

STUDENT CHAPTER REPORT

DATE - 26/4/2016

STUDENT CHAPTER : DJSCOE I.E.E.E. BRAINWAVES

IEEE BRANCH CODE : 60401

DEPARTMENT : ELECTRONICS, ELECTRONICS AND TELECOMMUNICATION

TENURE : 2015-2016

OVERVIEW:

INSTITUTE OF ELECTRONICS AND ELECTRICAL ENGINEERS (I.E.E.E) is the most significant institution in the field of technology. It provides a platform to professionals and students in the field of electronics and electrical engineering to improve their knowledge base as well as showcase their talent.

DJSCOE IEEE BRAINWAVES, aims at **raising the technological aptitude of students** at DJSCOE. The organizing committee has been working with dedication toward achieving this goal. “ A Student friendly student chapter “ is what we could call ourselves.

During the tenure of 2015-2016, the organizing committee has structured Events considering the benefits of the IEEE members as well as students of DJSCOE as the main priority. Conducting and organizing events has been the main focus. Structuring of the Events is done in four major categories as follows:

-INTERACTIONS: Short meetings which were of an informal nature, discussing various topics of students interest, obtain feedback and solve any disputes that may arise.

-SEMINARS: Imparting knowledge about a particular technology, the organizing committee has ensured that such an event is purely related to domains of technology.

-EXTENSIVE COURSES: Hands on workshop with more than 5 sessions. This is devised with the motive of inducing in the participants, a practical edge and adds value to a student's profile.

-WEEKEND CLUBS : A FRESH , NEW concept at DJSCOE and also an **highlight of IEEE BRAINWAVES**. A Senior-junior mentorship program to help make projects. The Components required for the project were provided to the students by IEEE BRAINWAVES. This structure is

devised after persistent brainstorming so as to maximize the learning experience without burdening the students.

ORGANIZATIONAL STRUCTURE:

IEEE COORDINATOR: Prasad Joshi (HOD ELECTRONICS)

FACULTY INCHARGE: Prof. Mayur Parulekar

STUDENT COMMITTEE CHAIRPERSON : JAIDEV DALVI

STUDENT COMMITTEE CO-CHAIRPERSON : SAUMIL SHAH

VICE CHAIRPERSON : RASHMI DAYANAND

SECRETARY : STUTI PATEL , DISHA KULKARNI

JOINT SECRETARY : KHUSBOO KORANI

TREASURER : ISHITA CHOUDHARY , SAYA MOGRA

JOINT TREASURER : CHARVI JAIN

TECHNICAL HEAD : RAHUL DESAI , KEWAL SHAH , MONISH KAPADIA , SANIKA WADEKAR

EVENTS HEAD : SAURABH LABDE , AKANSHA WARRIER , RIYA SHAH , SAMEER KADAM

EDITORIAL HEAD : SHREYA MAHAJAN , SANIKA SABNIS

MARKETING HEAD : YASH SHINDE , MANAV TRIVEDI , SHRADDHA SUTAR , SIDDHESH JAGTAP

There are some aspects which have been improvised by the organization committee. The structuring of events is one of the major factors. The aim of making Brainwaves as the most student friendly student chapter is a concept introduced by the above committee. Quality, not quantity has been the basis and inspiration for delivering the best events.

Proceedings during the tenure:

-IEEE Brainwaves, a committee affiliated with the international IEEE community, had its spectacular start with the seminar by the renowned **Professor Khanjan Mehta**, Founding Director of Humanitarian Engineering and Social Entrepreneurship(HESE) Program at **Penn State University, USA** and also a proud alumni of DJ Sanghvi College.

On 9th January, Professor Khanjan Mehta visited the college to share his experiences of his life as a DJ student to going abroad and reaching heights of achievements and also with an aim of instilling similar ideas in the minds of aspiring students of DJ Sanghvi.

Having met Principal Dr. Hari Vasudevan and taking a short tour of our college reminiscing his days in DJ along with his old friends, we finally started with our first event with him.

IEEE Brainwaves' Chairperson Jaidev Dalvi started with introductory speech after which Principal Sir also shared a small talk with everyone. With introductions over, Prof Mehta took over to begin his talk about entrepreneurship in abroad. As the presentation started, a smile appeared on everyone's face seeing some of the treasured photos of Prof. Mehta's old times. Prof Mehta then went on to tell the students about his own story.

Professor Khanjan Mehta shared his experiences on graduating from DJ Sanghvi College of Engineering. Being an Electronics engineer he talked about the future scope and pros and cons of completing his Masters from the Pennsylvania State University. He narrated his story of living his life in the USA. He has his own family now however he gives more importance to his work than his 2 year old daughter.

Later on he discussed more about Social Entrepreneurship and Humanitarian Engineering. He threw light upon the fact that Social Entrepreneurship is a profitable business and not just voluntary social work. Providing affordable products to the needy which help in improving their standard of living is one of the major objective of Social entrepreneurship. Conducting surveys and interacting with the poor tribes makes us more acquainted with their day to day needs.

'Make a Difference' is such a powerful saying however our professor is living a life making difference in the lives of others. He and his students together work on projects benefitting the society. Innovating and inventing is a necessary tool in the process. However the professor acknowledges that he is nothing without his team and he is extremely lucky to have such a hardworking team.

He gave us an introduction on his book which recently got published 'Solving Problems That Matter'. The book in detail revolves around his career and overcoming little obstacles in life to achieve something big.

Last part of the session included a small question and answer round where all students openly cleared their apprehensions about studying in the USA, how to go about building your profile, to be able to think out of the box etc. All the questions were addressed with great detail. The students got great advice as well as guidance from our professor. Khanjan Mehta's simple and enthusiastic attitude went down well with the crowd. Audience were able to connect to him as he belonged to the same background. He shared his email id with everyone in case anyone wished to contact him regarding any queries. This is how our session ended. We presented a certificated of appreciation to Professor Khanjan Mehta and thanked him for sharing his life journey with us.

Lastly our Chairperson, Jaidev Dalvi, gave a vote of thanks to all those who were present there and our vice chairperson took over the dias giving a short speech on the benefits of IEEE, the no. of activities to be conducted in the current semester as well as why should become an active IEEE Member as it will help students' portfolio as well. This marked the end of the seminar.

-Imaginarium IV (India's largest Rapid Prototyping and Rapid Manufacturing Centre)

They provide prototypes to an assortment of industries from jewellery, engineering, automotive, architecture, consumer goods, etc. With a friendly environment to work in Imaginarium has its unique office on the 7th floor of 'The Great Oasis' ,MIDC. Imaginarium provides 3D printing solutions to many industries providing a diverse range of products and services .Thus the company highlights all the advantages of opting for 3D printed products spanning in all the domains.

Imaginarium has a vibrant office including a projection room to showcase documentaries and make people aware with what they do. This place is also the place where many discussions and meetings take place. They have a very helpful and interactive staff .They entertained us all throughout the tour and showed us each and every nook and corner of their office.

We started our tour from the projection room. After getting a brief insight into the company's background we all proceeded towards the various sections taking a look at how different departments function .Their hard work and dedication took us by surprise.

Imaginarium has a very large socialising chamber which contains a large pool table along with a table tennis area which provides recreation and bonds employees over their short breaks during work. There are different departments working in sync to make a final product and to be able to deliver it across the country. We had a look at all the departments and their work finally we moved to the manufacturing unit which uses 3D printers to produce stuff

There are many ways for manufacturing 3D printed products. Some of the mechanisms used at Imaginarium include:

1. SLA - Stereolithography (SLA) is often considered the pioneer of the Rapid Prototyping industry with the first commercial system introduced in 1988 by 3D Systems. The SLA system consists of a Ultra-Violet Laser, a vat of photo-curable liquid resin, and a control system.

As a free form fabrication technology it builds one layer at a time by tracing a beam of UV laser on the surface of photo-curable liquid resin. Each layer is scanned corresponding to the 3D CAD solid model. The platform moves downward such that the surface of the platform is a layer-thickness below the surface of the resin. With each subsequent layer a fresh layer of photopolymer resin flows across the part for the next scan sequence. This process continues until the model is complete. Once the part is complete, it is removed to a photo curing oven where it is exposed to UV light to complete the curing process

2. SLS-Laser Sintering is the second most commonly used process after Stereolithography. Whilst accuracy and surface finish are not as good, the real benefit is the functionality that can be achieved. Working with nylon (or a filled nylon), parts demonstrate a very high level of toughness. This functionality is also behind the success that Laser Sintering has achieved in Rapid Manufacturing. The SLS system consists of a CO2 Laser, a part chamber, and a control system.

SLS rapid prototyping process uses the heat of a CO2 laser to "sinter" or melt powdered thermoplastic materials in subsequent layers. The laser is guided across the part bed by a

scanning system and "selectively" sinters the material based on cross-sectional slice information of the 3D CAD data. The platform then descends a layer thickness and the levelling roller pushes material from the powder cartridge across the build platform, where the next cross section is sintered to the previous. This continues until the part is completed. Once the model is complete, it is removed from the part chamber and finished by removing any loose material and smoothing the visible surfaces. The SLS prototypes do not require ant post curing.

3. 3D Printing Setup at Imaginarium

Machines for 3D Printing System

- 3 InvisionHR 3D Printers from 3D Systems, USA
- 2 ProJet 3D Printer from 3D Systems, USA

Materials for 3D Printing System

- SR200

4. Vacuum Casting - Imaginarium is one of the few fully-integrated product development services specialists that offer highly-sophisticated expertise in urethane castings. For injection moulded quality finish and performance without the cost and delays of injection moulding tools, vacuum-casting is the ideal process. It is used extensively for functional prototypes for marketing and consumer trials or as production parts for lower volume.

The urethane casting process frequently begins with a SLA master pattern. If the urethane parts are to be polished or cast in clear resin then the surface will be polished to a gloss finish in preparation to making the SRM (silicone rubber mould).

Next we begin creating the SRM. The silicone rubber uses a room temperature vulcanization process typically referred to as RTV. SLA master carefully scrutinized by one of our technicians to determine the best moulding setup to achieve the highest quality urethane casting reproduction. This SLA master is set-up on a parting block to make a two (or many) part. Silicone is poured around the SLA master pattern to create the mould. After the silicone is fully cured (approximately one day), the master pattern is removed, and the mould is reassembled, whereupon the urethane material is poured into the SRM to create the cast urethane part.

After dealing with all the technicalities of the process we had a quick glance at how the products are actually manufactured, all the machines working to deliver perfect models of the designed features. We then moved onto a gallery showcasing all the artifacts and 3D printed models. The finesse and quality of the products was above the mark. None of us could believe that turning your thoughts into reality was actually possible now with this new technology. All in all the trip was a huge success as all of us got acquainted with this new technology. We had a hearty conversation with the employees at Imaginarium. It opened all our bars of imagination and directed us along a path to innovate, discover and recreate. Thanks to IEEE who provided us with this opportunity.

- Educational seminar by **KIC Education**

An educational seminar was held by KIC education was organized for the IEEE members on 3rd February, 2016. KIC education, a well-known institute is known for their coaching of SAT, GRE and GMAT for aspiring students. Having more than 15 years of expertise, KIC is known for their personalized study plan based on the student's strength and weaknesses and their outstanding results.

- In the seminar, members got to know about various career choices available in the future in their respective area of interest and also about various things that are often overlooked while applying for further studies.
- Information about how and when to prepare was also given in the seminar in a lucid way with the help of a digital presentation.
- Members came to know about the 'Dos' and 'Don'ts' while applying for colleges and also about overall profile building.
- Members also got to know about the scholarships available and what prerequisites were required to get the same.

By the end of the seminar, all the members were open to Q and A session which cleared many doubts.

- IEEE had organized a Talk by Rushabh Doshi, who is a D J Sanghvi alumni from the 2008 batch and has done his masters from Imperial College, London and has 3 start-ups of his own and also won the 'most voted project' for his project 'controlling a SCARA robot using virtual open source teach pendant using LabVIEW' at the national instruments student design competition 2012-USA, for the members. This session was about the internship opportunities available for the members and about the projects that he had done and was conducted on 10th February, 2016.

- In this session, members got to know about the various internship opportunities available for members of various departments.
- Members also got to know about the future career options after their degree and about Rushabh's projects and the experience he had while he was pursuing his engineering.
- Members were also offered internships in his own start-ups.

By the end of this session, all the members got to interact with Mr. Rushabh and ask queries and also came to know about the career opportunities after the engineering degree.

-PARALLEL COMPUTING WORKSHOP

A workshop on parallel computing with GPU was organized by a team from Indian Institute of Technology Bombay (IITB). IITB was awarded the NVIDIA GPU CENTRE (GCOE) in the year 2013. GCOE plays a major role in promoting and supporting GPU computing by supporting HPC infrastructure development, student internships and research publications. The workshop aimed at introducing some of the key tools for parallel scientific computing and embedded computing. The workshop was included with lecture cum demo sessions and hands-on session.

The workshop was divided into three sessions:

1. Parallel computing with MATLAB
2. GPU computing with CUDA
3. Embedded Super Computing with Jetson TK1 board

SESSIONS:

The team from IITB were welcomed to DJSCE by our respected Principle Dr. Hari Vasudevan, Mr. Prasad Joshi (HOD Electronics), Mr. Mayur Parulekar, and IEEE committee with a token of appreciation. Prof. S. V. Natraj interacted with the attendees of the seminar and gave them a brief idea on parallel computing.

GPU computing with CUDA:

This part focused on enabling users to write CUDA codes, which was followed by an introduction to OpenACC – a standard for parallelizing existing serial code. Then the participants were introduced to the concept of GPU using single-block and multi-block vector additions. The session further continued with examples of shared memory, device query and error handling demos and hands-on.

Parallel computing with MATLAB:

This session aimed on reducing the computing time taken by MATLAB. The concept of vectorization, parallel MATLAB computing on multiple CPU cores, and parallel MATLAB computing on GPUs were explained in detail. The participants were taught how to parallelize loops, distribute large arrays over multiple CPUs, and speed up the matrix computations on both CPUs and GPUs. The concept was demonstrated through hands-on sessions.

Embedded Super Computing with Jetson TK1 board:

This part covered features and applications of embedded supercomputing with NVIDIA's high end Embedded platform Jetson TK-1. Jetson TK-1 gives high-performance with low-energy consumption for deep learning and computer vision applications. The participants were

introduced to hardware and software development on the Jetson TK-1 platform, enabling them to explore platform in their research work.

- IV to Daimler AG-Mercedes-Benz India Pvt. Ltd.

An Industrial visit to the Mercedes-Benz India Pvt. Ltd. plant located in Pune, MIDC Chakan was organised for the IEEE members on 18th February, 2016. Established in 1994, Mercedes-Benz India Pvt. Ltd. pioneered the luxury car market in India and boasts of more than 128 years of cutting edge innovation in the luxury automobile industry globally. With a world class production facility spread over 100 acres in Chakan, near Pune, set up in 2009 and an independent assembly facility for passenger cars; the facility is among the fastest green-field operations ever to be created and is rated among the top most CKD plants of Mercedes-Benz, globally. Mercedes-Benz India product portfolio comprises the locally produced S-Class, E-Class, C-Class, GL-Class and the M-Class. Completely Built Imported cars include the A-Class, CLS-Class, SLK-Class and the luxury tourer B-Class etc. The product portfolio also comprises offering the iconic off-roader G 63 AMG as well as a wide range of other AMG performance cars like the C 63 AMG, E 63 AMG, SLK 55 AMG, GL 63 AMG, ML 63 AMG and CLA 45 AMG. Mercedes-Benz India's strong focus on its four pillars of Products, Network, Cost of Ownership and Brand experiences has led the company's growth story with a total of 64 outlets located in 36 Indian cities, making it the brand with the densest network in the luxury segment.

In the plant the members first learnt all about the history regarding the introduction of the brand in India and how the plant was setup in Pune, also about the other different plants and assembly units present all over the world. All the information about various Mercedes-Benz products, materials required, and places from where they are imported, painting and all other jobs was given through a digital **presentation** in the 'Centre of Excellence' area by the events in charge present there.

- Members came to know about the MB financial and the other business solution services that are provided at the plant office.
- The members were divided into two groups and the groups were led by the in charge to the assembly plant. This session covered the working of the machines and the basic electronics present in every part of the luxury car being made there.
- By the end of the tour members were made acquainted with the cleaning, painting and the complex testing process that every car had to went through.

- MTNL POWAI IV

An Industrial Visit to MTNL (Mahanagar Telephone Nigam Limited) was organised by IEEE Brainwaves for giving insights to 2nd year students about the world of telecommunication. The training centre of MTNL was located at Powai which is actually CETTM - Centre for Excellence in Telecom Training and Management which is public sector Undertaking of Government of India under the ministry of communications which provides platform for training program and courses related to communication sector . The industrial visit included total of 5 lectures including introduction on the operation of MTNL services. The sessions were based on

- 1) Mobile Communication
- 2) Telephone Communication and Fibre Optics
- 3) Multiplexing and Telephone Exchange
- 4) Internet Service Providing and Broadband

SESSIONS:

After introductory session on MTNL which gave us insight above various services provided by MTNL and the future services that MTNL are going to plan in future, 4 sessions on various topics of telecommunication were held separately.

1) Mobile Communication and Antenna:

This part focused on mobile communication which included TDMA, GSM, and CDMA technologies. The actual process i.e. from transmitting signal via antenna to operating circles till the receiving of signal on mobile was explained in detail.

Afterward the actual hands on the same was held where we dealt with actual antenna and other machinery

2) Telephone Communication and Fibre Optics:

This part focused on fibre optics and how it is used in landline communication. The entire process about breaking the voice signal into multiple parts and transferring the data in the form of light using LASERS and transmitting them via fibre optics and decoding the same light signal back to voice was shown along with interactive question and answer session.

3) Telephone Exchange and Multiplexing:

This session included all the details about the control logic of the connection of two users that need to be connected. Comparison with old techniques, where everything was handled manually i.e. by person (a person who wants to talk with another person needed to 1st contact telephone exchange in charge who will then manually connect the line with the desired person

with whom 1st person needs to talk) to the present technologies where everything is handled by computer systems, was explained in this session.

4) Internet Service and Broadband

This session included the most important part i.e. internet connection. Everything i.e. from machinery to D.N.S to broadband was included in this session. When DNS was not into existence; one had to download a Host file containing host names and their corresponding IP address. But with increase in number of hosts of internet, the size of host file also increased. This resulted in increased traffic on downloading this file. To solve this problem the DNS system was introduced.

- The **Membership Drive** began in the first week of FEBRUARY 2016. Various promotional videos were developed and publicity in classes was various methods adopted for publicity. The drive was extended till last week of February, 2016. The Organizing Committee successfully received more than forty-five members. Members were from various fields such as Computers, Biomedical, Electronics, Electronics and Telecommunication.

FRESH CONCEPTS INITIATED BY IEEE BRAINWAVES 2015-16 ORGANIZING COMMITTEE:

-B-TALKS: A unique concept of **friends discussing technology among themselves**. Learning best happens when friends study together in a group. We have applied this fact and devised a platform where students can discuss, learn and exchange ideas. It gives them a feeling of being an engineer, solving problems.

-PROJECT CLUB

-IEEE BRAINWAVES NEWSLETTER

MODIFICATIONS DONE FOR IMPROVEMENT:

-THE STRUCTURE OF EVENTS THAT USED TO OCCUR IN PREVIOUS TENURE

-INTRODUCTION OF REGULAR INTERACTIONS AND CONSTANT FEEDBACK

-DESIGNING WORKSHOPS THAT INVOLVE MINIMUM COST REQUIREMENT

FUTURE VISION:

- Contribute towards raising the overall technological aptitude of students at DJSCOE.
- Sustaining and expanding the project club to other departments from which maximum students would benefit.
- To develop on the platform built by the organizing committee of IEEE BRAINWAVES 2015-16.
- Conducting events which would be a part of the "VALUE ADDED PROGRAM".
- Tie ups with national publications.
- Working towards making IEEE BRAINWAVES the most student friendly student chapter at DJSCOE.

The entire DJSCOE IEEE BRAINWAVES ORGANIZING COMMITTEE would like to thank **Dr. HARI VASUDEVAN SIR** for supporting and help us make our vision a reality.

THANK YOU











