extended ranges without adding much weight. This cannot be achieved with batteries without several difficulties.

The Average range of Tesla Model S is around 400 km and each kilogram of battery weight to increase range requires extra structural weight, heavier brakes, higher torque motor and in turn more batteries to carry around this extra stuff. This is just an infinite loophole.

This weight compounding is not an issue for hydrogen fuel cell vehicles. Also, the time taken to recharge a hydrogen fuel cell vehicle is very less when compared to the three-hour-long charging time of a Tesla Model S.

This clearly shows Hydrogen as a winner, but it starts to fall behind when we start considering the end-to-end production.

**The Cost:**

While Fuel Cells and Batteries are both forms of electric storage, the cost differs drastically. The total cost to fully charge a battery-powered electric vehicle (Tesla Model S in this case) is around $10 (~ 750 rupees) and has a range of 500 km whereas for the same range it costs a whopping $80 (~ 6000 rupees) to fuel a hydrogen-powered car (Toyota Mirai in this case). Here lies the problem. Hydrogen simply requires more energy to produce.

To understand the economic viability, hydrogen is not a readily available source. Though Hydrogen is the most abundant element in the universe, it's usually stored in water, hydrocarbons and other organic matter. One of the issues of storing Hydrogen as an energy storing mechanism comes from being able to ‘efficiently’ extract hydrogen from these compounds.

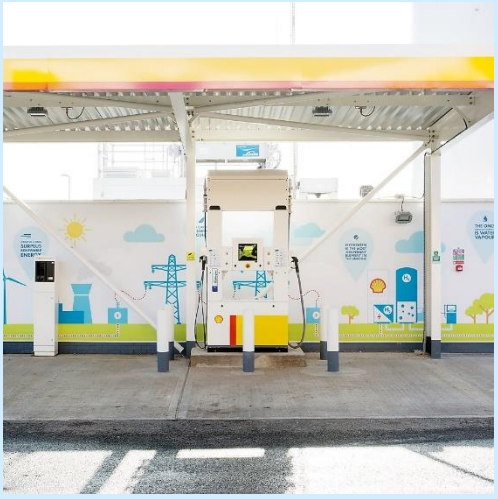
**The Procedures and The Hurdles:**

Despite the benefits mentioned above, most hydrogen today is produced by the process of methane reforming (Steam Reforming), the process of combining high-

temperature steam with natural gas to extract hydrogen. This tears apart all the potential of hydrogen-powered vehicles as a solution to fight climate change because of the carbon monoxide and dioxide that are generated in the process (The very first sentence in this article).

Another possible method to extract hydrogen is via Electrolysis – Separating hydrogen from water by using electric current. Though the current input 'can' be provided by renewable sources, this process requires more energy input than the Steam Reforming process. This process, though it sounds more Eco-Friendly, ends up losing around 30% of the energy from the total energy input. So now we're sitting at 70% efficiency for fuel cell vehicles before even the car starts its engine. We're not done yet.

Another possible method is Polymer Membrane Exchange Electrolysis at 80% efficiency with the added benefit of being produced on-site. Experts claim that the efficiency of PEM is expected to reach around 86% before 2030, which is still well short of battery charging efficiency at 99%.



The Hydrogen Refuelling Stations in Cobham and Beaconsfield, UK by Shell produces hydrogen on-site using Electricity from renewable resources.

But this 19% difference in efficiency doesn't explain the differences in cost yet. The major hurdle that hydrogen fuel cell vehicles face is transport and storage of pure hydrogen. Even if we assume that Hydrogen is being produced on-site (Though it's not for most of the hydrogen fuelling stations around the world), then we can eliminate one energy sink. But the cost of storage is just as problematic. Hydrogen has an extremely low density, and so to achieve adequate energy density, we have to increase its actual energy density and this can be achieved either by pressurization

or liquefaction. But hydrogen's physical properties means that hydrogen is harder to liquefy than any other gas except Helium (Also results in 40% loss). So, we're lucked out with pressurization as a viable option with 13% energy loss.

Where the hydrogen is being produced can have a huge impact on the costs and the delivery. For example, a large centrally located hydrogen production facility can produce hydrogen at a lower cost because it produces more but it then, costs more to deliver the hydrogen because the point of use in further away and vice versa for on-site production.

Let's take this a step further. Even if we can manage these issues, the next stage of powering electric vehicles is what is called a Tank to Wheel Conversion Efficiency.

For Hydrogen fuel cell vehicles, once the fuel is in, it must be reconverted into electrical power which is done by a fuel cell, which essentially works like a PEM electrolysis but in reverse. If the fuel cell is powered with pure hydrogen, it has the potential to be up to 60%

efficiency. This is without considering the Inverter and motor losses. All of these factors combined, lead to a total efficiency of less than 45%. Even with the best-case scenario.

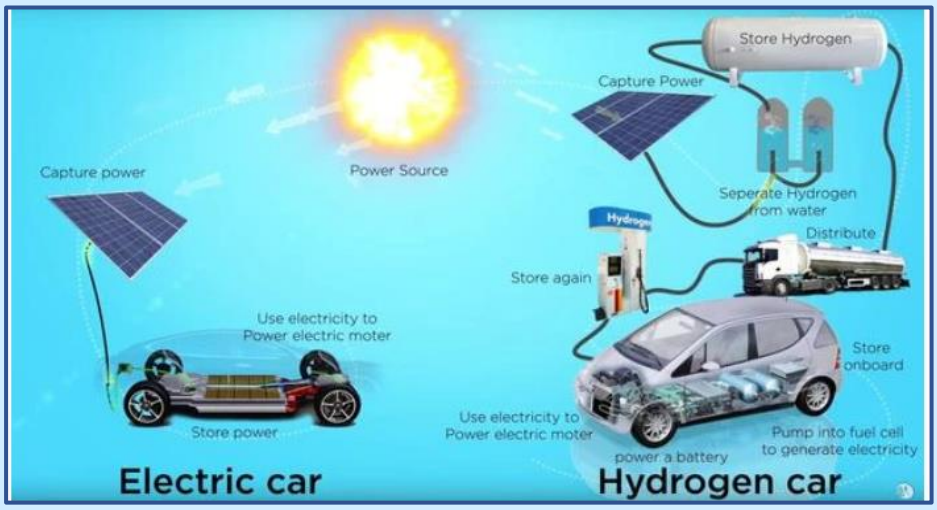
Even the battery-powered cars come with their inefficiencies and energy losses. The Gird provides AC which is stored as DC in the batteries. So, a charger is required for this AC-DC conversion. Taking the Tesla Model S as an example, its peak charger efficiency is at 92%. Considering the energy loses due to leakage from the Lithium-Ion Batteries and the Inverter Losses, the total efficiency is about 75 – 80%.

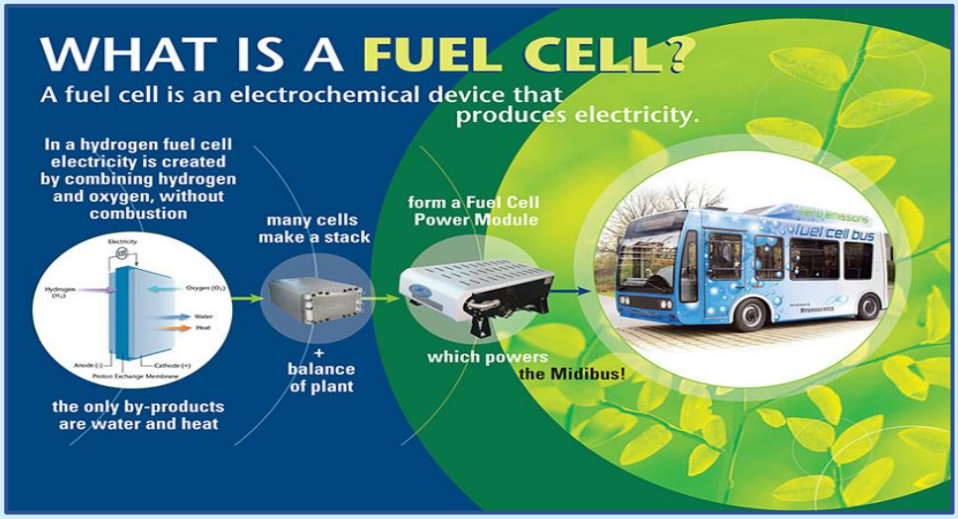
So, while we may be able to go further on one fill-up of Hydrogen in a fuel cell vehicle over a battery-powered Electric Vehicles, the cost to pull that off would be astronomically higher due to these energy losses and inefficiencies.

# Student Article

**The Conclusion:**
So, which wins? Both are equally green than the internal combustion engines, assuming equal renewable resources are used to power them. A very big advantage for fuel cells is the foster charging time and extended range but the battery-powered vehicles might catch up in range by the time there are enough fuel stations to make fuel cell vehicles viable.

For now, are hydrogen cars more sustainable? No. Battery-powered electric vehicles seem to be the sensible choice for going forward in the quest for pollution-free consumer transport with self-driving cars becoming the norm. Tesla has the high ground. For now.



# A REMENISCENCE

**BY SWETHAA S (2012-16)**

My four years in SSN were undoubtedly one of the most memorable and cherished periods of my life. I joined the Bachelor's in Electrical and Electronics Engineering program in 2012. The focus of college life was holistically designed. It was not just about receiving the right academic knowledge, but about providing a platform for students to transform and prepare oneself for life.

The teachers played a significant role in ensuring our all-around development. They were our friend, philosopher and guide. They established a good inter-personal relationship in order to engage with us to the fullest. They helped identify our hidden potentials and encouraged us to strive for higher things. With each semester, we encountered different challenges, accomplished new things and become a better version of ourselves. It was our teachers who stood by us during all these times.

College was the right blend of academics and extra-curricular activities. The annual technical fest, Eupraxia and the cultural fest, Instincts provided complete liberty to students to pool together their innovative ideas, design a competitive contest and attract the participation of the best minds from across the country. Organizing an event successfully was a momentous task that put to test a wide range of life skills from planning, budgeting, decision making, crisis management to execution. Thus, learning in college went much beyond the knowledge gained within the four walls of the classrooms.

Like most other college students, I was unsure of my career goals and was juggling between a number of options. But I happened to find an answer

# Alumni Article

to this question in the course of my research experience. With the guidance of faculties, I explored an inter-disciplinary field in the area of power system generation and machine learning. We were successful in publishing our work in a peer reviewed journal. This experience played a key role in strengthening my academic accomplishments and securing admits in my dream colleges.

SSN gave me the opportunity to meet people from diverse socio-cultural backgrounds. Apart from helping me widen my social circle, I was also lucky to make many friendships of a life time. I still fondly recall the many inspiring and thought-provoking conversations that we had while sharing our life stories, our experiences in overcoming different struggles and our aspirations for the future. I believe it were these conversations that help me see the world from a bigger perspective. Also, SSN's well renowned alumni network, spread across diverse fields has been a strong pillar of support. Their words of wisdom and their willingness to lend a helping hand has made them our first go to point while making important career decisions. Thus, the institution continues to be a family for most of us.

Looking back in time, I remember myself as a timid and shy person when I first stepped into SSN in 2012. But, when I left the institution in 2016, I realized that the rich experiences of four years had transformed me into a confident and independent woman, eager and ready to take on the challenges in the world. Today, as a I look forward to start my Master's program in Computer Engineering in Texas A and M. I whole heartedly thank the Institution, its eminent faculties and alumni for making me who I am today.

# EDITORIAL TEAM

## CHIEF EDITOR

Dr. R Leo

## STAFF EDITORIAL TEAM

Dr. M Pandikumar
Dr. K Murugesan
Dr. Mrunal Deshpande

## STUDENT CHIEF EDITOR

S Deekshitha

## SECOND YEAR

Harini
Sudhiksha
Tharun Prakash

## THIRD YEAR

R Niraimathi
Harish Anand
Raksshitha
Vivian Martin

## FOURTH YEAR

Dinesh
Harshini
Rithika
Vignesh

Design : Ramya R