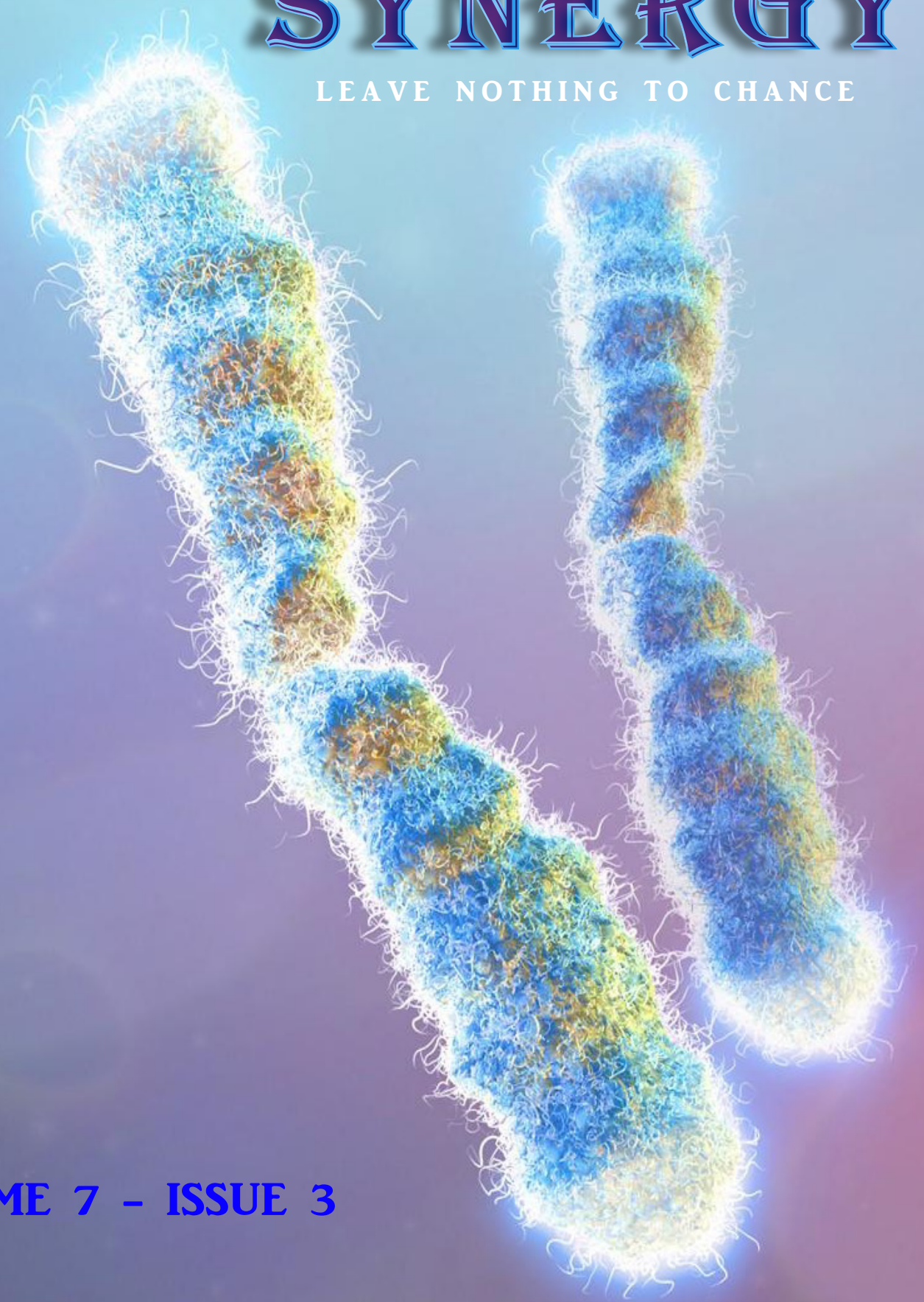
SSN

# SYNERGY

LEAVE NOTHING TO CHANCE

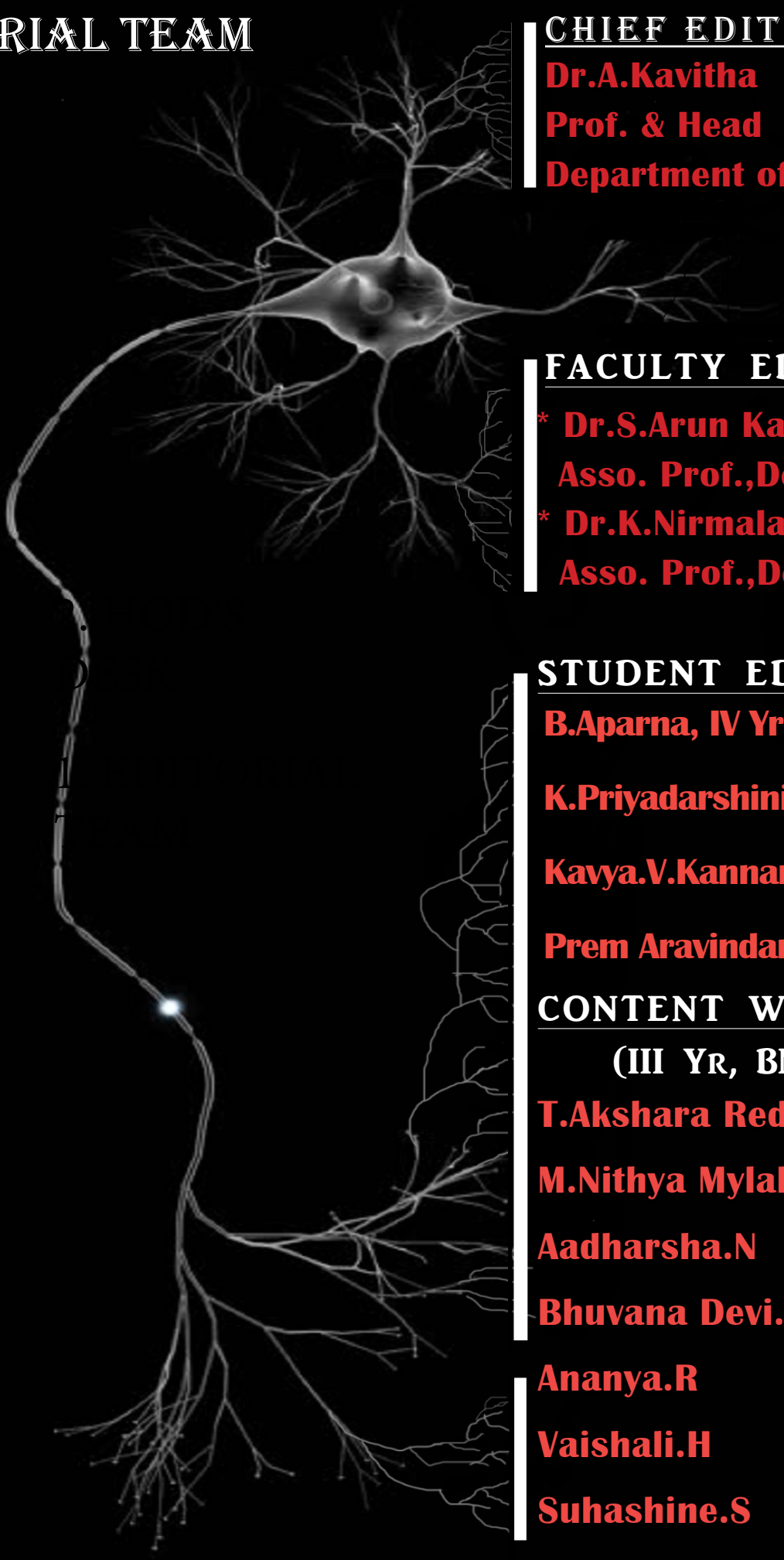


VOLUME 7 – ISSUE 3

DEPARTMENT OF BIOMEDICAL ENGINEERING

# THIS EDITION TAKES YOU THROUGH A VISUAL JOURNEY TO OUR...

# EDITORIAL TEAM



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# EDITOR'S DESK

Welcome,

We are extremely happy to present the third edition of the seventh volume of Synergy.

This edition brings out many spotlight events of the department. It also gives an insight in to the exciting and interesting inventions in the field of Biomedical Engineering.

We congratulate our fellow mates for their achievements. We are very thankful to our HOD and all the department faculty for giving us their support and constantly moulding us. We look forward to an ecstatic journey and strive hard to bring more laurels to the department.

## HIGHLIGHTS

# HOD'S DESK

It is a feeling of immense pleasure to once again put our heads together in releasing the next issue of our newsletter-SYNERGY. This volume brings out the campus updates and various events like workshops, seminars and development programmes organised by the department during July 2018 to September 2018.

It also showcases the achievements of the students in various fields (academic, sports, extracurricular).I would like to thank all the faculty members for their seamless contribution to the department's growth and guiding the students to achieve their goals. Let's together continue to raise the glory of the department and make it a euphoric journey!

**Dr. A. Kavitha**

**PROF. & HEAD**

**DEPARTMENT OF BME**

# CAMPUS UPDATES

## CONVOCATION CEREMONY:

**SSN 18th Graduation Day**

SSN proud to host its 18th Graduation day celebration felicitated by Dr. M. K. Surappa, Vice Chancellor, Anna University at. A total of 1180 students were conferred the degrees. Of these 832 were undergraduate students and 348 were post graduate students. BME UG and PG students bagged a total of 10 University ranks. A total of 192 students received first class with distinction. SSN Students received 107 ranks in Anna University for the year 2017.

# TEACHER'S DAY:


**Mrs. A. Vennila, Tamil Poet & Writer addressing the gathering**

SSN Institutions Celebrated Teacher's day on 5th September, 2018 with Mrs. A. Vennila, Tamil Poet & Writer as the Chief Guest for the felicitation. The faculty members were honored with various awards and titles. SSN has 275 dedicated faculty members with 80% of faculty holding Ph.D. and remaining are pursuing Ph.D. 150 faculty members are recognized research supervisors of various universities.

# INVENTE 3.0

Invente is a resplendent national symposium built around encouraging budding engineers to discover hidden talents, interests and entice technophiles to showcase their skills with unbridled enthusiasm. The third version of this techfest, Invente 3.0, was held on 21st and 22nd of September,2018. SSN's national level technical symposium of eight departments, namely BME, EEE, ECE, Civil, Mechanical, IT, CSE and Chemical, amalgamate to form this prodigious technical festival. This event creates space for tech savvy, fun loving and puzzle enthusiasts to flaunt their abilities, this massive technical festival allows each individual to showcase their dexterity.

The esteemed Chief guest for Invente 3.0 was **Shri. Gangadhar- Associate Director, Liquid Propulsion Systems Centre, ISRO**. He is a recipient of Silver medal from IIT Kharagpur for first rank in M.Tech, Gold medal from Astronautical society of India, ASI award for Rocket and Related Technologies, Development and Performance Excellence award and Team Excellence Awards at ISRO.

Workshops were conducted during this festival in various imperative fields such as

Artificial intelligence
Machine learning
Advanced Surveying Equipments
3D printing
Deep learning and computer vision
Augmented Reality and Virtual Reality


**Shri. Gangadhar- Associate Director, Liquid Propulsion Systems Centre, ISRO ,the honorouble chief guest with The President Ms.Kala Vijaykumar , The Principal Dr.Salivahanan, The Department Head's and Student Presidents**

The flagship events of the techfest were:

Codolympics
Biomart
Bottle Rocketrix
Build it,Autochem
Hackathon
Line follower
Concrete Challenge
Nitro GP

Students from various colleges took part in the 80+ events that was part of this mega festival and cash prizes were awarded to the winners.

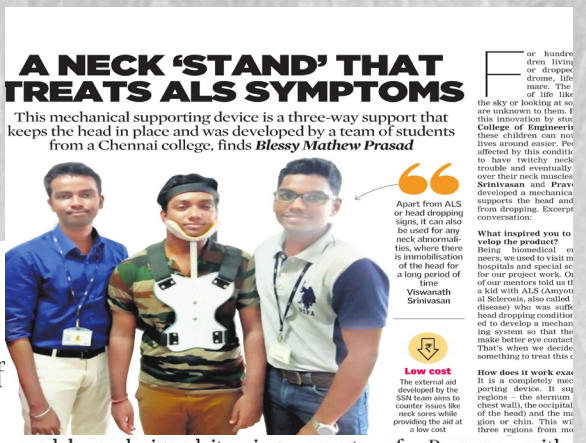
This year, the theme for the Biomedical department was space. The department was decorated to give an extra-terrestrial effect.The Biomedical Department conducted 9 events, namely Scintelligence, Biomart, PUBG, Biognize, Paper presentation, Misterioso, Tellurians, Matalino, Demexxon.

A virtual reality workshop was also conducted as part of the symposium by the department.


**Invente 3.0 , Department of Biomedical Engineering**

# DEPARTMENT VENTURES

We are proud to present that the students, Vishwanath.G and Praveen Kumar.G final year, from Biomedical Department and their Guide Ms. Dhanalakshmi have been featured in the media on August 13, 2018 for their invention of a medical aid for Amyotrophic Lateral Sclerosis (ALS).



## A NECK 'STAND' THAT TREATS ALS SYMPTOMS

This mechanical supporting device is a three-way support that keeps the head in place and was developed by a team of students from a Chennai college, finds ***Blessy Mathew Prasad***

Apart from ALS or head dropping signs, it can also be used for any neck abnormalities, where there is immobilisation of the head for a long period of time
Viswanath Srinivasan

**Low cost**
The external aid developed by the SSN team aims to counter issues like neck sores while providing the aid at a low cost

For hundre dren livin or droppe drome, life mare. The of life like the sky or looking at so are unknown to them. I this innovation by stu College of Engineeri these children can no lives around easier. Pe affected by this conditi to have twitchy neck trouble and eventually over their neck muscles Srinivasan and Prav developed a mechanica supports the head and from dropping. Excerpt conversation:

**What inspired you to velop the product?**
Being biomedical e neers, we used to visit m hospitals and special sc for our project work. O of our mentors told us t a kid with ALS (Amyot al Sclerosis, also called disease) who was suffe head dropping conditio ed to develop a mechan ing system so that the make better eye contact That's when we decide something to treat this c

**How does it work exac**
It is a completely mec porting device. It sup regions – the sternum chest wall), the occipital of the head) and the m gion or chin. This wi three regions from mo

INITIATIVE

# Innovation for change

## Two engineering students aim to improve the quality of life f

BHAVYA VENKATESH

It is estimated that five in every 1,00,000 people in India suffer from amyotrophic laterals sclerosis (ALS), a rare, progressive and debilitating condition that weakens muscles and affects physical function. People with ALS and other neuromuscular disorders are known to suffer from the 'dropped head' condition, and being able to continue normal functions such as maintaining eye contact with others could improve their quality of life.

SPECIAL ARRANGEMENT

**Dedicated:** Viswanath S. and Praveen Kumar G. with mentor Prof. M. Dhanalakshmi

### For the disabled

For Viswanath S. and Praveen Kumar G., final year students of biomedical engineering at SSN College of Engineering, Chennai, a visit to an institute supporting persons with disabilities sparked an idea. After two years of study, research and hard work, the duo has come up with an external aid for ALS patients – one that offers head, chin and neck support.

"The products that are currently available weigh one to three kgs and cost more than ₹ 40,000. With our aid, we aim to reduce both the cost and the weight, without compromising on the quality of support it provides," says Viswanath. "We have been studying the bio- and have designed it using 3D-modelling software," he adds.

The device is largely made of aluminium – which makes it comparatively light, at around 800 grams – and is designed in such a way that the head's load is distributed equally over the thoracic and back region of the body. The product can be created in multiple sizes, with adjustable height. Additional features such as cushion support and nylon straps aim to increase comfort and reduce difficulties in swallowing, speaking or breathing while wearing the aid. The team estimates that the cost of producing a piece could be around ₹1,000.

With initial funding from SSN, the students are obtaining validation from the Na- ment of Persons with Multiple Disabilities and the Spastics Society of Tamilnadu.

### Way forward

Trials are being conducted with patients, and the aid has been constantly modified based on user feedback. "Once we are satisfied with the trials, we plan to mass-produce the device in collaboration with orthotic and prosthetic centres," hopes Viswanath. The duo is open to prospective collaborations to scale up production.

With a patent being filed and the process of validation and approval underway, the device is close become a reality. "We believe that the aid can help patients lead normal lives," signs off Praveen Kumar.

From **The Hindu - about our invention**

**( From the left - Ms.Dhanalakshmi, Asst. Prof, Dept. of BME, Praveen Kumar.G, Vishwanath.G)**

Many Daily Publications covered about our Invention, the coverage report is as follows:

| Date | Headline | Publicaiton | Edition | Circulation | Page No. |
|---|---|---|---|---|---|
| August 13 2018 | Innovation for change | The New Indian Express | Chennai/ Hyderabad | 139,500/ 31000 | 14 |
| August 13 2018 | A neck 'stand' that treats ALS symptoms | The Hindu | Chennai/ Delhi | 3,75,000 | 4 |
| August 23 2018 | SSN Institutions Builds a Low-cost and Light-weight Support System for ALS Patients | Dinakural | Chennai | 65,000 | 6 |
| August 23 2018 | SSN Institutions Builds a Low-cost and Light-weight Support System for ALS Patients | Viduthlai | Chennai | 70,000 | 7 |
| August 27 2018 | SSN Institutions Builds a Low-cost and Light-weight Support System for ALS Patients | Thinathodar | Chennai | 72,300 | 4 |
| August 27 2018 | SSN develops low cost device for ALS patients | DT Next | Chennai | 3,30,300 | 4 |

# BOARD OF STUDIES MEETING

The board of studies meeting was held on 5th July 2018. To crytallze the Institution after getting their status of Autonomy, this panel of discussion decided upon the UG, PG curriculum and syllabi for the forthcoming batches. The members of the BOS are:

1. Prof. S. Ramakrishnan, Biomedical Engineering Division, Department of Biomedical Engineering, IIT Madras, Chennai.
2. Prof. Renu John, Department of Biomedical Engineering, IIT Hyderabad
3. Dr. C. M. Sujatha, Department of Electronics and Communication Engineering, CEG Campus, Anna University, Chennai
4. Mr. S. Shankar, Senior Director & Business Head Philips Healthcare, Philips India Limited
5. Ms. S. Sivaranjani Research Scholar, Department of ECE, Anna University, Chennai
6. All the Faculty Members of the Department, BME, SSNCE

**Faculties along with the members of BOS**

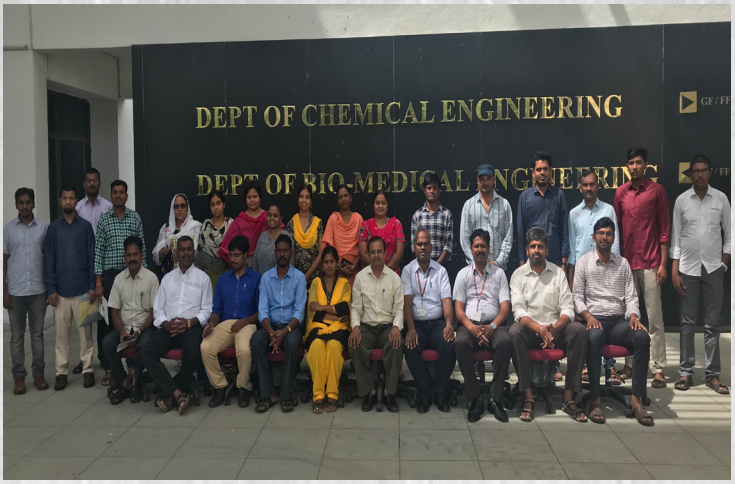
# EVENTS ORGANISED:

## NITTR:

National Institute of Technical Teachers Training & Research (NITTR) organized a one week training programme on "MEDICAL ELECTRONICS AND TELEMEDICINE" between 9.7.18 and 13.7.18. As a part of it, the Department of Biomedical Engineering hosted two days lecture series between 11.7.18 and 12.7.18. The Programme was co-ordinated by Dr. S. Bagyaraj, Asso.Prof/BME.

Dr. S. Bagyaraj, Asso.Prof/BME, delivered a Guest lecture on Origin and measurement of Biopotentials. This lecture was to educate about the origin, measurement and importance of Biopotentials in Medical Electronics.

Dr. J. Vijay, Asso.Prof/BME, delivered a Guest lecture on Electric safety Analyzer & Cell phone Radiation. This guest lecture was to educate about safety analyzers and cell-phone radiations and their uses in the biomedical industry.




**Participants of the Workshop with BME Faculty**

Dr. B. Geethanjali, Asso.Prof/BME, delivered a guest lecture on EEG, Cardiac Pacemakers and Defibrillator.

Dr. V. Mahesh , Asso.Prof/BME, delivered a guest lecture on the Principles of Dialyzers and Ventilators.

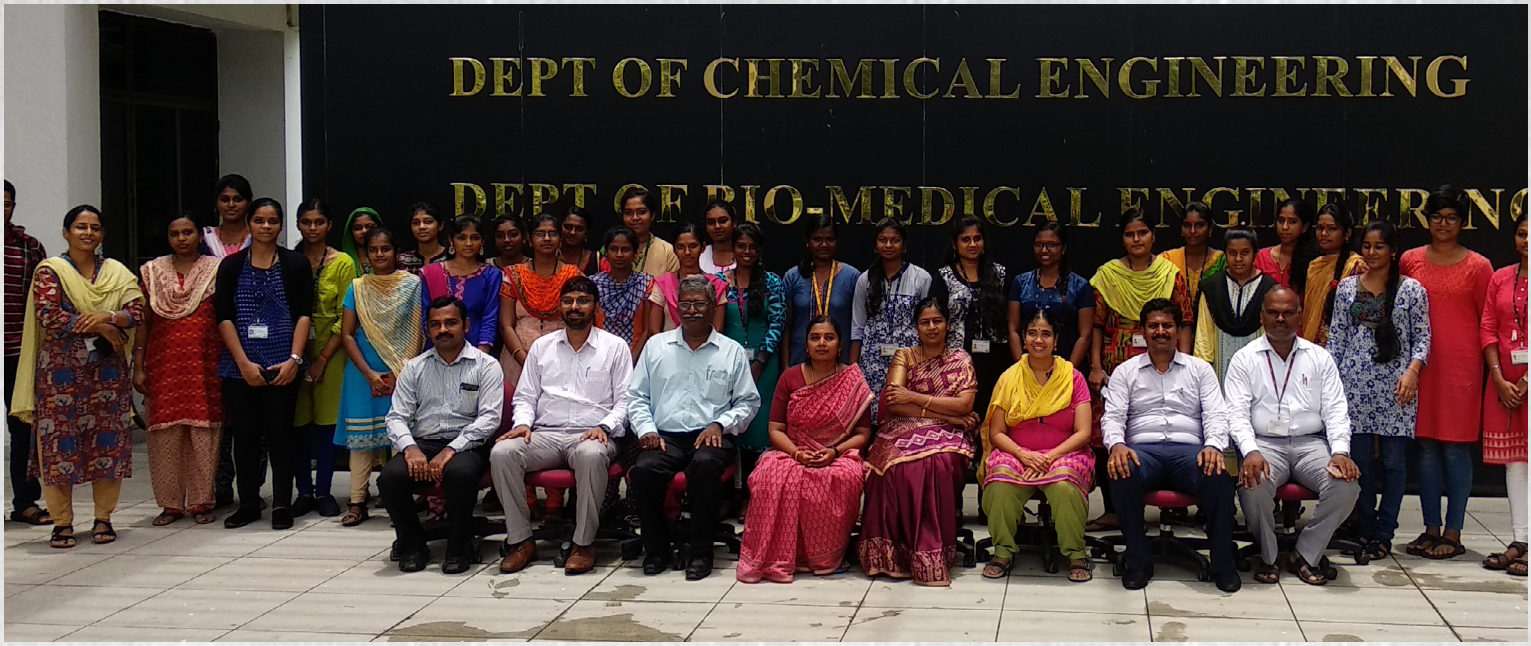
• On 31st of August, a one day seminar on **"Medical Textiles for Healthcare – The Promising Future"** was coordinated by **Dr. S. Arun Karthick**, Asso. Professor and **Dr. J. Vijay**, Asso. Professor, for the UG and PG students of the department, faculty members, research scholars and other students. The seminar was an informative session with the aim of bringing together leading academic scientists, researchers and research scholars to exchange and share their experience and research results on all aspects of Medical Textile Applications. The speakers were :

•Dr S Arun Karthick, Asso. Professor, Department of Biomedical engineering, SSNCE.

•Dr S Subramanian, Asso. Professor and Head, Department of Textile Technology, Anna University, Chennai.

•Dr Balaraman Madhan, Principal Scientist, CSIR-Central Leather Research Institute .

•Dr S Weslen Vedakumari, Asst. Professor at Faculty of Allied Health Sciences, Chettinad Academy of Research and Education, India.




**Participants of the workshop along with the speakers and faculty members**

# WORKSHOP

• A Workshop on "Immunoelectrophoresis and Histopatholgy" was held on 12 th September 2018. The workshop showcased invited lecture from eminent academicians and clinicians in the field who are specifically working on technologies to understand pathology of tissues in situ. The workshop was coordinated by Dr. R. Subashini, AP/BME. The workshop started by Dr. D. Lawrence Cruze, MD., Consultant, Sri Ramachandra Medical College & Research Institute, Chennai on Histopathological examination of tissue followed by Dr. P. Balashanmugam, Principal Scientist, Avanz Bio Pvt Ltd.Tambaram, Chennai featured two hands on learning sessions for the participants about biopsy tissue processing and immunoelectrophoresis (SDS-PAGE).

**Participants of the Workshop along with the Speakers**

- Ms. M. Dhanalakshmi, Asst.Prof/BME, organized a 'Two day workshop on Deep Learning'on 18.9.18 to 19.9.18. Mr.Vimalanathan, Co-Founder and Mr. Kamaleesh, Co-Founder, Kalviakkam, Chennai handled the sessions with hands-on training. Mr. Yash Manivannan, Technical Evangelist, Microsoft, Canada handled a session on CNTK.

- The workshop gave an insight into python and deep learning. It also provided a hands-on experience on working with pytorch and keras.
- Many interesting concepts in deep learning and neural networks, convolutional neural networks, recurrent neural networks, feed forward neural networks, etc. were explained. Overall the workshop was an exciting learning experience for the students.

**Participants during the Workshop**

**Lecture on deep learning during the Workshop**

# SEMINAR

Department of BME and Mathematics jointly organized a Two Day National Seminar on Computational Biomedical Engineering, Coordinated by Dr. V. Mahesh, Asso.Prof/BME and Dr. R. Sundareswaran, AP/BME, Dept of Maths. The seminar was held on 26th and 27th of September, 2018.

The Speakers were:

1. Dr. S. Thanigaiarasu, MIT, Chennai
2. Dr. Jagannathan Mohan, VIT , Chennai
3. Dr. B.Geethanjali SSN CE, Chennai
4. Ms. G. Srinidhi Tiger Analytics, Chennai
5. Dr. K. Kamalanand, MIT, Chennai
6. MS. M. Thilaga, PSG College of Tech, Coimbatore
7. Dr. D. Nagarajan, Hindustan Institute of Technology & Science.

**Participants of the National Seminar along with the Speakers**

# MOU

A MoU has been signed between SSNCE and National Institute for Empowerment of Persons with Multiple disabilities (NIEPMD), Muttukadu, Chennai on 26th of July 2018. National Institute for Empowerment of Persons with Multiple Disabilities (NIEPMD) is an Indian government agency providing services to people with multiple disabilities. This MoU would be beneficial to both the parties in terms of collaborative research, data sharing, joint technical events, student's internship and technology transfer.

**From the left; Dr.A.Kavitha(HOD,BME), Dr.S.Shankaranarayanan (NIEPMD), Ms.Kala Vijayakumar (President SSNCE),Dr.Salivahanan(Principal SSNCE)**

MoU has been signed between SSNCE and Indian Biomedical Skill Consortium(IBSC), AMTZ campus, Vishakapatnam, Andhra Pradesh on 29th June, 2018. This partnership would work in the direction of achieving global mobility of skilled biomedical workforce from india through International equivalence partnerships.

## Indian Bio Medical Skill Consortium

Nitturi Naresh Kumar (KHIT) with Dr.J.Vijay

Several bodies such as American College of Clinical Engineering (ACCE), Association for the Advancement of Medical Instrumentation (AAMI), The Canadian Board of Examiners for Biomedical Engineering and Dialysis Technologist and Technicians, The Register of Clinical Technologist (RCT), and Clinical Engineering Voluntary Registration Board are certifying the healthcare professionals through BMET (Biomedical Equipment Technician) examination. These kind of exams are internationally harmonized rating to recognize the skill level of Engineers who are working in the field of Biomedicine.

In India more than 2 lakh Biomedical Engineers / Technicians are working in Hospital / Clinical Laboratories / Company / Organizations etc.,. However, there is no such apex body to certify competency skills of these Engineers. Considering this issue, Andhra Pradesh MedTech Zone (AMTZ), Kalam Institute of Health Technology (KIHT), National Accreditation Board for Certification Bodies (NABCB) under the Quality Council of India (QCI) with support of Indian Medical Devices Industry have recently initiated a joint proposal to enhance the consortium

for skill development of Biomedical Engineers in India. This consortium "Indian Biomedical Skill Consortium" will facilitate a certification / license to large number of biomedical professionals by considering their work experience and percentage of Technology Competency Score (TCS) earned in IBSC assessment examination.

Our Institution (SSNCE) has given consent and signed a MoU with AMTZ to become a member of the consortium to act as assessment and strategy committee. The Indian BioMedical Skill Consortium (IBMSC) Certifies Indian & International Biomedical Engineers based on their Experience, Competency and Qualification levels. The Certified BioMedical Engineers will be highly preferred to practice profession in BioMedical field and also gets equivalence certification to work in abroad. Initially more than 2 lakhs Biomedical Engineers from India will be benefited by this proposal and it is expected that 6,500 or more fresh graduates will use this platform every year. **Those who have/had graduated from non-BME background and working in BME field are also eligible for this certification.**

| Name of the Exam | Education Qualifications | Experiences |
|---|---|---|
| Indian | ITI / Diploma / B. Tech / B. E / M. E / M. Tech / Ph. D / Post – Doctoral in Biomedical Engineering / Bioengineering / Medical Engineering / Medical Electronics or equivalent. | Fresh graduates (or) working professionals in Biomedical Field. |


**Association for the Advancement of Medical Instrumentation (AAMI) in front of partnering members at India Habitat Center, New Delhi on August 24, 2018**

This Certificate will be awarded based on the score of Technology Readiness Level (TRL), which is based on Experience (E), Competency (C) and Qualification (Q). The Complete details of the points for E, C and Q is available in IBSC official site www.ibsc-amtz.in. Recently, AMTZ has signed a MoU with Association for the Advancement of Medical Instrumentation (AAMI) in front of partnering members at India Habitat Center, New Delhi on August 24, 2018.

On this event, Launch of 50 IBSC assessment centres across the country and a participative discussion among various stakeholders including 31 partner institutions of IBSC, Labs and Research were held.

**The MoU signing event was inaugurated by Dr. Renu Swarup, Secretary, Department of Biotechnology**

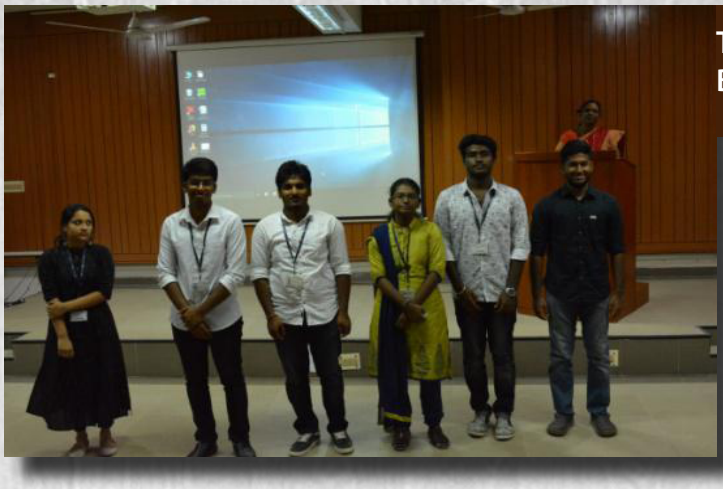
# INSPIRE CAMP

On 31st July, students from the "INSPIRE Internship science camp" visited the Department of Biomedical engineering. The event was co-ordinated by Dr. N. P. Rajesh, Assistant Professor, Department of Physics. The students visited the department, went through the Bioscience, Tissue engineering, Electronic devices, Diagnostic and Therapeutic equipment and Biomedical Instrumentation laboratories, and demonstrations were given to the students.

# ABE INAUGRATION

The Association of Biomedical Engineers organized an inaugration program to induct the new office bearers for the academic year 2018-2019, on 14th August 2018. Mr. B. Srihari, General Manager, Biomedical engineering services, Apollo hospitals, chennai, was invited as the chief guest. The assosiation bearers are:

| | | |
|---|---|---|
| President | - | Jerome Jeyakar.S.A |
| Vice President | - | Devayani.S |
| Secratary | - | R.Manuj |
| Treasurer | - | Raviprasad.R.V |
| Event Co-ordinator | - | Anirudhh Balaji.R |
| Joint Secratary | - | Madhumitha Shankar |



The members of the Association of Biomedical Engineering (ABE)

Dr.A.Kavitha,HOD/BME Inaugrating the association Program for the academic year 2018-2019

# VIDHAAN 2K18

Vidhaan is the biomedical techfest initiated in the year 2017. The second edition of this techfest, Vidhaan 2k18 was held on 14th of August, 2018. It was an exorbitant initiative that let the participants showcase their dexterity in their field, and also realize how interdisciplinary the biomedical field is. 4 technical and 4 non-technical events were conducted.

The technical events were:

Gizmo wizard

Revolution

Code Mania

Mesh Up

The non technical events were:

Treasure hunt

Bigg boss

Quiz Up

Lensation


**The crowd of participants in BME Department**

Over 200 people participated from various departments across the college. Winners were awarded with cash prizes.

**Gizmo Wizard**

# FIRST YEAR PG ORIENTATION

An orientation program was held on 12th of September in the department for the first year PG students .They were given an insight about the department and the faculty members .They were introduced to vision, mission, lab facilities and specialisation of the faculty members in the department.

**Dr. A. KAVITHA HOD/BME addressed the 1st year P.G Students and welcomed them to the exciting journey of learning**

# DREXEL INTERNSHIP

From Drexel School of Biomedical Engineering, three undergraduate students came to the Cognition and Bioengineering Lab of Dr. A. Kavitha Prof & Head, Department of Biomedical Engineering. Three projects were selected by the students of Drexel University during their STAR meet in April and they worked under Dr. Kavitha's guidance for a period of 10 weeks (June to August 2018). The students are Mr. Nadim Amin, who worked on an exoskeleton design project mentored by Ms.R. Nithya, Asst.Prof., Department of BME, Ms. Ashley Bishop who worked on a speech imagery project mentored by Ms. C. Sandhya and Ms. R. Ananda Sree, research scholars of Dr. Kavitha and Ms. Malena Farber who worked on Virtual reality environment for Autistic children mentored by Ms.Vidhusha, Asst. Prof. Department of Information and Technology.

In the month of August, they completed their Internship with a good progress in their projects.

Before their leave, the concepts they learnt and implemented were discussed and the students were felicitated with a momento.

**The Intern Team**

# RESEARCH AWARDS

Improving the diagnosis of the human voice disorders could be benefited in the future from the unique research of vocal vibrations for which the post doctorate Pravin Kumar Subbaraj from the Laboratory of Voice Research, Department of Biophysics, Faculty of Science, was presented with two awards at the prestigious international conference by The Voice Foundation in Philadelphia. He is the first participant ever in its history winning two awards. In this award-winning research on vocal fold vibrations, the Olomouc scientists collaborated with the experts from the Prague Voice Center and Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic.

**Dr. Robert Sataloff, Chairman, The Voice foundation, USA presenting award to Dr. S. Pravin Kumar**


Dr. S. Pravin Kumar has become the first ever person winning two different awards in one year from The Voice Foundation: Sataloff New Investigator Award sponsored by Elsevier, USA and Hamdan International Award sponsored by Dr. Abdul-latif Hamdan.

# EXTERNALLY FUNDED PROJECTS

## RECEIVED:

Dr. A. Kavitha, Prof & HOD, Dr. S. Bagyaraj, Asso.Prof & Ms. R. Nithya ,Asst. Prof., received a grant of Rs.23,70,206/- towards the project proposal entitled "Design and Development of Biosignal Controlled Hand Exoskeleton" , approved by LSRB, DRDO.

## SUBMITTED:

- Dr. J. Vijay, Asso. Professor/BME, submitted a project proposal titled "Development Of An Integrated Framework For Medical Image Retrieval And Classification System In PACS Environment Using Deep Learning" under early career schemes to funding agency DST-SERB with a budget of rupees 18.27 Lakhs and the proposed project duration is 24 months.

- Dr. J. Vijay, Asso. Professor/BME, submitted a student project titled "Development of Mobile Dermatoscope for Automatic Skin Lesion Classification" to TamilNaduState Coucil for Science and Tech (TNSCST) Chennai with a budget of rupees 10,000.

- Dr. S. Arun karthick, Asso. Prof., submitted a student project titled "detection of parkinson's disease by using paper based sensors" to Tamil Nadu State Council for Science and Technology (TNSCST), Chennai with a budget of Rs.10000/-

# INTERNALLY FUNDED PROJECTS

## FACULTY:

- Dr. J. Vijay, Asso. Professor/BME, submitted a project titled "Design and Development of Wearable Textronic for Monitoring Physiological Parameters" with Co PI's Dr.S.Saraswathi,AsP,CSE and Dr.S.ArunKarthick,AsP,BME with a budget of rupees 3.40 Lakhs and the project duration is 30 months.

- Dr. S. Arunkarthick, Asso. Professor/BME, submitted a project titled " Fuctionalised nasal Filter for ABC filteration"with a budget of rupees 6.65 Lakhs and the project duration is 36 months .

- Ms. M. Dhanalakshmi, Asst. Professor/BME, submitted a project titled " Design and Development of Hi-Tech Composite blades for lower limb amputees" with a budget of rupees 1.95 Lakhs and the project duration is 12 months.

## STUDENT:

- N. Nanthini, R. Janaki of II Year have submitted a proposal titled, "Automatic eye drop dispenser" under the guidance of Dr. Sachin Gaurishankar Sarate.

- J. Prem Aravindan, R. Aishwarya, S.E. Durgadevi, R. Sandhanakrishnan of III year have submitted a proposal titled, "Wearable device for detecting hypertension, hypotension" under the guidance of Dr. S. Bagyaraj.

- S. Viswanath (IV Year), M. Janani (II Year), Saranya (II Year) have submitted a proposal titled, “Portable power generating microbial fuel cell” under the guidance of Dr. R. Subashini.

- Anupam Bhaskarbhatta, Arvindh Swaminathan of III year have submitted a proposal titled, “An ankle foot orthotic device integrated with a functional electrical stimulation unit to assist and improve walking for a foot drop” under the guidance of Ms. B. Divya and Dr. Sachin Gaurishankar Sarate.

- P. Kawya, S. Srija of III year have submitted a proposal titled, “Wearable reader for visually impaired people” under the guidance of Ms. M. Dhanalakshmi.

- D. Sutheshnna (III Year), T. S. Subhasri (II Year), R. Aarthi (rinithi (II Year) have submitted a proposal titled, “Automatic writing stylus for visually challenged” under the guidance of Ms. R. Nithya.

- S. Santhosh, Venkatakrishnan Sudharshan, R. Saisrinivasan, Patrick. A. Joseph, S. Prashanth of III year have submitted a proposal titled, “EEG based brain computer interface for prosthetic hand control” under the guidance of Dr.S.Bagyaraj.

# JOURNAL PUBLICATIONS

1. T. R. Thamizhvani, Suganthi Lakshmanan & R. Sivaramakrishnan, "Mobile application-based computer-aided diagnosis of skin tumours from dermal images", in The Imaging Science Journal (Online Published), July 2018.

2. R.Subashini,Madhumitra.S.k,Balashanmugam.P,Mosachristas.K,Tamilselvi.A had published a paper in an international journal on In Vitro cytotoxicity of biosynthesized gold nano-particles from shells of Pistacia VeraL. Int J App Pharm (scopus indexed), Vol 10, Issue 4, 162-167, (July-Aug), 2018.

3. Vanitha Priya D, Sudersan K, Arun Karthick S, Arumugam P, Pandima Devi MK, Anuradha V, N. Gobi, "Adsorption Mechanism Of Chitosan, Activated Carbon, And Magnetic Chitosan Activated Carbon Composites On To The Dyes With Different Polarities: Adsorbent Optimization Study", International Journal of Current Advanced Research, Vol 7, Issue 7(G), 14306-14312, July 2018.

4. Manasvi, Sai Aarthi Ganesh, Sridhar Anjali, Kunnavakkam Vinjimoor Swetha, Krishnamoorthi Nirmala, "Detection of Malarial Parasite from Blood Smear Image", Biomedical Letters, Vol. 4, Issue 1, 24-33, Aug 2018.

5. Vanitha Priya D, Sudersan K, Arun Karthick S, Arumugam P, Gobi N, Siva Shankar. P and Anuradha V, "Extraction Of Chitosan From Crab Shells Using Five Different Chemical Methods And Its Characterization", International Journal of Recent Scientific Research, Vol. 9, Issue, 8(D), pp. 28512-28517, August, 2018.

# CONFERENCE PAPERS

- C. Sandhya, B. Divya, A. Kavitha & T. Christy Bobby, "Influence of Relative Power in Multi-trial Speech Imagery", 17th International Conference on Cognitive Informatics & Cognitive Computing (ICCI*CC'18), University of California, Berkeley, July 16-18 2018.

- The following paper is presented in an International Conference:(11.9.18 to 12.9.18) R. Anitha and R. Subashini, "Evaluation of In-vitro antimicrobial properties of Cassia auriculata extracts", International conference on emerging areas of biotechnology for human welfare and bioentrepreneurship , ICE-BHE' 2018, B. S. Abdur Rahman Crescent Institute of Science and Technology, Vandalur, Chennai.

## FACTS

ARTIFICIAL ORGANS Developing a functional, implantable artificial organ is one of the holy grails of biomedical engineering, and one of the most active areas of research. Biomedical engineers have developed dozens of artificial hearts, but as of 2013 all have had serious limitations. Penn State University has an active artificial heart research program. Other bioengineering researchers are involved in projects to develop artificial kidneys or skin.

# EVENTS ATTENDED

- Dr. J. Vijay, Asso.Prof/BME, participated in "Celebrating 60th year of phototherapy event" organized by Standford University of Medicine, USA, National Neonatology Forum of Tamil Nadu and India Neo Designs collaborated with Phoenix Medical Systems at Hotel Savera, Chennai (1st August,2018).The conference showcased different technologies in maternal and neonatal health and in continuing medical education on Phototheraphy.

- M. Dhanalakshmi, Asst.Prof/BME, had attended a three day "Workshop on Conventional Machine Learning to deep learning for speech, image and text processing" organized by Dept.of ECE at SSN college of Engineering (16th August, 2018-18th August, 2018). This workshop signifies the importance of machine learning and deep learning and the application of deep learning for speech, image, text procession as deep learning can improve the algorithm much effectively than machine learning.

- Dr. J. Vijay, Asso.Prof/BME, participated in MoU signing ceremony of IBSC with AAMI (American Association of Medical Instrumentation) in India .

# PATENTS FILED

Dr. S. Arun Karthick, Asso.Prof/BME, filed the following patents:

1. "Multifunctional nanocomposite nanofibrous filter for aerosol filtration, chemical and biological protection", Application No: 201841029428.

2. "An enhanced carbon dioxide sorbent nanofibre membrane and a device thereof", Application No: 201841031076.

# ONLINE COURSES COMPLETED

Dr. S. Arun Karthick, Asso.Prof/BME, has completed "ACS Reviewer Lab" online course conducted by "American Chemical Society".

## FACTS

### Micro/Nano Technologies

Microtechnology and nanotechnology use semiconductor fabrication and 3-D printing methods to create tiny medical devices. As of 2013, research in biomedical micro/nano technologies includes lab-on-chip devices that can perform sophisticated analyses and diagnoses, implantable biomedical microdevices, biodegradable scaffolds to support tissue growth, nanoscale biosensors and various nanoparticles for imaging

# GUEST LECTURES DELIVERED

- Dr. S. Bagyaraj, Associate Prof/BME, delivered a Guest lecture on title "Positive Feedback and Oscillators" at Department of Electrical and Electronics Engineering in RMD College of Engineering, Kavaraipettai on 18th August, 2018. This guest lecture provided idea about positive feedback in oscillators .
- Dr. B. Geethanjali, Asso.Prof/BME, delivered Guest Lecture on "Computational Neurosignal Processing and Its Applications" at National Seminar On Computational Biomedical Engineering on 26.9.18 conducted at Department of Biomedical Engineering, SSNCE.

# TECHNICAL PAPERS REVIEWED

- Dr. J. Vijay, Asso.Prof/BME, reviewed a manuscript titled "Feature Based Road Traffic Congestion Estimation and its Application in ITS" submitted to the International Journal of Computer Aided Engineering and Technology (IJCAET), Inderscience Publisher.
- Dr. S. Arun Karthick, Asso.Prof/BME, reviewed a manuscript titled "Integrated Intelligent Computing for Heat Transfer and Thermal Radiation based two phase MHD Nano-fluid flow model" submitted to Springer Neural Computing and Applications.

# BEST TEACHER AWARD:

The department is proud to present two of the faculty members, Dr. R. Subhashini and Ms. K. Nirmala who have received the best teacher award from the college on the TEACHERS DAY program held on the 5th of september 2018.

**Dr.R.Subashini recieving the award from the Chief guest**

**Dr.K.Nirmala recieving the award from the Chief guest**

# DOCTORATE CONFERRED

Ms. K. Nirmala, Asst.Prof/BME, successfully completed her Ph.D.Viva Voce on 7.9.18 on her thesis titled "Investigation on feature based detection of Glaucoma in fundus images" and she was awarded the Ph.D. degree from SSNCE.We congratulate her on behalf of the BME department.

# Ph.D VIVA VOCE

- Dr. V. Mahesh, Asso.Prof/BME, conducted Ph.D. viva- voce for his student Dr.S.Pramila (2011114033) . She defended her thesis titled "Prediction and Classification of Spirometric Features using Parametric and Non-Parametric Approaches, on 27.08.2018.

**Ms.S.Pramila defending her thesis**

- Dr. A. Kavitha, Prof. and Head, Dept.of BME, conducted a Ph.D. viva-voce for her student Ms. C. Sandhya (Reg. No. 1324499758), a full time scholar. She defended her Ph.D. thesis titled, "Speech Imagery based Vowel Identification using Brain Connectivity Estimatorsand Machine Learning Techniques", on 28.9.18.

**Ms.C.Sandhya defending her thesis**

# INTERNSHIPS/ HOSPITAL TRAINING

**4th year:**

- Harshni. V has done a 3 week internship at Siemens Goa.
- Rukmani Krishnamurthy has done intern at Bioklone,SIPCOT.
- S.Viswanath has done internsip in Delta inspection and research cetre.
- Janani Aiyer has done internship at the University of California at Davis from June to August.

**3rd year:**

- T Akshara Reddy has persued a 40 hours Internship course in MATLAB, at the LiveWire Institute, Mylapore.
- R.R.Gayathiri has done internship in IIT-MADRAS on data analytics.
- G.Aghil Kavya has done internship in IIT madras on Data Analytics.
- Suhashine S has done internship at Appasamy associates;Internship in Gait lab at Clri, Guindy .
- P.Kawya has done an inplant training at CANCER INSTITUTE In the department of biomedical engineering.
- Ishaasamyuktha had undertaken a training at Apollo Hospital, Chennai.
- Se.Durgaadevi, Saranya.T, Aishwarya.R has done their observership at Ramachandra Hospital for 2 weeks in the month of June.
- L. An. Lindhiya, Aadarsha.N, Prem Aravindan.J; Implant training at Meenakshi Mission Hospital and Research Centre in the month of June.
- Nithya Mylakumar.M has done Implant training in Biovision medical.

# SPORTS

**4th year:**

- Aniruddh Balaji R has represented the college and is the winner of:

1. Spree 2018, BITS Goa - Winner (Table tennis )
2. Breeze 2018, Shiv Nadar University - Winner (Table tennis)

- Anjana.K.R has represented the college and is the winner of:

1. Anna University Interzone Tennis Tournament
2. Tamilnadu Inter-University Tennis Tournament

**3rd year:**

- C.Kezia Sharon has represented the college and is the winner of:

1.The state level inter-college table tennis tournament conducted by PITS,TANJORE.

2.The ANNA UNIVERSITY ZONALS table tennis tournament.

3. The state level inter-college table tennis tournament conducted by IIT MADRAS.

# ONLINE COURSES COMPLETED

**4th year:**

- Sangeetha.B has completed online course in NPTEL on Biomedical signal processing
- S. Om Prakash has completed online course in NPTEL for the subject data analytics decision making and for the subject economics in health.
- S. Viswanath completed an online course in NPTEL on patent drafting for beginners and Management of new products and services.

**3rd year:**

- G.Aghil Kavya has completed an online course in NPTEL onon MATLAB programming for Numerical Computation
- G.Niharika has completed an online course in NPTEL on Drug designing and delivery.
- Kavya.V.Kannan and Prem Aravindan.J has completed an online course in NPTEL on Human Molecular Genetics.

# EXTRACURRICULAR:

**2nd year:**

- P. Florina Jane has started a music band named Concordia and uploaded two music covers.
- Mayura Balagurunathan performed classical dance in Singapore during summer.

# PLACEMENTS

LTI
Larsen & Toubro Group Company

- S.Nivedha

Cognizant

- Ancy Carshia S
- Aniruddhbalaji R
- Divya R
- Jaya Pradha R
- Jaya Sree S.N
- Jerome Jayakar
- Lakshmi Parvathi M
- Nagalakshmi K
- Nandhini D
- Naresh Narendernath E L
- Nissy Elan Shaji
- Praveen kumar G
- Shruthi P S
- Sahana V
- Saisudan R
- Sivaranjani M
- Sreeja P
- S Subashini

Infosys

- Ancy Carshia
- Aniruddhbalaji.R
- Divya
- Lakshmi
- Manuj
- Sahana
- Sreeja
- Subashini
- Vedavalli Nivetha
- Viswath Narayan.R
- Yaamini

TATA
TATA CONSULTANCY SERVICES

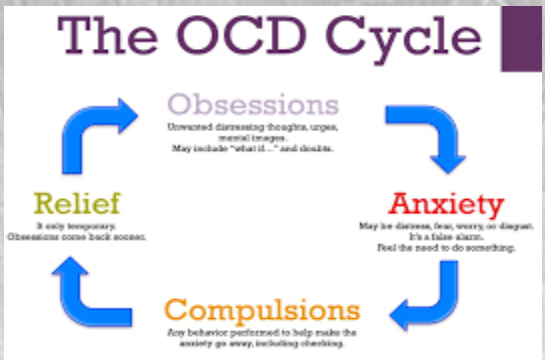
- Lakshmi M
- Viswath Narayanan R
- R Manuj
- Yaamini D

ZIFO
RnD SOLUTIONS

- Anuharshini K
- Kirthana M
- Rukmani Krishnamurthy
- Sucharitha S. Prakash

# STEP OUT OF YOUR OCD MORE EASIER!

*Brainsway's Brain Stimulation device to treat Obsessive -Compulisve Disorder.*





Its not only diseases that require treatments or better solutions, there are various conditions too.One such is the Obsessive Compulsive Disorder(OCD)- its not something which needs symapthy but needs attention.

The OCD is one common syndrome present in the wordly population and is treated as one form of depression or just an anxiety disorder. It starts from small things like getting depressed for an unclean table to something big like thinking everything to be a failure.In some cases, drugs and counselling will help but there are severe cases too.

Eariler, non invasive electrical and magnetic fields were applied to the scalp and were called transcranial direct current stimulation. But these techniques weren't effective and for better results they required implanting electrodes into the brain.

A new discovery of a company called BRAINSWAY has designed the device such that it relies on deep transcranial magnetic stimulation (Deep-

TMS) to stimulate deep brain structures via powerful, carefully positioned electromagnets. The BrainsWay device stimulates the brain at greater depth and breadth than other TMS devices and can target areas which were impossible to reach non invasively earlier. The device looks exactly like a helmet or rather like bonnet hair dryer and contains a magnetic coil that specifically targets regions in the deep front of the brain. For depression, a specialized coil targets the bilateral prefrontal cortex with preference towards the left.

For treating OCD , they have developed the H-7,which is basically a coil on the frontal lobe that folds over the corpus callosum. Imaging studies have shown abnormalities in the frontal area of the brain in patients with OCD, but the reason behind it is still unanswered.Currently this deivce has got the FDA approval based on their trail for 100 patients belonging to the United States population. The study involved observing, taking this treatment versus the ones not and their brain conditions were observed regularly. The treatment was given for about 25 minutes for five days a week for a total of six weeks. Of the 50 odd ones taking the treatment almost 40 had decrease in thier OCD symptoms and had no side effects.

The BRAINSWAY has now decided to install these cute helmets in hospitals and clinics but have stated it cannot be used to do self treatment in the patient's home itself.

By,
Suhashine.S, 3rd yr, BME

# TECHNOLOGICAL ADVANCEMENTS IN BIOMEDICAL ENGINEERING

Biomedical engineering is a branch of engineering that applies principles and design concepts of engineering to healthcare. Biomedical engineers deal with medical devices such as imaging equipment, biocompatible materials such as prostheses or therapeutic biologicals, or processes such as regenerative tissue growth.

Biomedical Engineering has knocked the doors of innovation constantly in past years. This growth is supported by advances in biological science, which have created new opportunities for development of tools for diagnosis and therapy for human disease. The discipline focuses both on development of new biomaterials, analytical methodologies and on the application of concepts drawn from engineering, computing, mathematics, chemical and physical sciences to advance biomedical knowledge while improving the effectiveness and delivery of clinical medicine. Biomedical engineering now encompasses a range of fields of specialization including bioinstrumentation, bioimaging, biomechanics, biomaterials, and biomolecular engineering. Biomedical engineering covers recent advances in the growing field of biomedical technology, instrumentation, and administration.

Contributions focus on theoretical and practical problems associated with the development of medical technology; the introduction of new engineering methods into public health; hospitals and patient care; the improvement of diagnosis and therapy; and biomedical information storage and retrieval.

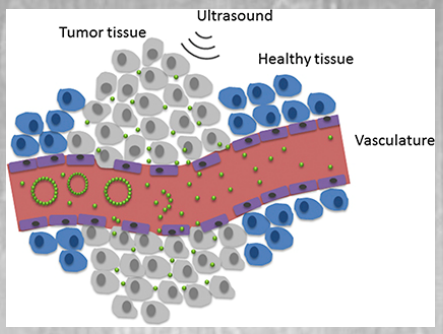
## 'Bionic eye'

A team of researchers at the University of Minnesota have, for the first time, fully 3D printed an array of light receptors on a hemispherical surface. This discovery marks a significant step toward creating a "bionic eye" that could someday help blind people see or sighted people see better. Bionic eyes are usually thought of as science fiction, but now we are closer than ever using a multimaterial 3D printer. Researchers started with a hemispherical glass dome to show how they could overcome the challenge of printing electronics on a curved surface. Using a custom-built 3D printer, they started with a base ink of silver particles. The dispensed ink stayed in place and dried uniformly instead of running down the curved surface. The researchers then used semiconducting polymer materials to print photodiodes, which convert light into electricity.

## 'Micro bubbles'

Today in the area of drug delivery, some of the things that excite us the most is nano technology where one might be able to deliver drugs right to a tumor and no other place in the body. Microbubbles, they're very tiny particles, micron size, and

instead of being filled with liquid, they're filled with gas. Because of that they're visible on ultrasound and they're used to improve ultrasound diagnostics. So, drugs are incorporated into these microbubbles. If those microbubbles are loaded with drugs and injected into the body, they will distribute everywhere, but then the microbubbles can be disrupted by an ultrasound beam and the drug will be delivered specifically where the drug is needed.




## 'Smart stethoscope'

The humble stethoscope is back and coming to a smartphone near you. This fixture of every kid's toy doctor kit has been outshone by today's arsenal of sophisticated electronic diagnostic tools. Doctors and nurses still pay attention to a patient's heart and lung function, of course, but now it is often easier and more definitive to order x-rays, electrocardiograms, or other, more advanced tests. But a new electronic take on this old-school tool, the Eko_Core attaches to an analog stethoscope to provide seamless analog and digital sound, which it transmits using Bluetooth to the cloud, from where a doctor can download it to a smartphone.

Selected by *Time* magazine as one of the top inventions of 2015, the scope does the listening for the doctor, who can visualize waveforms in real time, record and playback body sounds, share recordings, and store data in the patient's electronic health record in compliance with federal patient\rules. The scope could help reduce healthcare costs related to unnecessary specialist care by helping general practitioners take more advanced measurements on their own.

## ‘P300 brain computer interface’

A brain-computer interface (BCI) enables communication without movement based on brain signals measured with electroencephalography (EEG). BCIs usually rely on one of three types of signals: the P300 and other components of the event-related potential(ERP), steady state visual evoked potential (SSVEP), or event related desynchronization(ERD). Although P300 BCIs were introduced over twenty years ago, the past few years have seen a strong increase in P300 BCI research, and could lead to improvements in bit rate, reliability, usability, and flexibility.

By,
Kirthana.N, 3rd yr, BME

# ROBOT-ASSISTED SURGERY

On April 11, 1985, Long Beach Memorial Medical Center in California used an industrial robot (Unimation PUMA 200) to insert a probe for use in a brain biopsy using computed topography navigation. This was the first recorded robotic surgery procedure. Of course, the field has come a long way since then. Robotic surgery, or robot-assisted surgery, allows doctors to perform many types of complex procedures with more precision, flexibility and control than is possible with conventional surgical techniques. A true robotic surgery system uses a camera arm and mechanical arms with surgical instruments attached. A surgeon controls the arms while seated at a computer console.

## Autonomous Surgical Robots: The First Generation

The evolution of robotic systems has taken a route that is contrary to logic: the early, first-generation robots—some even cleared by the U.S. Food and Drug Administration (FDA)—were autonomous, meaning they could carry out some procedures entirely by themselves without a surgeon's guidance. Examples include the 1991 Probot developed at Imperial College London and used for a urological procedure, and the 1992 Selective Compliance Assembly Robot Arm (SCARA) used for a total hip arthroplasty (THA). However, the first surgical application used in humans was with the ROBODOC for THA in 1992;  Two other surgical robots, both based on sound science, were never used clinically: BRIGIT's price of $100,000 was the reason despite FDA clearance, and VectorBot's full autonomy was a problem—surgeons wanted robots to be collaborative assistants, not replacements. This gave rise to the second generation of surgical robots that involved the concept of the master and slave.

## Robotic-Assisted Surgical Devices: The Second Generation

Yielding to surgeons' demands, the industry pivoted toward robotic-assisted surgical devices. In the master-slave configuration, the robot (slave) translates the surgeon's (master) hand, wrist and finger movements.The surgical team assists at the patient's side, preparing entry sites and installing instruments as requested by the surgeon. The robotic system has three or four robotic appendages: two or three for instrument manipulation and an endoscope that is equipped with image processing and visual acuity tools that provide surgeons with an enhanced, three-dimensional view of the surgical site. The instruments have seven degrees of motion that mimic the human hand and wrist. The robotic arms enter the patient through a 1- to 2-centimeter opening. The surgeon controls the endoscope, with 360-degree rotation, distal and proximal movement, and zoom capability. The console instrument controls that the surgeon uses emulate scaled-down movements of instruments inside the patient.

Examples of this generation include the Rio from Mako (which was acquired by Stryker in 2013), Hansen's Sensei, and the pioneer and the most popular of all: Intuitive Surgical's da Vinci robot.

## The Need for Third-Generation Devices

Given the high price tags on these systems (the base price of a da Vinci system is upwards of $1 million) and the lack of plausible evidence of a sufficient return on investment for hospitals and health systems, there is criticism and push-back about this technology from some parts of the industry. Surgeons also are demanding a better haptic interface. The tactile experience—the sense of touch to "feel" what the robotic arm faces—is also important feedback for a surgeon

while carrying out a procedure. Once again, the industry is beginning to pivot to accommodate these demands.

Surgical robots will become a standard of care as early as 2020. However, only 5 to 10 percent of all open surgical procedures were performed by robot-assisted systems in 2016, so the rate of uptake over the next few years will provide a clearer picture of how this market is developing. Analysts believe these devices have the potential to penetrate as much as 50% of all surgical procedures, making it a highly lucrative market. Will you opt for a robot to operate on you, if the time comes?

## FACTS

### Biomaterials Research

Biomaterials research is of critical importance to many facets of biomedical engineering. Advances in biomaterials underlie advances in many areas of biomedical research, particularly artificial organs, prostheses and wound healing. Biomaterials research focuses on the interactions of biomolecules and cells with materials. Biomaterials researchers study the properties of materials and develop new materials for biomedical applications.

# UPCOMING EVENT

FIFTH INTERNATIONAL CONFERENCE

**BIOSIGNALS, IMAGES, AND INSTRUMENTATION**

# ICBSII 2019

WWW.ICBSII.COM | MARCH 14 - 15, 2019 | CHENNAI

The Department of Biomedical Engineering, SSNCE is organizing the FIfth International Conference on Biosignals, Images and Instrumentation (ICBSII 2019) during March 14 - 15, 2019 for deliberating with renowned experts in this field. This invitation is open for all academicians, research scholars, Post-Docs, PG and UG students working in the field of Biomedical Engineering related areas.

## CALL FOR PAPERS

ICBSII 2019 is an opportunity for medical engineering professionals from around the world who are involved in the field of healthcare to submit their original research papers which have not been submitted elsewhere in other conference / journals. All selected papers presented in the conference will be published in Springer Lecture Notes and the extended papers will be submitted to possible inclusion in scopus indexed Journals

## TOPICS

3D Bio-printing
Advances in Biomedical Instrumentation
Biomedical Imaging and Data Visualization.
Biomedical Signal Processing
Brain Computer Interface
Cardiovascular & Respiratory Systems Engineering
Cognitive Neuroscience
Computer Aided and Automated Diagnosis
Devices: Micro- & Nano-bioengineering
Device Technologies & Biomedical Robotics
Drug Delivery & Diagnostic Systems
IOT & Healthcare Information System
Medical Image Mining & Retrieval system
Mobile Health and Wearable Sensor Networks
Nanotechnology for Biomedical Applications
Neural Engineering, Neuromuscular Systems & Rehabilitation Engineering
Speech Signal Processing
Optimization techniques
Virtual Reality and also topics related to biomedical engineering

### IMPORTANT DATES

**Full Paper Submission:**

December 14, 2018

**Acceptance Intimation:**

December 28, 2018

**Submission of Revised Paper:**

January 21, 2019

**Camera Ready Paper Submission:**

February 11, 2019

**Early Bird Registration:**

January 25, 2019

## PUBLISHER

Springer