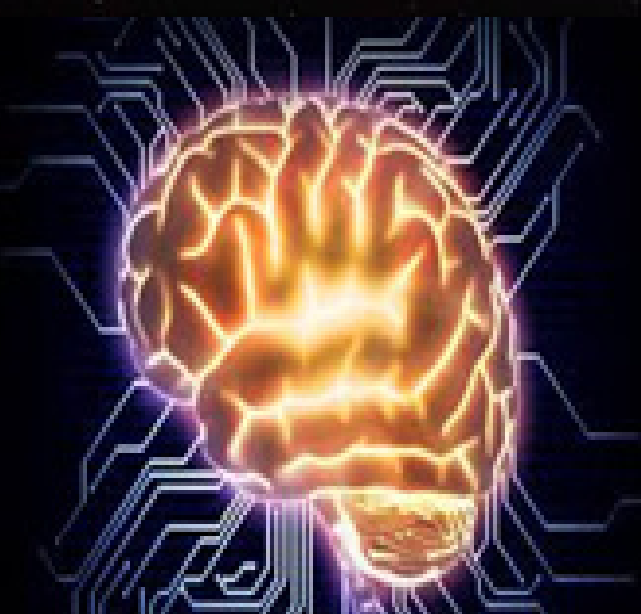


SSN COLLEGE OF ENGINEERING
DEPARTMENT OF BIOMEDICAL
ENGINEERING

SyNeRG 

ARTIFICIAL INTELLIGENCE

VOL: 4
ISSUE: 3



EDITORIAL DESK:

It is indeed our pleasure to present to you our quarterly newsletter- **SYNERGY**.

Once in 3 months, we update you with the developments in the department and the biomedical field. It is not our goal to bring to you the laurels of our department but to throw light on the plethora of opportunities it can provide. This edition focuses on the national level technical symposium, **SRISHTI 2k15** with its central theme as Artificial intelligence. The unveiling of our magazine **SAMHITA** was a joyous and proud moment for the editorial team.

We shall stride forward and engage our best efforts in bringing to you excellent edition of Synergy.

-Best Wishes,

Editorial Team

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FACULTY CORNER:

EVENTS ATTENDED:

Workshops:

- **Ms.R.Nithya and Ms.D.Kanchana** attended national workshop on *“Additive manufacturing: 3D printing”* organized by the Department of Mechanical Engineering, School of Engineering, Shiv Nadar University, Noida.
- **Dr.Sivarama Krishnan R** attended a One Day Workshop on *“Tissue Engineering”* on 29-09-2015 organized by Centre for Medical Electronics, Department of ECE, College of Engineering Anna University.

Conferences:

- **Dr.L.Suganthi**, Asso. Prof, presented a paper titled *“Morphological Analysis of Pressure Wave in the Arterial Tree with Stenosis - A modeling approach”* in 37th Annual International Conference of IEEE Engineering in Medicine and Biology Society, at the MiCo Milano Conference Center in Milan, Italy



- The following papers were presented in IEEE ICCI*CC 2015 conference at Tsinghua University, Beijing, China.

- **Mrs.A.Santhy and Dr.A.Kavitha**, *‘Analysis of Speech Imagery using Brain Connectivity Parameters’*
- **Mrs.A.Santhy and Dr.A.Kavitha** *‘fMRI Analysis to assess Functional Connectivity in Patients with Autism’*



- Hemnath. N, Krishna raj. T, **Dr.Sivarama Krishnan R**, presented a poster on *“Biofilm Formation and Bacterial Growth Analysis”* at Two Day International Conference on

Advances in Micro/Nanotechnologies for Biological Applications (ICAMB-2015), held at Nano research, Innovation and Incubation Center, PSG Institute of Advanced Studies, Coimbatore

- **Ms. R.Nithya** presented paper titled '*Analysis of segmentation algorithms in color fundus and OCT images for Glaucoma detection*', in an International Conference on Soft Computing in applied sciences and Engineering organized by Noorul Islam University, pp-249-253.

PAPER PUBLICATIONS:

- ❖ E. Priya & **Dr.Mallika Jainu**, published a research article titled "*Adverse drug reactions of combinatorial therapy of vildagliptin and insulin*", International journal of research in Pharmacy & Life Sciences. Vol.3, 2015.
- ❖ S. Krishna Mohan, V. Vishnu priya, **Dr.Mallika Jainu**, AP/BME, "*Effect of pioglitazone, quercetin and hydroxyl citric acid on extracellular matrix components in experimentally induced non-alcoholic steatohepatitis*" Iran J Basic Med Sci 2015; 18:832-836. (I.F: 1.22).



GUEST LECTURE:

- **Dr. S. Pravin Kumar** and **Mrs. B. Geethanjali** gave a technical talk on "LabVIEW based Projects at BME in SSNCE " in SMK Fomra College.



INSPIRE CAMP:

The department of BME coordinated an **INSPIRE CAMP** for aspiring school students of classes XI and XII. Around 200 students were benefitted by this. The students were shown demonstrations of various instruments and equipments in all the 6 labs of our department.



Staffs coordinating the Inspire camp for school students at SSNCE/BME



Students exposed to various equipments in BIOCHEMISTRY Lab

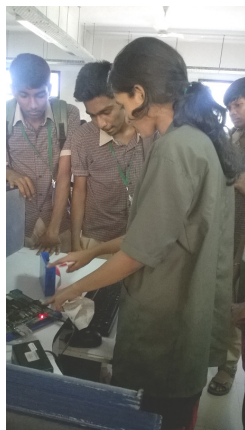


Dr V. Mahesh sharing his insight to the budding school students in BMI Lab



Students attending a demo on Ventilator in DTE Lab

Working of Processors and controllers were explain to the students in MEDICAL SOFTWARE Lab



Various basic circuits were explained in BIO ELECTRONIC Lab

INTERNAL FUNDING:

■ Dr.A.Kavitha was approved a funding of Rs.6.5 lakhs for implementing finite element analysis (FEA) in bone biomechanics for designing suitable implants using MIMICS and 3D printing technology

■ Dr.S.Pravin Kumar was approved a funding of Rs.4 lakhs for his innovative approach towards cardiac risk monitoring system.



EVENTS ORGANISED:

■ **Dr. S. Pravin Kumar and Dr. V. Mahesh** organized a *workshop on "Biomedical statistics and Information Technology influencing the current medical field"* under the banner of IEEE student branch and EMBS Student Branch Chapter. **Mr.RamKadambi, CEO of Aries biomed technology solutions, Coimbatore** had demonstrated with case studies about how the budding engineers can gear up to think about out of box innovations and entrepreneurship in the three fields of Information Technology, Biomedical and statistics.



■ **Mrs. B. Geethanjali, Dr. V. Mahesh and Dr. S. Pravin Kumar** organized the *Hands on workshop on "Control System and Simulation using LABVIEW"* by **Mr. Shantha Kumar, Application Engineer, National Instruments, Bangalore** under the banner of IEEE - EMBS.



■ A **LABVIEW workshop** was conducted by IEEE, chapter of BME, on the 29th July 2015. **Mr.Logeshwaran, an alumnus Department of BME,**

SSNCE gave a wonderful practical demonstration on Lab view. Around 300 people participated in it.

- The **Embedded Systems Workshop** was conducted by **Texas Instruments** which redefined the whole process into an easy system. This was also organized by IEEE which attracted large crowd.
- A **MATLAB workshop** was conducted on the day of Srishti by **Diya Labs**. The software was taught by the professionals in a dedicated manner went on for 5 hours. A massive crowd of 270 turned up for this workshop.

- A **Workshop on Robotics and Automation** covered every nook and corner in the field of robotics. Students were provided with a training kit and were able to experience the process of automation. Around 110 people gathered for this workshop.



- IEEE-EMBS student's chapter organized *a talk on current developments in the biomedical industry and regarding project ideas and development* by **Mr. Sri Logeshwaran** (alumni of SSN), **Application Developer, HCL**, Medical Devices Business Unit



- **Dr .S. Pravin Kumar** and **Dr. V. Mahesh**, organized an *Interactive Technical Q&A Session for students with the Technical Consultant of Health Care Technologies and Innovation Centre (HTIC)*, **Mr. Jayaraman Kiruthivasan** in the conference hall, Dept. of BME, SSNCE.



- **Dr. S. Pravin Kumar** and **Dr. V. Mahesh** organized a *Circuit Design contest under the banner of IEEE-EMBS*. Vishal, Vibav & Atul (III yr BME)

and Saravanaprakash (IV yr BME) were the student coordinators for this program

- CHT has a discussion with **Mr. Jayaraman Kiruthivasan**, Technical Consultant of Health Care Technologies and Innovation Centre (HTIC) for research developments of the department on 16.10.15. He gave his insights on product development



- An inter-department technical quiz event ‘**Q^UV-Z²**’ was organized by **Dr.V.Mahesh** and **Dr.S.Pravin Kumar** under the banner of IEEE EMBS and Engineering in Medicine and Biology Society (EMBS) Student Branch Chapter.



- **Dr.R.Subashini** organised a technical seminar on “**Market research and Consumer behavior in healthcare**”. The session was headed by **Ms. GeetaSanthosh, Associate Professor, MCA Department, SSNCE.**

- **Mr. Jayaraman Kiruthivasan**, Technical Consultant of Health Care Technologies and Innovation Centre (HTIC) gave a technical talk on “**Design consideration of Medical Devices**” on 16.9.15 for I & II year PG Students. It was organized by **Dr. Pravin Kumar.**



OTHER ACTIVITIES:

- ❖ **Dr.Mallika Jainu** and **Dr. S. Pravin Kumar** have been felicitated with *The Best Faculty Award* on the Teacher’s Day celebrations held on 07-09-2015.
- ❖ **Dr.R.Yuvaraj** has received his doctorate in *Bio-Signal Processing* by “University Malaysia Perlis (UniMAP), Malaysia”.



❖ **Teacher's Day Cultural Programs** were held on 05-09-2015.

- **Dr.Sivarama Krishnan R, Dr.M.S.Alphin and Dr.K.S.Vijay Sekar** emerged as winners in the event *Sakalakala Vallavan* .
- **Dr.G.S.Sachin, Dr.Sivarama Krishnan R, Dr.L.Suganthi** won the third prize in the *Quiz* event.
- **Dr.Sivarama Krishnan.R, Dr.L.Suganthi, Mrs.M.Dhanalakshmi and Ms.R. Nithya ,Dr.R.Yuvaraj** participated in the *Antakshari* event.



STUDENT'S CORNER:

INTERNSHIPS:

- ❖ **L.Vijay Mani Shankar**-2nd Year interned at Hermed Med Systems.
- ❖ **Nikhil Balakrishnan**-2nd Year interned at Kauvery Hospitals
- ❖ The final years underwent one week training in Hospital Management in leading hospitals like Sri Ramachandra University, SRM Medical College and Hospital, Apollo Hospital, Kauvery Hospital, Billroth Hospital etc.
- ❖ **Ragavi M, Gundhavi and PJ Raagavi**- 4th Year volunteered for Blood Donation Campaign
- ❖ **Muthumeenakshi**-4th Year volunteered for Good Citizen Forum Inaugural Ceremony
- ❖ **Vijayalakshmi R** – 4th Year actively volunteered for BHUMI Organization

ACHIEVEMENTS:

❖ **Srivatsan.P.B**-2nd Year has won the All India Inter Engineering Championship title for basketball.

❖ **Manasvi Sundar**-2nd Year was awarded the runner up in the Chennai Times Fresh Face solo singing event.



❖ **Dixit**-3rd Year has won the championship title for Cricket in SSN Trophy 2k15

❖ **Imaiyan**- 4th year is the core committee member of SSN trophy. He also participated in the Zones Handball.



❖ **Prabanjan**- 4th year participated in the SSN trophy 2k15.

❖ The following students participated in NSS Camp volunteering.

- Ganesh Kumar, N.Megala, S.Pavithra, G.Ranjitha, A.Ranjitha, R.Revathy, T.Sathyapriya, S.Thariga, S.Gunapriya.

❖ **Nikhil Balakrishnan** and **Yaamini Nandakumar**-2nd year won second place in theatre fest held at NIT Trichy.

PLACEMENTS:

The following students have been placed in the given below list of companies.

Zifo technologies:

- ❖ Archana.S
- ❖ Nandhini.T
- ❖ BhanuSaranya.A
- ❖ Settipalli Dinesh Kumar Reddy

Mu-Sigma:

- ❖ Haritha.S
- ❖ Bhavana.T

Zoho Corporation:

- ❖ Deepak V.D
- ❖ Ibrahim Asif Ali
- ❖ Pooja.C
- ❖ Subiksha.S

Fresh Desk:

- ❖ Sreenidhi.S
- ❖ Shrisha.M



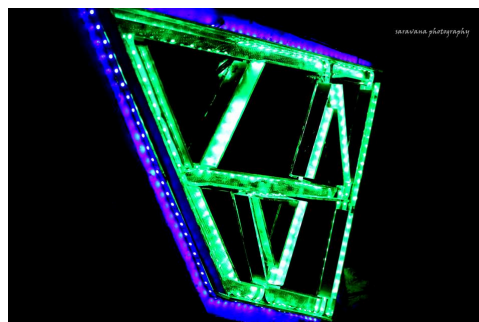
SRISHTI V.8.0

One man's magic is another man's engineering. September-3, 2015 marked the 8th instance of **SRISHTI-SSN's very own biomedical symposium**. The national level technical symposium saw students from various departments coming in pursuit of knowledge. The theme for this year was **Artificial Intelligence** based on the advancement in neural science.



From left: Geetha Priya (Secretary-ABE), Mrs. Dhanalakshmi (Association –In charge - ABE), Dr. Salivahanan (Principal, SSNCE), Dr. Anita Aggarwal (Chief Guest), Dr. A. Kavitha (HOD, BME), Mr. Loganathan (President -ABE)

Srishti, the festival of biomedical engineers where every biomedical engineer presents fruit of his hard work was inaugurated by the honorable chief guest **Dr. Anita Aggarwal, Scientist, Dept. of science and technology, New Delhi**. She is a part of the Instrumentation Development Program (IDP) which focuses on strengthening indigenous capability for research, design, development and production of instruments in the country. She gave an inspiring speech on the various govt. schemes which provide ample opportunity for the young biomedical engineers. The program was set into full-fledged motion with the release of Srishti V.8.0 logo and the official promotional video. This was followed by the release of **SAMHITA-The annual magazine** by our principal and first copies were received by the chief guests.



Both technical and non-technical events attracted huge crowds. Events like paper presentation, poster presentation, project display, technical quiz, circuit debugging, math attack, gaming, connexions were the highlights of the day and saw black and white were the crowd pullers. Around 1600 students from various colleges across the city participated in different events.

MATLAB and Robotics workshops were also held on the same day. These workshops which saw a huge turnout of 400 participants were conducted by the final year students of the department. Thus, the event came to an end leaving behind fond memories

INVENTION AND INNOVATION:

CARDIO CYBORG –THE HEART THAT WILL GO ON FOREVER

No beauty shines brighter than that of a good heart. I'm sure that's not the only beauty about the heart; the way the heart works continues to fascinate the mankind to develop various strategies ,devices, mechanical systems etc. in order to replace it or repair it or even improvise it.

Around 27.3 million people in the world have heart failure, meaning their hearts cannot pump enough blood and oxygen to other organs. But the great need for a life-saving treatment in heart-failure patients has driven investigators, both in academia and private industry, to try to build a better artificial heart.. In the patients having heart ailments, the heart's pumping abilities have grown so weak that it cannot deliver enough oxygen and nutrients to the body. Sometimes failure is limited to one side of the heart and can be treated with an implant that boosts flow but does not replace the heart entirely. But in cases where both sides of the heart are failing, a patient will need a heart transplant. And with demand for heart transplants far exceeding donations, patients can wait for years for a donor heart, while others may be ineligible altogether because of other health issues.

Attempts to completely replace the human heart with a prosthetic device started decades ago. It is



hugely challenging to create a device that can withstand the harsh conditions of the body's circulatory system and reliably pump 35 million times per year, as the heart does. Until now, such patients have relied on pacemakers and ventricular devices, which help pump blood from the heart to the body to keep them alive. But many are temporary, designed only to help patients survive long enough for a heart transplant. Once the artificial heart is available, patients will be able to have a new heart immediately and will no longer need to rely on ventricular devices to keep them alive. Another advantage of the artificial heart is that the body doesn't react against the high-tech plastic from which it is made. As a result, patients won't need to take the strong immunosuppressive drugs that heart transplant patients currently take to prevent their body rejecting the donor organ.

A new kind of artificial heart that combines synthetic and biological materials as well as sensors and software to detect a patient's level of exertion and adjust output accordingly is to be tested in patients at four cardiac surgery centers in Europe and the Middle East. If the "bio prosthetic" device, made by the Paris-based Carmat, proves to be safe and effective, it could be given to patients waiting for a heart transplant. An artificial heart can provide a life-saving bridge while a patient waits for a transplant. Developed by Abiomed, an American biotech company, the new model is a 'clot-proof' version of an older device which caused strokes in three out of the six heart patients who received it last year. Just like a natural heart, the AbioCor artificial heart beats quietly, is about the size of a grapefruit and consists of two blood pumping chambers. It is made of a strong, flexible plastic, designed to prevent clotting and mirror the tissue from which heart is made. The right pump supplies blood to the lungs while the left pump provides blood to the rest of the body. Each of the two pumps is capable of delivering more than two gallons - eight liters - of blood every minute. An internal battery powers the heart and is recharged by an external pack that passes energy through the skin. When batteries run low, they can be recharged from a portable external pack that passes energy through the patient's skin using electric currents. Because there are no tubes or wires to the heart, there is less chance of infection. Vitality, the heart is capable of beating. Electric sensors in the heart use pressure measurements to decide when the heartbeat needs to speed up to cope with exercise or slow down for relaxation. The AbioCor heart also contains an active monitoring system that provides detailed performance feedback and alarms in the event of heartbeat irregularities.

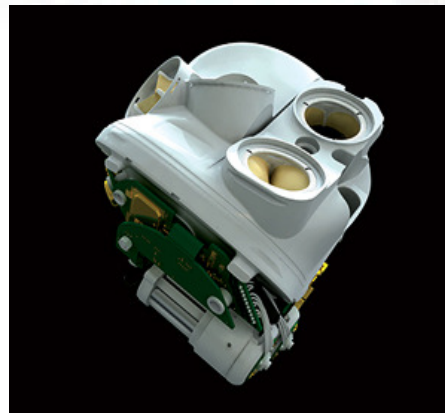
In Carmat's design, two chambers are each divided by a membrane that holds hydraulic fluid on one side. A motorized pump moves hydraulic fluid in and out of the chambers, and that fluid causes the membrane to move; blood flows through the other side of each membrane. The blood-facing side of the membrane is made of tissue obtained from a sac that surrounds a cow's heart, to make the device more biocompatible. "The idea was to develop an artificial heart in which the moving parts that are in contact with blood are made of tissue that is [better suited] for the biological environment," says Piet Jansen, chief medical officer of Carmat.

That could make patients less reliant on anti-coagulation medications. The Carmat device also uses valves made from cow heart tissue and has sensors to detect increased pressure within the device. That information is sent to an internal control system that can adjust the flow rate in response to increased demand, such as when a patient is exercising. The system was developed through collaboration between the European Aerospace and Defense Systems and Alain Carpentier, a cardiac surgeon who pioneered heart valve repair.

Carmat's device, Abiomed's device etc. is just few of several artificial hearts in development across the globe.

The animal's heart is the basis of its life, its chief member, the sun of its microcosm; on the heart all its activity depends, from the heart all its liveliness and strength arise. Equally is the king the basis of his kingdoms, the sun of his microcosm, the heart of the state; from him all power arises and all grace stems.

~WILLIAM HARVEY



INTERESTING FACTS:

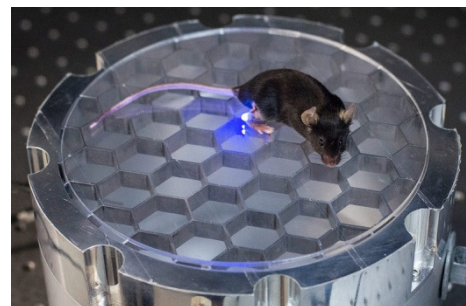
- When it comes to body transplants, it's pretty much a necessity that the donor is alive. In October, 2014, a team of Australian scientists made history when they revived dead hearts from cadavers and successfully transplanted them into awaiting patients. About 20 minutes after the hearts had stopped beating, doctors put them inside a machine, dubbed the "heart in a box," which supplied the vital organ with oxygen. After removing the heart from the box it was injected with a preservation solution, designed to keep it fresh. This was done by a perfusion-based machine, named **OCS-HEART**



- **Multiple sclerosis (MS)** occurs much less frequently in tropical and semitropical areas than in cold parts of the world. You can even map it out by latitudes. No one knows exactly why cold weather and MS go together. One theory advanced in The China Study holds that it may have to do with the consumption of dairy products, which is more common in colder than hotter parts of the world. Others suggest it may be that MS is genetic.
- **Low Cholesterol Levels** Associated with Violence. According to a study conducted on 79,777 patients, violent criminals had a much lower level of cholesterol than non-violent individuals. Low cholesterol is also associated with higher rates of suicide. In a study of monkeys, low cholesterol was also linked to aggressive behaviors.
- **Heart attacks** occur more on Monday. Heart attacks occur more often on Monday than any other day of the week. This finding comes from a European 10-year study which found Monday's heart attack death toll is 20% higher than other days of the week. The reasons are not clear, but some people consider it's the stress of work-reentry that causes the attacks.

- The **life-sustaining liquid** has more power over brain function than most like to think. A 2014 study published in the journal *Neurology* found those with blood type AB were twice as likely to experience memory problems as those with type O blood. However, the association made was relatively small and warrants further research to validate the claim. This blood type is also prone to blood clots and can lead to heart attacks, stroke, or other vein clogging due to its high level of proteins VIII.
- A **blue glowing device** the size of a peppercorn can activate neurons of the brain, spinal cord or limbs in mice and is powered wirelessly using the mouse's own body to transfer energy. Developed by a Stanford Bio-X team, the device is the first to deliver optogenetic nerve stimulation in a fully implantable format. A miniature device that combines optogenetics – using light to control the activity of the brain – with a newly developed technique for wirelessly powering implanted devices is the first fully internal method of delivering optogenetics.

The device dramatically expands the scope of research that can be carried out through optogenetics to include experiments involving mice in enclosed spaces or interacting freely with other animals. The work is published in the Aug. 17 edition of *Nature Methods*. The device dramatically expands the scope of research that can be carried out through optogenetics to include experiments involving mice in enclosed spaces or interacting freely with other animals. The work is published in the Aug. 17 edition of *Nature Methods*.



ALUMNI TALK:

■ The department of biomedical engineering is known for its renowned staff members and excellent lab facilities. A great exposure of knowledge and welfare of the students are given utmost importance. As an individual one can grow his or her activities including extracurricular and can achieve great heights. The students are asked to think beyond and the outcome of their results in some products or publications which add a great mark in their resume. The students are trained well and by the end of the educational year they are fully qualified. They have enough talents to produce themselves in great companies and earn rewards.



-V.NAGASAI,

Working in Infosys

■ A dept. with blend of medicine and engineering values is throwing lights upon things that are untouched. We are given a practical knowledge of things that we learn. Constantly encouraged by our faculties to do, engage in conference and workshop. We are gifted with the best software that We utilize in our work (MATLAB, LabVIEW, MIMICS). Biomedical equipment that revolutionize today's world are in our labs for us to get familiar with it . We are also encouraged to involve in sports and extracurricular activities. Our gifted bunch of faculties with their great knowledge constantly try to enlighten us .Apart from lectures and so ,they act as our guide for choosing a good career,higher studies,constant support for preparing for entrance exams



-VINUTHA

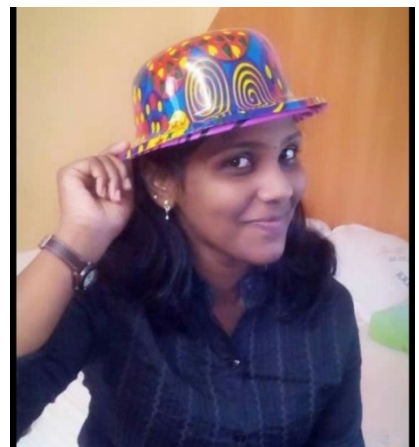
Doing M.E in CEG

■ The department of biomedical engineering has many facilities like well-developed equipment, labs, library etc...This was very helpful for us in positive way. The interest of our faculties under our project really made us to cross across the sea to reach the success. The support of lab technicians stood a major role in the successful completion of our projects. We utilized all the extra efforts such as placement class, E-cell which had been clearly arranged for our sake. Extra lab classes and extra time spent in lab for our project was very useful to complete our work in time. Teaching of our faculties are extraordinary were there are no room for mistakes. According to me all the subjects, study materials and the guidance from the faculty was very good but paper like physiological modeling, microprocessors should need a well-organized material which made us little difficult to sort out all the concepts. So little measure is needed for the students to score well in future.

-HEMAPRABHA

Undergoing IAS training in Manithaneyam

■ It is indeed my pleasure to share a few words about my very own 'Department .Like every other student, I've also had a lot of dreams and loads of expectations when I passed out of my Junior college. And fortunately, ended up in SSN. And no wonder, SSN stood up to my expectations. And to be precise, The department of BME which was among the top ranked ones in the city served a niche to enhance my skills theoretically as well as hands on! The faculty of the department had always been a pillar of support in whatever I pursued. They were always keen in the welfare of students and the department. They've always motivated us to take part not only in curricular activities but also in



social issues and welfare activities. The Association of Biomedical Engineers (ABE) of SSN had been a great motivation and support in all aspects. The association has always been keen in promoting the awareness of latest technologies in the field of biomedical sciences among the students. And it had been standing successfully all these years and I wish It widens its wings and fly high in the future as well.

- YUVADHARINI

Doing M.S. in Biomedical Engineering in NTU, Singapore

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- ❖ Ms.J.Delpha

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