ABE

SSN

Department of Biomedical Engineering

saṁhita

Technical Magazine of Srishti,
The Intellectual Synapse
2k13

DEPARTMENT OF BIOMEDICAL ENGINEERING

proudly presents

saṁhita

The Technical Magazine of SRISHTI 2k13

SSN College of Engineering OMR Road, Kalavakkam, 603110

FROM THE PRESIDENT'S DESK

At the outset, I wish to convey my heartfelt congratulations and felicitations to the faculty and students of the Biomedical Engineering discipline for bringing out the magazine, "SAMHITA" on the day of "SRISHTI", the National Level Technical Symposium to be held under the aegis of the Biomedical Engineering Department on 3rd September, 2013. I am happy that the symposium has rightly chosen to focus on health care importance in 21st century, besides highlighting the real time projects carried out by the Biomedical Engineering students of SSN. This Symposium will definitely provide the right environment for exchange of ideas and experience between the members of the biomedical community. I am certain that Srishti will be a premier forum, presenting the technological advances in the field of biomedical engineering and generating thought-provoking and innovative ideas.

I wish Srishti 2k13 all success!

Ms. Kala Vijayakumar
President, SSN Institutions

FROM THE PRINCIPAL'S DESK

I am pleased that the Department of Biomedical Engineering is conducting SRISHTI 2k13, the National Level Technical Symposium and is releasing "SAMHITA", their magazine.

The college moulds the students to gain knowledge in the state-of-the-art techniques in their discipline, which enables them to apply the same in various situations. The mission of SSN is to make a positive difference to the society through education. I am overwhelmed with joy to see our students who are not only diligent, devoted and dedicated in their efforts but are also innovative in their thinking. I wholeheartedly appreciate the HOD and faculty members of the Biomedical Engineering Department for their guidance and the continuous support they extend to the students. I congratulate the members of the editorial board for their exemplary achievement.

Dr. S. Salivahanan
Principal, SSNCE

FROM THE HOD'S DESK

It gives me immense pleasure to write this foreword, yet again, for our annual magazine ‘SAMHITA’. I would like to congratulate our student editorial team for continually coming up with new ideas for the magazine. It requires patience and skills to present a magazine, and I would like to laud the efforts taken to collect, edit and present one.

Biomedical Engineering, as we know, is a multifaceted field and having a program that integrates academia with technology and its latest developments, is meritorious. We believe that our department plays a crucial role in designing the future of healthcare. The presence of a highly skilled faculty, who teach with a vision, complements the high end technology available in our labs, providing the students, the right path in their journey of innovation and learning.
This year’s theme for Srishti, our National Level Technical Symposium, is Cognition. The field in itself is unfathomable and plays a significant role in shaping the perfect research professional in the current scenario. It is heartening to see the diverse arenas within cognition that are being highlighted this year. The unity of the students in their attempt to make the event a success is heart-warming.

I am confident about the success of this magazine. And I hope to be able to witness more such success stories.
All the very best!

Dr.A.Kavitha

Head of the Department
Biomedical Engineering

FROM THE ABE PRESIDENT

“The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honors the servant and has forgotten the gift. We will not solve the problems of the world from the same level of thinking we were at when we created them. More than anything else, this new century demands new thinking: We must change our materially based analyses of the world around us to include broader, more multidimensional perspectives.”

-Albert Einstein

In adherence to the above, we have taken a step towards revolutionizing ideas. Srishti is our prodigious attempt to realize those dreams and provide a forum for lateral thinking, to open the doors of creativity and to expand the horizons of intellect.

On behalf of the Association of Biomedical Engineers and the Department of Biomedical Engineering, I feel very elated to announce this year’s version of Srishti with the central theme being Cognition.

Coming together is a beginning. Keeping together is progress. Working together is success. Let us unite for this idealization.

John Besly
President, ABE

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FROM THE RESONATING NEURONS AT SAMHITA

It's time of the year where we celebrate the phenomenon called Biomedical Engineering, a rather new member of the technology family, which rose as a result of a paradigm shift in the domain of man-machine interaction. It's the time for Srishti, 2013 – the Intellectual Synapse, so called due to our theme for this year's technical symposium – Cognition. Taking the tradition forward with each symposium, we bring to you SAMHITA. This celebration of intellect, skill and achievements would be sure to give you a glimpse into the department's potential.

'Samhita' in its literal sense represents the Vedas. An extremely intriguing Sanskrit word, which represents the compilation of knowledge representing the eclectic mix that biomedical engineering is.

Cognition represents all the mental processes occurring within each of us. It has been an integral part of human survival over centuries and the recent trend of artificial enhancement of cognition has caught up in a big way. This Srishti emphasizes on this and much more of the mysterious shroud around the concept.

'Samhita' is the culmination of the efforts and the encouragement put in and provided by a lot of people. The head, Dr. A Kavitha and the entire faculty whose constant support and suggestions helped us improve. Also, a big thank you to all our fellow students, without whose inputs none of this would have taken its present shape.

We do hope that you find yourselves as amazed and enlightened reading through it, as we were while putting the whole thing together. So, until next year when the new blood takes it a notch higher, keep innovating, keep dreaming and keep discovering!

Senior Editors

ABOUT THE COLLEGE

Dr. Shiv Nadar, Chairman, HCL Technologies founded SSN College of Engineering in the year 1996. The College is set in a sprawling 250-acre campus on Rajiv Gandhi Salai also known as the IT Corridor of Chennai. The institute was founded with the mission of providing world-class education to the diverse and dynamic community of students who work towards obtaining a variety of graduate and undergraduate degrees. Also, wide ranges of research programs are available as options for students to choose from.

Apart from a plethora of academic opportunities that SSN provides, it encourages students to take part in various sports, extracurricular and co-curricular activities that helps in the rounded development of students. Their journey through learning is accentuated by the availability of state-of the art facilities, a world-class teaching faculty and a carefully integrated infrastructure.

SSN follows an admission policy based completely on merit but also provides an opportunity to students of diverse economic strata through various scholarship programs that have been inducted. Strongly backed by a well-connected alumni association, the college also gives the past students of the college to share their experiences with the current students.

This heady cocktail of good administration, bright young minds and an undercurrent of strong technology has cemented the position of the institute among the country's finest.

ABOUT THE DEPARTMENT

The department of Biomedical Engineering at SSN College of Engineering is all about conceptualizing and implementing exciting ideas that seek to blend engineering and medicine. The Department, started in the year 2005 has continuously strived to achieve excellence and promote quality research in the field of Biomedical Engineering. Novel healthcare innovations that can potentially improve the medical scenario in terms of quality, affordability, availability and accessibility have always been the key focus of the department. The department has got MOUs signed with Phoenix Medical Systems, Bharat scans, Trivitron Inc., Chettinad Hospital and Sri Ramachandra Medical University. Maintaining cordial associations with both the medical and the engineering fraternity has significantly helped in continuously updating and understanding the emerging challenges in the field of healthcare and thus bringing out apt solutions. The department is led by a team of 12 highly qualified faculty, 4 teaching assistants supported by the administrative staff. The student strength of the department is 260. The department has got six high-end laboratories each with state of the art facilities, updated with the latest technology.

A students' chapter of IEEE Engineering in Medicine and Biological society and setting up of the I-cell are some of the many initiatives taken by the department to nurture research interests in students. The I-Cell initiative has been instrumental in stimulating research interests. There are seminars and guest lectures conducted periodically in the department to enable students maintain a steady rapport with the industry and help identify their research interests. The department has consistently won accolades for the different innovative ideas put forth by its members. The various awards and cash prizes won by the students stand a tall proof for the same.

The Journey..

Srishti was born in the year 2008. Being the first of its kind; it was a landmark event in the history of engineering institutes in the state. The event attracted more than 300 students. The event was presided over by Dr. Kamala Selvaraj, an eminent gynecologist and the brainchild of the first test tube baby of India. Srishti-08 was a huge success. Its impact was evident; it sparked off a lot more such events in the other institutes as well.

The focus of the second edition of Srishti was organ donation. Key note speakers shared their ideas, views and opinions on the subject and inspired people to pledge their organs. The event was yet again a grand success and paved way for a slew of workshops that year.

The 2010 version of Srishti raised the bar higher. There were around 500 participants. The theme was autism awareness. It saw the participation of people from varied backgrounds such as medicine, psychology, engineering, etc. The year also marked the first version of this magazine.

Srishti 2011 was the biggest biomedical symposium of the state, with visitor strength of 650. The theme was Diabetes. The idea was to create awareness about the disease since India was the emerging diabetic capital of the world. There were novel workshops and an interesting series of events.

The success of Srishti continued in 2012, the centenary year of contact lenses. The theme accordingly was vision. The student body, as an inspiring gesture, pledged to donate their eyes. Conditions like corneal blindness and bionic eye were lighted upon and the event was the fifth helping of success.

We are back this time, bigger and better. We have chosen cognition and its enhancement as the primary theme of this year, keeping in mind its importance in every walk of life in the current professional and research scenario. We truly believe that Srishti version 6 will continue the tradition, be a lot more successful.

The inauguration of the Association of Biomedical Engineers (ABE) was held on 31-07-2013 in the Mini Auditorium as a primary step towards Srishti and other technical events. The inauguration started at around 10.00 a.m. with the invocation song rendered by Rasikha R, final year. The Head of the Department, Dr A.Kavitha, welcomed the chief guest for the day, Dr. Vinayak Senthil and the distinguished gathering and also addressed the audience. The President of ABE, R. John Besly delivered the presidential address. He lucidly made everyone understand that Srishti is an extravagant event organized every year as an effort taken by the students. He put forth cognition as the idea of this year's Srishti version 6.0. Following his address, Mrs.M.Dhanalakshmi took the privilege of introducing the chief guest, Dr.Vinayak Senthil to the gathering. Dr.Vinayak Senthil is the founder of Speed Hospitals and also established the Speed Medical Institutes, a pioneer institute in training medical graduates for higher studies. He gave an inspiring speech that emphasized the significant role played by biomedical engineers in the healthcare industry. He urged the students to pursue biomedical engineering as it is a platform for the innovators to exhibit their latent potency. He was presented with a memento by Dr.Kavitha as a token of gratitude.

The most awaited part of the event followed. The poster for Srishti 2k13 was released by the chief guest. The teaser done by Deepak Dennison, II year was presented and the crowd was enthralled by seeing the number of

technical and non-technical events planned for the technical symposium. The final year students B. Vignesh, Sanjay Romero D'Sami, Shamala and Sona conducted a workshop on Matlab and Android. Nearly 300 participants thronged and actively took part in the workshop. The basics of MATLAB programming, designing of user defined functions, usage of Data acquisition tool box, Curve fitting tool box, the basics of Artificial Neural networks design on MATLAB, design of Graphical User Interface with MATLAB were discussed and finally the participants designed their own calculator software using MATLAB. The second session of the workshop dealt with Android application development. The IDE "Eclipse Indigo" was introduced to the participants and the basics of "JAVA" programming and "XML" programming were covered and the participants also learnt to design their own calculator on Android and then in addition to this, an application was designed for switching between various activities using Intents. Certificates were provided to the participants.

Association of Biomedical Engineers 2013-2014

Association Co-ordinator
Mrs. Dhanalakshmi
Asst. Professor

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John Besly
IV Year

Vice President
Rajashree
IV Year

Treasurer
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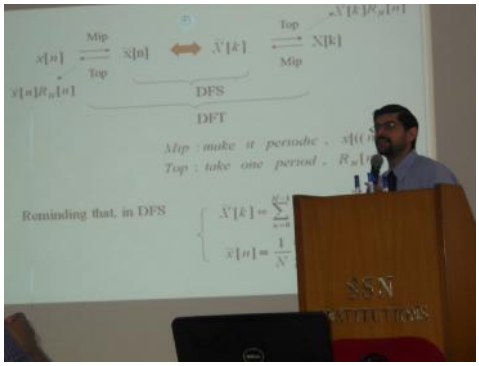
Co-ordinator
Sudhakar Chinraj
IV Year

Office Bearer
S Hema Vardhini
III Year

Office Bearer
N.Hemanath
III Year

WORKSHOPS/CONFERENCES CONDUCTED:

The past year witnessed a number of department activities:



- A workshop on “Arduino & LabVIEW with its biomedical applications” was conducted on 16th and 17th October 2012, by Mr. Pragadheeswaran, CEO of Aries Biomed Technologies, Coimbatore.
- A three day National Level Technical Workshop was conducted on, "Applications of Wavelets in Life Sciences", from 13th to 15th December 2012.
- A workshop on Recent Advances on Diagnostic and Therapeutic Equipments and their applications that was held on 22nd and 23rd January 2013.
- A Skype presentation on Viscoelasticity of Tissues and Biofilms was given by Dr. Prashanth Sharma, University Medical Centre Groningen (UMCG).
- There was then a non-technical workshop on Product Development by the HOD of Mechanical Department, Dr. V.E. Annamalai. The talk was on product design and development.

- The biggest event though, was the ICBSII – 2013: International Conference on Bio-Signals, Instrumentation and Imaging. The conference was held over three days, 14th to 16th March, 2013. There were key-note speeches by eminent speakers from the field such as Dr. Emilio Gomez-Gonzalez, Director, Group of Inter-Disciplinary Physics, University Of Seville, Spain, Mr. Solaikutty Dhanapal, Academic Manager (Asia), National Instruments.

- The department then conducted, on the 9th of April, 2013, a one day workshop on “Digital Signal Processors”. Mr.R.Suresh, Assistant Professor, School of Electronics Engineering, VIT, Vellore gave demonstrations on DSP processors.
- There was an AICTE sponsored Project Exhibition to display all final year projects.

- A workshop on Recent Advances on Diagnostic and Therapeutic Equipments and their applications was held on 22nd and 23rd January 2013.

Faculty Achievements

There have been quite a number of inspiring and motivating achievements by our faculty, on the technical side in the past twelve months.

- Mallika Jainu, AP/BME Supraneni Krishnamohan and Saraswathi have published a research article: Non-alcoholic steatohepatitis experimental model induction in rats in the International journal of Pharma & Biosciences, Volume 3 Issue 3; 2012.
- Subashini Rajakannu AP/BME, Sritharan Umamaheswari Rakshitha published a paper titled “Phytochemical Screening, Antimicrobial Activity and In Vitro Antioxidant Investigation of Methanolic Extract of Seeds from Helianthus annuus L.” in the International Journal Che Sci Rev Lett 2012, 1(1), 30–34, ISSN 2278-6783 and was also selected for Best Research Paper Award.
- Dr.A.Kavitha and Dr.S.Pravin Kumar presented Cognitive Science Research Initiative concept notes, before the DST, Screening Committee on Cognitive Science, at CR Rao Advanced Institute of Mathematics, Statistics & Computer Science, Hyderabad.
- M.Dhanalakshmi AP/BME, Anbarasi Rajamohan, Hemavathy Rajasekaran published a paper on “Deaf-Mute Communication Interpreter” in the International Journal of Scientific Engineering and Technology, Vol 2 issue 5, May 2013.
- Mallika Jainu, AP/BME, E. Priya published a paper on “BRCA1/2 Mutation Genetic Screening” in the proceedings of International conference on Bioinformatics and Biotechnology, Karnataka University, India on 28th June, 2013.
- Kavitha Anandan, Janani Sivasankar Babu and Lakshmi Bhavani Sukumar, published a paper on ‘Quantitative Analysis of Digitized Mammograms Using Nonsubsampled Contourlets and Evolutionary Extreme Learning Machine’ in the Journal of Medical Imaging and Health Informatics. Volume 3, No.2 (June 2013) pp. 206-213.
- Mallika Jainu, AP/BME and Mohan KV’s paper on ‘Protective role of ascorbic acid isolated from Cissus quadrangularis on NSAID induced toxicity through immunomodulating response and growth factors expression' published in International Immunopharmacology journal, Elesevier publication was selected as an article topper by BioMedLib, USA.

STUDENT Activities

Our students too have proved themselves, both technically and non-technically and raised the bar higher for the future batches to come:

- Seven of our students featured in the top 13 in Anna university Rank list with Varsha Vijayan coming third in the list.
- A team comprising of Akshaya.C, Akshaya.H, Manoj.M and Praveen.C from were selected among top 20 teams to take part in the ABLE-BEST 2012 in Bangalore.

- Two teams including Akshaya.H and Anjana Vencatesan, Arun Srinivas, Deepak, Navathej, Ganesh Kumar were selected in the Texas Instruments Analog Design Contest 2012.
- Tharani R.C and Sheshank Srinivas from final year have secured the Best NSS Volunteer Award for the year 2012 among all affiliated colleges under Anna University, Chennai.

- Utthara and Renita.A of Final year participated in the Kernel 2012 Biolympics and bagged 1st prize in Technical Quiz and Cocktail and also came second in Treasure Hunt.
- Achudhan S.M and Sruthy S were a part of the SSN Dance Team N2K and were one of the finalists at the Nxg Campus Jive 2012 held in the month of November.

- Every year Schneider-Electric India conducts Innovation Challenge Award, this year's theme was Smart Living. The project, "Optimized Switch Control for Elder and Disabled Patient Using EEG" by Deepak.N, Ganesh Kumar K, Vignesh S M and Fareesha Fathima M won second place in the challenge and were awarded a cash prize of 3 lakhs.

PAPER PUBLICATIONS

- Sivakumar, Sri Logeshwaran.R, Dr S. Pravin Kumar published a paper titled "LED Based Wireless Data Transfer Secured with Index Shuffling Algorithm- Pulse Plethysmography" in the International Journal of Biomedical Engineering and Consumer Health Informatics- IJBECHI, Volume 4, Number 2, July-December 2012, pp. 23-27.
- A. R. Anusha, A. Lakshmi Soodi, Dr S. Pravin Kumar published a paper titled "Detecting Algorithm using adaptive Thresholding for Identification of Normal and Cheyne - stokes Breathing" in the International Journal of Advances in Computer Science and its applications - IJCSIA, Vol.2, Issue.3, December 2012, pp.349-353.
- Arun Srinivas P, Navathej G, Vignesh SM, of the 2009-2013 batch, presented a project titled 'Computer based Communication Aid for Paralytic Patients using EEG' at the final round of 'Next Big Idea 2013'. The project is shortlisted among 30 projects from all over India.

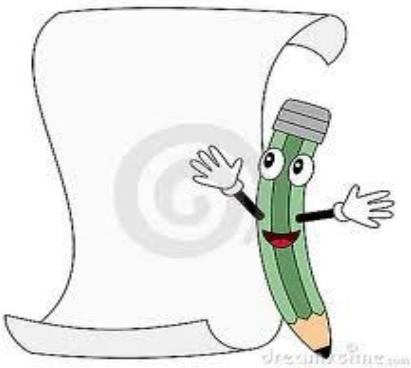
Akshaya C, D. Saranya Priyadharshini, S.Sowdhami, Dr.A.Kavitha and Dr. Alphin, published an article, 'Reconstruction of Osteoporotic Femur bone from CT Images', in the Proceedings of International Conference on Pattern

Recognition Applications and Techniques, ISBN: 978-1-25-905849-3, 1-2 March 2013.

- Praveen Richard Ebenezer.C, Priyadharshini.B, Vishnu Priya.K, Dr.A.Kavitha, Dr. N.Venkateswaran published an article, 'Wavelet based image fusion scheme for Human Head modeling', in the Proceedings of International Conference on Pattern Recognition Applications and Techniques, ISBN: 978-1-25-905849-3, 1-2,March 2013.
- Priyadharshini.B, Vishnupriya K and Praveen of Biomedical Engineering won the first place in AICTE sponsored Project exhibition held on 24th April, 2013.

INTERNSHIPS

- Navathej.G was selected for an internship at National Instruments, Bangalore from January 22nd to March 28th to work on Ball on Plate System – an analysis on wear and tear of ligaments.
- Vaishali Gupta was awarded the Summer Research Fellowship by the Indian Academy of Sciences, Bangalore owing to which she was given the opportunity to intern at IISc, Bangalore in the Department of Electrical Engineering. She worked in the Image Processing Domain.



Go for the world than India

In the bustling Ambattur Industrial Estate is nestled a 16 year old dream of 2 brothers, Arjun Sooraj and Arun Krishna, the founders of Akas Medical, a biomedical R&D and production company. The company, started in 1996 has been a pioneer Indian company in therapeutic equipment like infusion pumps, oxygen concentrators, etc. The company has 2 production units in Chennai and Trichy and over 40 service and marketing franchisees across the country. G.Santhosh, final year student represented the department and Samhita to interview Mr.Arjun Sooraj, the CEO of the company.

Samhita: Sir, interacting with an entrepreneur who has chosen biomedical engineering is a rare find these days and it is a pleasure of meeting you. Tell us about your educational and professional background.

Arjun: Soon after schooling in Trichy under a CBSE school, I joined College of Engineering-Guindy, Anna University for an ECE undergraduate degree in 1992. This was followed by a MBA at Bharathidasan University and a stint in a company for a year. Then, I joined Akas, founded by my brother in 1996. The 16 years have been successful and we have been expanding every year.

Samhita: Okay sir. What was your inspiration to start a biomedical company when you had better prospects in other fields?

Arjun: The experience of being in a middle-class family and the travails of expensive medical care has been instrumental factors in me nurturing a dream. Then the choice of a biomedical elective in my undergraduate further accentuated my interest in the subject. The MBA equipped me with the necessary skills to market and run a company. That is how Akas started with a small infusion pump and has grown now to over 50 products.

Samhita: What are the challenges you face as a biomedical company from India catering to the Indian market?

Arjun: The challenges are numerous, the principal being convincing the medical fraternity of our products quality and efficiency. The other factors are maintaining the standard, safety and cost of the product.

Samhita: Mentioning the medical fraternity, what are their expectations?

Arjun: The medical practitioners generally have the perception that imported equipment provides more reliable and quality results than the local brands. That is absolutely not wrong as India has been an importer of medical equipment rather than producers. The corporate hospitals are in fact more concerned about this and it is very difficult to convince them. I have followed a doctrine of throwing open challenges to the client regarding the quality of my product and have even offered to replace my instrument with an imported one free of cost if it does not satisfy their needs. That is the type of belief needed to be successful in the industry and also take care that you emerge right in these challenges.

Samhita: That's entirely true sir. An important aspect of any medical equipment is the service and calibration post-purchase. How do you ensure it?

Arjun: The service and calibration is important as you say. But, the size of the market must also be taken into account. A small town such as Nagercoil may have 1000 sets of television by even a small company. But the market of ours is such that 500 equipments are spread over a distance of more than 1000 sq.km which makes the recruitment of a service engineer in each of these areas and their transportation is non-feasible. So, the training of in-house biomedical engineers in the hospital and providing manuals is a more practical way of maintenance of the equipment.

Samhita: Okay sir. What are your expectations of a biomedical engineer to be recruited in your company?

Arjun: Rather than saying my expectations, I can say the industry requires not many engineers but entrepreneurs. The field is vastly open in our country and I would say a career scope can be in the following percentage- Hospital service and maintenance – 25%, Entrepreneurship – 50%, Innovation and research – 25%. This is to be understood by all the students rather than thinking of searching for non-existent jobs. Why cannot you self recruit yourself and in due course, your colleagues rather than searching for an outside job?

Samhita: But sir, entrepreneurship requires a lot of marketing, people management and other skills. I can assure you that an Indian is behind most of the successful equipment produced today. But, how do we develop these skills?

Arjun: What you mentioned about an Indians technical knowledge is true. But, brain-drain and difference of pay-scales in the local and environmental markets has refrained us from contributing here. But, the misconception that people management and other stuff you mentioned are important is there too. You have to just manage your thinking, time and ability. Prepare a project idea, come to me and I am ready to fund you with a legal contract. If you can give me a successful hardware-software component in a specified time, both of us benefit from it All you need is wires, electronic components, PCB's, micro-controllers, a room and a lot of burning desire to do something. This is a form of entrepreneurship and you can go about expanding this with specializing and narrowing down your interests.

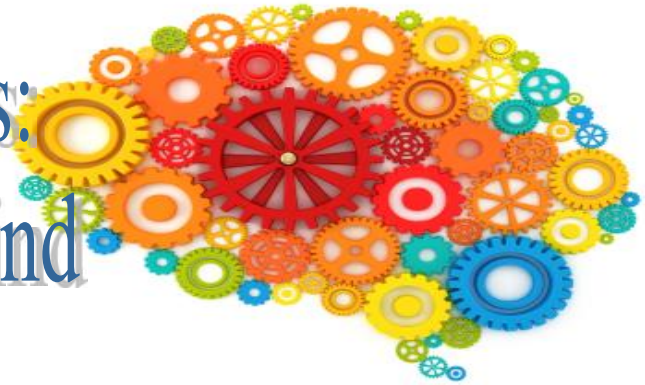
Samhita: This is a very different idea of entrepreneurship sir. I can assure you that a lot of our students will be inspired by this.

Arjun: I will be very happy to award even 10 contracts today like that. All we need is this initiative. To say that Indian IT industry is the best in the world today was a result of the spurt of engineering colleges in the 1980's. This lead to large availability of manpower in the 90's leading to rise of IT and automobile industry like never before. The electronic, IT, communication revolutions over now; It is the time for the biomedical revolution to happen in the next 10 years and you will have to carry it forward. People are just looking up to local and indigenous equipment as an affordable alternative and so, this may lead to the next boom if students are ready to become entrepreneurs.

Samhita: That's very true sir. What is the goal of your company?

Arjun: The goal is 'Aim for the world, not India.' A combination of German engineering, Japanese quality, American service-marketing, Chinese pricing and Indian software ability is what is needed to become top in the world. We need to beat the Germans and Japanese in their own fields so as to put our feet into this industry firmly. This should not only be my dream, but every Indian biomedical entrepreneur. "**Aim for the world and Keep innovating than just improving**".

Cognitive Sciences: The study of the mind



Research into the functioning of the human brain, particularly during the past decade, has greatly enhanced our understanding of cognitive behaviors which are fundamental to education: learning, memory, intelligence and emotion.

Recently, advanced cognitive researchers have been especially focused on the capacities of abstraction, generalization, specialization and meta-reasoning, etc. The term "cognition" is also used in a wider sense to mean the act of knowing or knowledge, and may be interpreted in a social or cultural sense to describe the emergent development of knowledge and concepts within a group that culminate in both thought and action.

Cognitive science is the interdisciplinary study of mind and intelligence, embracing philosophy, psychology, artificial intelligence, neuroscience, linguistics, anthropology and memory. Memory is often associated with “recalling to the mind” of something learned at an earlier time. The American writer Austin O’Malley, once said, “Memory is a crazy old woman who hoards colored rags and throws away food.”Memory is an integral part of our existence, yet it is only vaguely understood. Through empirical studies on people, the methods of cognitive psychology have lead to some useful descriptions, distinctions and theoretical advances in our understanding of different types of memory.

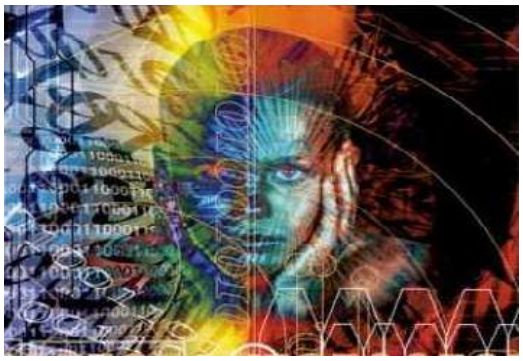
An important development in cognitive theorizing is the subdivision of memory into three separate processes of encoding, storage and retrieval. Encoding, which can be further broken down into acquisition and consolidation stages, involves the laying down of a memory trace. Storage is the maintenance of a memory trace over time while retrieval is the process of reactivating a stored memory for current use.

Cognitive science has unifying theoretical ideas, but we have to appreciate the diversity of outlooks and methods that researchers bring to the study of mind and intelligence. Although cognitive psychologists today engage in theorizing and modeling, their method

is experimentation with human participants. But the saying goes, “theory without experiment is empty, experiment without theory is blind”. To address the questions about the nature of mind, experiments need to be interpretable within a theoretical framework that postulates mental representations.

One of the best ways of developing theoretical frameworks is by forming and testing models. To complement psychological experiments on deductive reasoning, concept formation, mental imagery, and problem solving, researchers have developed computational models that simulate aspects of human performance. This process of designing and experimenting with computational models is the central method of artificial intelligence, the branch of science concerned with intelligent systems. Like cognitive psychology, neuroscience is often theoretical as well as experimental, and theory development is aided by developing computational models of the behavior of groups of neurons. Cognitive anthropology expands the examination of thinking to consider how thought works in different cultural settings. The study of mind should not be restricted to English speakers but should consider differences in modes of thinking across cultures. Philosophy deals with questions such as the relation of mind and body and with methodological questions such as the nature of explanations found in cognitive science.

Cognitive science, being an upcoming field, has its quota of challenges. Cognitive science neglects the important role of emotions in human thinking, ignores the importance of consciousness in human thinking, disregards the significant role of physical environments in human thinking, neglects the contribution of embodiment to human thought and action, etc. However, all these challenges can be met by expanding and supplementing the computational-representational approach.



Dr.A.Kavitha, Head of the Department

Ms.Sandhya.A, Research Scholar

Niveditta.B, IV year

Technopolis

When it comes to Science and Technology, it is believed that India is still lagging behind most of the countries in the world because India lacks lot many resources compared to other developed countries and the general meaning of technological research is development of new electronic products which will increase the convenience of the users. However, India is most well known for its "best selling" product all over the world. It is YOGA. And many people have added to the yogic kriyas and derived many different types of yoga like Ashtanga Yoga and Power Yoga and Slimming Yoga and so on. The yogic postures and the pranayamas came way after the Principal author of Yagasutras, Yogi Patanjali actually gave the yogasutras. The very first sutra says - "Atha yogaschittavritti nirodhah." According to one text available online (http://www.gita-society.com/scriptures/Patanjali-yogasutra.IGS.pdf), the meaning of this verse is "The skill of yoga is demonstrated by the conscious non-Operation of the vibrational modes of the mento-emotional energy." I had learnt this verse in IIT Bombay, Powai when I took a credit course in Humanities Department. I could not understand a single word from the translation provided there as well! However I was quite curious about its meaning. While attending a Vipassana Meditation course, I could get some relevant meaning of the same verse.

The body can be studied structurally and functionally by dividing and dissecting it or seeing different parts under microscope and with some physiological experiments. However, it is a very tough job when it comes to mind. We cannot hold the mind and dissect using blades or a microtome. We cannot see it with eyes and hence analysing its to depths is very difficult task. Neurophysiologists and the whole modern scientific fraternity have a strong belief that Brain is the seat of mind and it is from here that all the mental functions are executed. Psychologists and Psychiatrists also have been seen to believe this common truth

and are aiming towards the brain function as a cure for mental diseases and abnormal behaviour. Usually the psychological diseases are either attention deficit problems or hyperactivity problems or depression problems grossly. But it is a common experience that the rehabilitation of a person with diseases related to mind is more complex than someone with any surgical or orthopaedic disease. This is shown nicely in the movie on Prof. Nash named "A beautiful mind".

Coming back to the first verse of the Yogasutras, which means - "The skill of yoga is demonstrated by the conscious non-operation of the vibrational modes of the mento-emotional energy", it sounds like Patanjali wants a yogi to stabilise his/her mind in such a state that the emotional turmoil does not disturb the mind any more. To really bring such a concept into practice, one needs to really go to the depths of mind where this turmoil begins and apply brakes there. It is indeed a very difficult process. But this process is explained in one canonical text called Abhidhammapitaka, which is a part of Tipitaka - a collection of actual words of Buddha and his close disciples when he was alive.

The Buddha is well known for his discovery of four noble truths. The first one is Dukkha - Sorrow, second is Dukkha Samudaya - The reason of sorrow, third is Dukkha Nirodh - Uprooting the sorrow, and the fourth is Dukkha nirodha gamini patipada - The path leading to the complete destruction of sorrow. While describing the first noble truth, the Buddha says "When five aggregates come together, it is sorrow." In this group of five, one is the body and the other four are parts of mind. He says mind consists of four parts. One part is called "Vinnyana" which means cognition. The other part is called "Sangya" which means recognition. Next is called "Vedana" which means bodily sensation. Last is the "Sankara" which is translated in English as Mental formation. He says there are six senses and six sense organs. Home of Visual sense is Eye, home of hearing sense is Ear, home of taste sense is Tongue, home of smell sensation is Nose, home of touch/ body position sense is Body (Skin) and home of sixth sense Mind is Hadayavatthu. We very well know about other sense organs but this haday vatthu is never heard of.

The base of Buddha's teachings is that all these sense organs get stimulated by their respective objects outside like eye with light, ear with sound, tongue with something having taste, anything that touches the skin and for the haday vatthu it is the thought. If an individual reacts to the present sensations going on any of the sense organ by craving or aversion,

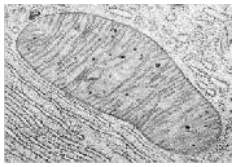
he/she creates a new memory or mental formation. Also he says that when a person starts meditating in such a way that he has stopped reacting to all the six objects coming in contact with the sense organs, then the older mental formations that were accumulated for all previous births surface up and get destroyed, leading that person to a stage where the mind ultimately gets completely freed from all mental formations. Such a person is called an Arahant. When such a person dies, there are no mental formations present in the mind which will start a next life. Such a person never gets birth again. That resonates with "Atha yogaschittavrutti nirodhaha!!"

When one hears the word hadaya, it seems it is the heart. However, mind is present everywhere in the body. It is interesting to see that the explanation given in the canonical text called "Visuddhimagga" regarding the Haday Vatthu resembles one cell organelle called Mitochondrion. The words from Visuddhimagga say - "As to shape, it is the shape of a lotus bud with the outer petals removed and turned upside down, it is smooth outside, and inside it is like the interior of kosataki (loofah gourd)."

The parts of mind described by the Buddha are quite interesting. Vinnyana means cognition - which is the first event that occurs when a sense organ is exposed to its respective object. As soon as some visual scene forms an image on retina of the eye, an electrical impulse is generated in there and it is carried to the visual cortex. All other sense organs also



get electrically activated when they are stimulated and send the information to the respective part in brain. Skin or body sends the information via the spinal cord to the brain. Though humans are most evolved, the lowers centres seen in lower animals like reptiles and other mammals still exist there. However, the biggest difference is the frontal cortex - or more particularly the prefrontal lobe that makes humans more intelligent than the lower animals which gives us the option of "Equanimity"!

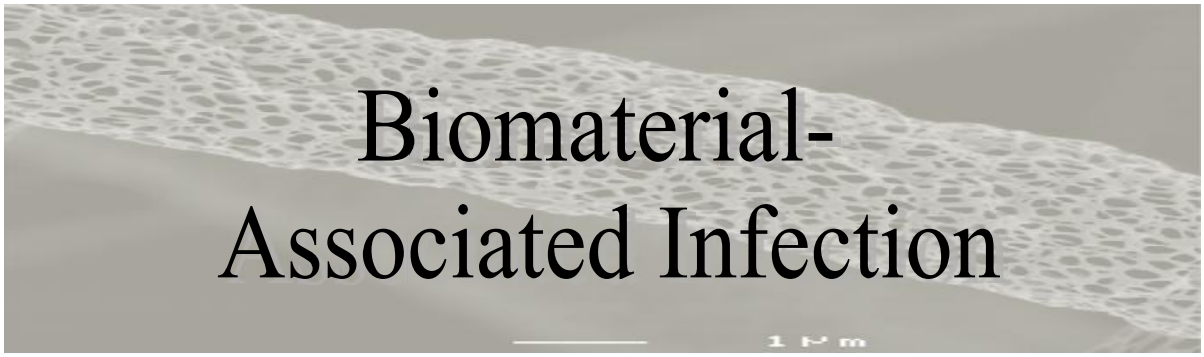



Once the Vinnyana is formed, the signal is compared with the various previous memories. Again today it is believed that brain is the memory bank. After comparison, the Vinnyana is given a label - this is a GOOD sensation or this is a BAD sensation or this is a NEUTRAL sensation. This process is called Recognition. A cognised signal is

recognised with the use of previous memories. This recognition given to the Vinnyana is called Sangya. Thus formed Sangya then spreads all over the body like a wave. This wave is called Vedana. We call this Vedana as sensation. If we hear a word of praise, a very pleasant sensation flows over the body. If we hear words of abuse, a very unpleasant sensation spreads all over the body. To this Vedana, one can either react or see equanimously as a phenomenon that is arising and passing away. If one reacts, a new mental formation or Sankhara is formed. If one remains equanimous and does not react, then one does not form a new mental formation. Also, whichever mental formation had created that sensation, that mental formation gets eradicated if one remains equanimous. If this state of equanimity is maintained for a long time, the mind gets freed from all mental formations. If there are no mental formations, then there is no recognition and cognition remains only cognition!!!

The actual function of Mitochondria in the cell is to synthesise ATP which is the currency of energy for the cells. However, they also store a lot of calcium and also contribute to the free radical formation in the body. We all know that these free radicals are harmful to the body and harm it. All over the body we have these mitochondria which are the energy suppliers which are self replicating organelles having their own DNA. The DNA of mitochondria is different from DNA in the nucleus which we know as those genes which carry the information about characters of an individual. Every individual receives these mitochondria from the mother as the paternal mitochondria in sperm do not enter the ovum during fertilisation. Maybe that is why women are named "Shakti"! According to the canonical texts, it appears that this cell organelle is the home for the mind sense and the individual is attached to the whole body calling it "My" body through these mitochondria. The Buddha discovered a technique called Vipassana, in which one has to explore each and every small part of the body by one’s own mind and examine if there is anything that can be called I or My anywhere. Everybody gets the same answer, it is void. That ultimately leads the practitioner to "Atha yogaschittavrutti nirodhah."

- Dr. Sachin G.S
Assistant Professor



Healthy ageing accompanied by a high quality of life is generally desired among humans, now facing unprecedented long life expectancies. Yet, no matter how well human lifestyles are adapted, sooner or later the human body will reach a state that exceeds its capacity for natural repair. Sometimes severe trauma causes the human body to become damaged beyond repair.

Nowadays, irreparable damage to the human body need not necessarily be accompanied by loss of function and quality of life. Frequently, surgical repair is achieved using numerous permanently implanted biomaterials, or using instruments and temporary devices for transient intervention to promote tissue regeneration, functional restoration and healing. Whereas the implants and devices may differ widely, encompassing amongst many others the artificial heart, prosthetic joints, vascular prostheses, dental implants, surgical meshes, breast implants, sutures, urinary and intravascular catheters, voice prostheses, contact lenses. All biomaterials implants and devices will attract microorganisms whose continued presence interfere with the intended function of the implant or device and adds risk to human use.

Biomaterial implant infections, recognized since the 14th century (*1*), have a substantial and largely unchanged clinical incidence, associated mortality and morbidity and significant costs shared across all implant and devices.

In the famous landmark paper (*2*) in which the phrase "*race for the surface*" was first introduced, Gristina suggests that "*the fate of an available biomaterials surface in the human body might be conceptualized as a race for the surface, which is a contest between tissue cell integration and bacterial adhesion to that same surface. Host defense systems that are perturbed by biomaterials are a vital factor. If the race is won by tissue, then the surface is occupied and defended and is thus less available for bacterial colonization*".

Since implant colonization is the prelude to biomaterial-associated infection (*3*, *4*), biomaterial surface properties have long been the focus for understanding microbial infection mechanisms and the design of preventive measures. Progress in designing biomaterials surfaces and coatings that influence the outcome of the race for the surface has been limited and there have been no materials or coatings introduced with nearly comparable clinical acceptance as antibiotics. Failure of design technologies to reduce bacterial adhesion, occurring to virtually every materials surface and to effectively block microbial phenotypic changes upon adhesion, including production of extracellular polymeric substances (*5*) in which bacteria embed and protect themselves. This highly protective, so-called biofilm mode of growth enables the organisms colonizing a biomaterials surface, to evade environmental attacks by antibiotics and the host immune system even for several years (*6*).

Van Leeuwenhoek wrote over three centuries ago that "*the vinegar with which I washed my teeth killed only those animals which were on the outside of the scurf, but did not pass through the whole substance of it*", referring to the protective, biofilm mode of growth of microorganisms on a tooth surface.

In conclusion, the challenges in producing new infection-resistant biomaterials and coatings have remained for many years.

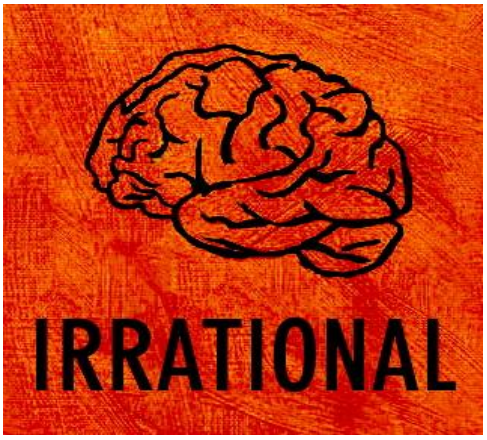
-Dr. S. Guruprakash
Assistant Professor

DO YOU KNOW?

Ginkgo biloba is an ancient plant that has survived many thousands of years and has no Living relatives. It is commonly sold in health food stores as a herbal supplement and There is good evidence that in small doses it can increase mental performance, particularly attention, in healthy young adults. It is thought to work through direct effects on neurotransmitters and by promoting blood flow and circulation to the brain. Although Ginkgo is considered safe enough to be sold in shops, it does not agree with everyone – some people may find it upsets their stomach. More Seriously, it is usually advised that people with blood circulation disorders, those taking aspirin, pregnant women and people taking certain forms of anti-depressants (known as monoamine oxidase inhibitors or MAOIs) should avoid it as a precaution.

TECNÓPOLIS

IRRATIONAL COGNITION



The human brain is capable of 10^{16} processes per second, which makes it far more powerful than any computer currently in existence. But that doesn't mean our brain is not limited. The lowly calculator can do arithmetic thousands of times better than we can, our memories are often less than useless and we're subject to cognitive biases, those annoying glitches in our thinking that cause us to make questionable decisions and reach erroneous conclusions. Here are some of the most common and pernicious cognitive biases.

It's important to distinguish between cognitive biases and logical fallacies. A logical fallacy is an error in logical argumentation (slippery decisions, circular arguments, appeal to force, etc.). A cognitive bias, on the other hand, is a genuine deficiency or limitation in our thinking — a flaw in judgment that arises from errors of memory, social attribution, and miscalculations. Some social psychologists believe our cognitive biases help us process information more efficiently, especially in dangerous situations. Still, they lead us to make grave mistakes. We may be prone to such errors in judgment, but at least we can be aware of them.

Confirmation Bias

We love to agree with people who agree with us. It's why we prefer to visit websites that express our political opinions, and why we mostly hang around with people who hold similar views and tastes. We tend to be put off by individuals, groups, and news sources that make us feel uncomfortable or insecure about our views. It's this preferential mode of behavior that leads to the confirmation bias — the often unconscious act of referencing only those perspectives that fuel our pre-existing views, while at the same time dismissing opinions that threaten our world view. And paradoxically, the internet has only made this tendency even worse.

In-group Bias

The in-group bias is a manifestation of our innate wild tendencies. And strangely, much of this effect may have to do with oxytocin, the so-called ‘love molecule.’ This neurotransmitter, while helping us to forge tighter bonds with people in our in-group, performs the exact opposite function for those on the outside. It makes us suspicious, fearful, and even disdainful of others. Ultimately, the in-group bias causes us to overestimate the abilities and value of our immediate group at the expense of people we really don't know.

Neglecting Probability

Very few of us have a problem getting into a car and going for a drive, but many of us experience great trepidation about stepping inside an airplane and flying at 35,000 feet. Flying, quite obviously, is a wholly unnatural and seemingly hazardous activity. Yet virtually all of us know and acknowledge the fact that the probability of dying in an auto accident is *significantly* greater than getting killed in a plane crash but our brains won't release us from this crystal clear logic. This is what the social psychologists call false probability, our inability to properly grasp a proper sense of peril and risk, which often leads us to overstate the risks of relatively harmless activities.

Observational Selection Bias

This is that effect of suddenly noticing things we didn't notice that much before. A perfect example is what happens after we buy a new car and we inexplicably start to see the *same car* virtually everywhere. It's not that these things are appearing more frequently, it's that we've selected the item in our mind, and in turn, are noticing it more often. It's also a cognitive bias that contributes to the feeling that the appearance of certain things or events couldn't possibly be a coincidence even though they are.

Bandwagon Effect

Though we're often unconscious of it, we love to go with the flow of the crowd. When the masses start to pick a winner or a favorite, that's when our individualized brains start to shut down and enter into a kind of groupthink state. The bandwagon effect is what often causes behaviors, social norms, and memes to propagate among groups of individuals, regardless of the evidence or motives in support. This is why opinion polls are often maligned, as they can steer the perspectives of individuals accordingly.

The Current Moment Bias

We humans have a really hard time imagining ourselves in the future and altering our behav-

iors and expectations accordingly. Most of us would rather experience pleasure in the current moment, while leaving the pain for later. A 1998 study showed that, when making food choices for the coming week, 74% of participants chose fruit. But when the food choice was for the current day, 70% chose chocolate.

Anchoring Effect

This is the tendency we have to compare and contrast only a limited set of items. It's called the anchoring effect because we tend to fixate on a value or number that in turn gets compared to everything else. The classic example is an item at the store that's on sale; we tend to see the difference in price, but not the overall price itself. This is why some restaurant menus feature very expensive entrees, while also including more reasonably priced ones, so as to play about this fallacy of ours.

Now that we know these fallacies of ours, we will be tending to be careful in the future and think about these before making a decision. This will cause a delay in your decision making in the recent future, which is yet another fallacy, **Self-Analytic Bias**. And you will now tend not to follow these after reading this, which is another one, **Negative Perception.** Our brain is imperfect is what you may think now, yet another **FALLACY.**

SANTHOSH .G, IV Year

SHOULDERING OUR RESPONSIBILITY TO BUILD A WORLD CLASS INSTITUTE

Shouldering our responsibility to build a world class institute – Department of Biomedical - SSNCE

In this article, I wish to express the associations between various courses that we study in our program, to analyze the results of these associations and to define strategies to pursue our course work. I firmly believe that these strategies might help us out to build a world class institute.

Category I - Basics of Electrical Engineering laboratory pursued in our first semester – Electric Circuits and Electron Devices (II semester) – Electronic Circuits (III semester) – Analog and Digital Integrated Circuits (IV semester) – Microprocessors and Micro controllers (V semester) .

Category II - Similarly the expertise in these subjects when applied to the knowledge obtained

in Medical Physics (III semester) and Sensors and Measurements (III semester) help us to better understand Biomedical Instrumentation (IV semester), Diagnostic and Therapeutic Equipment –I and II (IV and V semester), Radiological Equipments (IV semester).

Category III - Signals and systems (III semester), Transforms and partial differential equations(IIIsemester), Probability and Random Processes (IV semester), Basics of Electrical Engineering(IV semester), Digital Signal Processing (V semester)and Digital Image Processing (VII semester)are inter-related courses.

Category IV - Similarly, Bio control Systems (V semester), Biomechanics (VI semester), and physiological modeling (VII semester)are inter-related courses.

One of the objectives of the course is to build a system for either therapeutic or diagnostic application, analyze the characteristics of the system and then interpret results from it.

The course work is so well designed that the Anatomy and Human physiology (III semester) course helps us to understand the normal and the peculiarities of the human body so that we could build a system to monitor those changes, using the knowledge obtained from category I and II courses, and then analyze the functioning of the system using the knowledge obtained from category III courses and then interpret our results.

Therefore the above four categories can be tagged as

Category I – Building an electronic system.
Category II –Customizing our knowledge to build a medical system
Category III – Analyzing the characteristics of our medical system and using mathematical tools for analyzing our results.

The category III courses provide solutions for both analyzing our own system as well as for analyzing the results obtained from them.

The category IV courses treat human bodies as a garage of electronics.

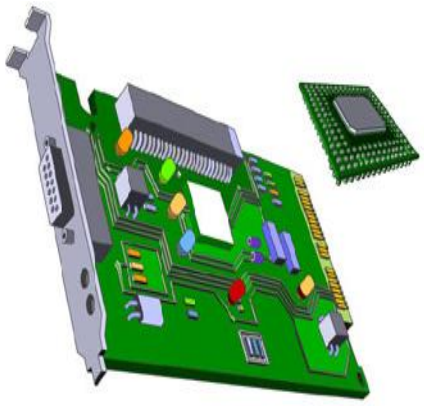
A mini project: **Acquisition of ECG:**
Human Body - Sensors – Data Acquisition system – Filter - Amplifier– Computer – Processing – Analysis

Anatomy, Human Physiology and Biomedical Instrumentation courses teach us the science behind ECG.

Sensors and Measurements course teaches us which type of electrode could be chosen. Biomedical Instrumentation and Analog and Digital Integrated circuits course helps us to

build the amplifier system. Signals and systems and Basics of Electrical Engineering help us to analyze the stability of the constructed system, using the transforms studied during transforms and partial differentiation course work.Once the ECG signal is obtained the knowledge from Digital Signal Processing course work helps us to cancel out the noises and to diagnose the anomalies from diagnostic and therapeutic equipment course work knowledge.

Therefore our entire course work substantially helps us out to achieve the objective of building a **system for either therapeutic or diagnostic application, analyze the characteristics of the system and then interpret results from it.**



Well, now we have realized that the courses are so strategically designed to fulfill one of the objectives of the department, let us dive into few of the courses and derive strategies to how to pursue them?

Electric Circuits and Electron Devices, Electronic Circuits and Analog and Digital Integrated circuits would be very interesting to study, if we practically try doing them in the laboratory simultaneously when we study the theory. A Virtual Laboratory in hand could be much more useful and easy to access. Therefore try using National Instruments Multisim, which can simulate all our laboratory experiments on your PC.Believe me, you can visualize all our Signals and systems, Transforms and partial differential equations, Probability and Random Processes, Basics of Electrical Engineering, Digital Signal Processing and Digital Image Processing, and Artificial Neural Networks problems on “MATLAB”.

Okay fine why studying Object oriented programming language? A question in the minds of many people. Ok, let me illustrate this with a very small case study, personally experienced by me. We were designing Identity cards for “Srishti”. At that time we had to take 65 students photographs and repeat the same process of pasting it on same background in photoshop. We had a very boring time repeating this process over and over again. Suddenly something struck in my mind. I opened “MATLAB”, made all the 65 photographs as objects of a single class and coded just for one photograph and the 65 identity cards were ready not even in 10 seconds. That is the power of Object Oriented Programming language. Code once, reuse it “∞” number of times.

And a small tip, “Never just google and study our courses”, but “Always Youtube and study”, as youtubing lays less cognitive load than googling. Just a spill of essence of our theme, “Cognition”. Many more strategies in the next edition to shoulder our responsibility!

VIGNESH.B , IV Year

POTPOURRI!

TEACH FOR INDIA

It is a matter of chance that we are, where we are today. We didn't choose the family that we were born into, or choose the fact that our parents could afford to give us quality education. Most of us do not even think about the fact that we were given a proper education, we tend to take things for granted. Look around you, as you walk down the road back home after a day in college, the kid running ahead of you, chasing a tyre has most probably never seen the gates of a school. No, I'm not exaggerating. According to the **A**nnual **S**tatus **E**ducation **R**eport (ASER) 2012, conducted by Pratham, four percent of the Indian children never go to school, around 42% drop out before they finish primary school. 90% end up dropping out before entering college. You and I, we are among the privileged ten percent who end up entering a university, pursuing our dreams to make our lives better.

Teach For India is a joint initiative of the Teach for All global movement by Wendy Kopp and Shaheen Mistry, CEO and Founder of the Akaansha Foundation, Pune. It is a nationwide movement of outstanding college graduates and working professionals who commit to a two-year full-term teaching fellowship in under-resourced schools. The TFI Fraternity believes that every child must attain an excellent education. This is their vision for the future and the ideals they believe in and the program structure they follow are based on this vision. Should a child's demographics determine his or her destiny? No. The end of the educational inequity we currently face is the freedom for all children to have the opportunity to reach their potential. And the day all our children reach their potential is the day that India reaches her potential.

For this, you'd say we need a change in our education system at the grass root level. I ask you, would the change alone suffice? Over the years, from 2004 to 2011, the budget allocated by the Union Government for Education has increased ten fold. There has been a significant increase in the infrastructure and provisions allotted. What we also need is quality teachers, leaders in their own right who will work towards educational equity in our country. Teach for India fellows are precisely the kind of teachers we need. The fellows constitute a movement of leaders with the idealism, belief, skills and commitment to actualize their vision.

So what is this fellowship program about? The fellows serve as full time teachers in low-income schools for two years. They work tirelessly to bridge the immense gap their children face, putting them on life-changing paths. In the second year of the fellowship, the fellows undertake a " Be the Change" project. This need not necessarily focus on their students alone, it can be a simple idea or an innovation which has an impact beyond the classroom, on the schools and communities and tackles problems and challenges that their students face. Teach For India's "Teaching as Leadership" model is based on the belief that excellent teachers employ the same skills as excellent leaders in any field.

Now, the TFI's movement works the following way:

The Alumni Movement is a growing leadership force. Wizened by their experiences and insights they have gained during their fellowship, the alumni work relentlessly across allied fields to effectuate the long-term changes necessary to ultimately realize the mission of excellent education to all. They work towards eliminating inequity across various sectors.

How can you be a part of this movement? APPLY NOW for the fellowship program! Students and professionals with a Bachelor's Degree at the time of joining the fellowship are invited to apply. Remember, this is as much about you as it is about the children you teach. You are not just giving back to the society, through the two years of this fellowship, you'll evolve into a leader, someone who's inspired thirty-odd children to choose their life paths. I'm not saying it is going to be easy, but believe me when I tell you it is worth it.

V.R.SHREE SHYAMALEE , IV year

THE GE EXPERIENCE..

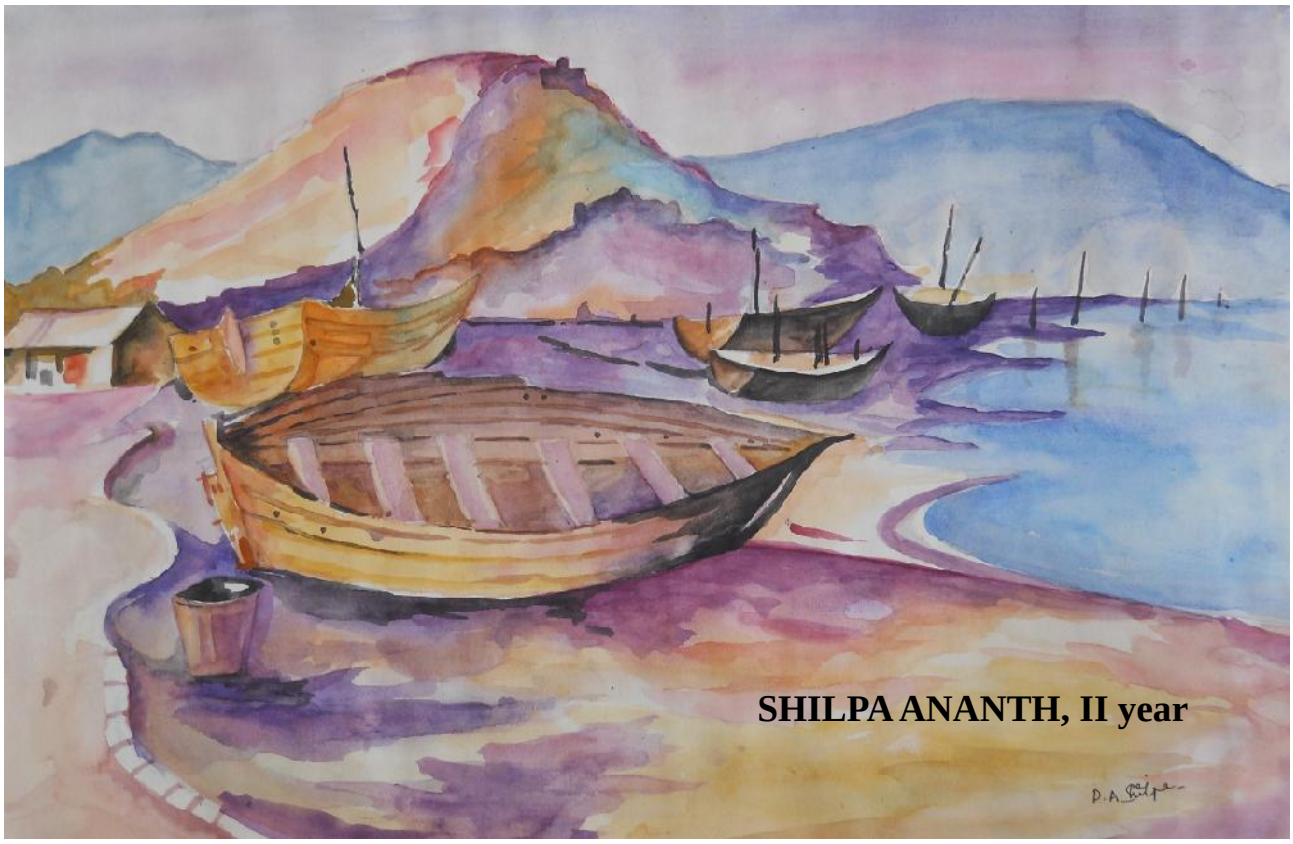
I was an intern in General Electrics (GE) Health care, Bangalore in the month of June, 2013. It was truly a mind-blowing experience where I learnt about my new passion for designing circuits and electronic devices. I spent 5 weeks there, exploring the labs and CT and MRI manufacturing units, learning more each day about the circuitry and mechanisms behind each of the components of these machines, which make up the main diagnostic equipments in today's world. At the same time I was supposed to design a Hall Effect Current sensor, with the help of my mentor, which is a major component in controlling the magnetic waves being sent to the patient in the MR machine.

At first, I was clueless about what to do and didn't know what to expect or what my superiors expected from me. It was hard understanding the concepts and applications at first, but once I started designing it, the passion to learn more drove me to achieving better design and accuracy. It is nothing but a simple transformer-like core with a primary and secondary winding, where the secondary forms a feedback around the primary magnetic core. It also consists of an instrumentation amplifier and push-pull current amplifier. The overall circuit was simple to design but achieving low offset and high accuracy and protection were the major targets to be accomplished.

My design was recognized by the higher authorities in GE and I was lauded for my dedication and hard-work. However, this would not have been achievable without the help of my mentor and colleagues. They assisted me in many ways, mainly by providing me with a PC and sufficient materials and papers to get ideas from. I understood how the theory (which many of us find boring!) which we learn in the everyday class is applied in an actual biomedical application and how important it is to focus on the accuracy and low noise levels the device provides. There is always room for improvement in this field where technology grows at an exponential rate. I realized that it is in our hands to improve the scope of this field across the world and especially India and that it is very much possible if we apply our minds with full dedication and think outside the box.

I also understood how important it is for engineering students to pursue such internships during their courses. We get to expose ourselves to the office environment and people, be independent with our thoughts and processes and it most importantly helps us identify our areas of interest, with which we can move forward and pursue our post-graduations. At the end of the day, we should enjoy what we do and always wonder how we can make our world a better place to live in with new technologies and equipments.

SRINIDHI, III year



SHILPA ANANTH, II year

GAYATHRI.S, III Year

A good painting to me has always been like a friend. It keeps me company, comforts and inspires. - Hedy Lamarr

IS THIS ADDICTION?

They say television spoils the youngsters and their reason is as always, a simple yet occurring fact that once a kid is left to his free will in front of the television, no matter how long he sees it, he gets addicted to it!!! They speak as though some kind of a really fatal radiation emitted from the T.V stimulates the secretion of a certain type of hormone in our body that tends to rack our minds and make it a habit for us. Therefore by the end of the day they get the honor of naming us an addict but yet again what about us? So do I have an option to name this disease as well? Even if I do, what would I call it? ***'The psychotic parenting syndrome'***

But I just don't seem to understand the point as to why T.V is even being considered in the zone of addiction. It is not like taking drugs, consuming alcohol or smoking pot. These are the stuff which falls into the zone of addiction which could be marked with a big heavy skull with its mouth wide open. And the question is does anyone ever get this tag of addiction if they sit with their books 24*7? So their core point is learning is fine.

Then getting bored of this dramatic thriller, I switched the channel to watch a show where a guy tells his kids the story of how he met their mother. Why doesn't our dad get to have any of these awesome stories to tell us? Though it is totally against all our dads saying "live up to your dreams", it is the truth in today's world. It gets you going on in your life without any disappointments.

Then, moving on to my all time favorite show Grey's Anatomy, it made me love my course as a bio-medical engineer. It has inspired me in so many ways with its quotes and medical cases. I bet watching this instead of learning a dry pathology book would provide much better results any day for any student. I've been exposed to the rarest of medical cases and it helped me on so many levels in my life.

Well reflecting over these facts I switched off the T.V feeling so good, so confident thinking that life isn't that bad after all. I walked to my room grinning so wide with a halo behind my head. Yes, I felt heavenly. And I stepped into my room with a great determination to take out my books and study. But before which I came to a halt when I glanced at my laptop and so I had to pause my mind a little to update my blog and so went the fuse in my halo and I had to repeat watching T.V all over again in order to recharge it. Now tell me, ***is this addiction??***

-VISHALI MATHAVAN, III year

DOMINANCE OF MEDICINE, CA, ENGINEERING OVER OTHER COURSES

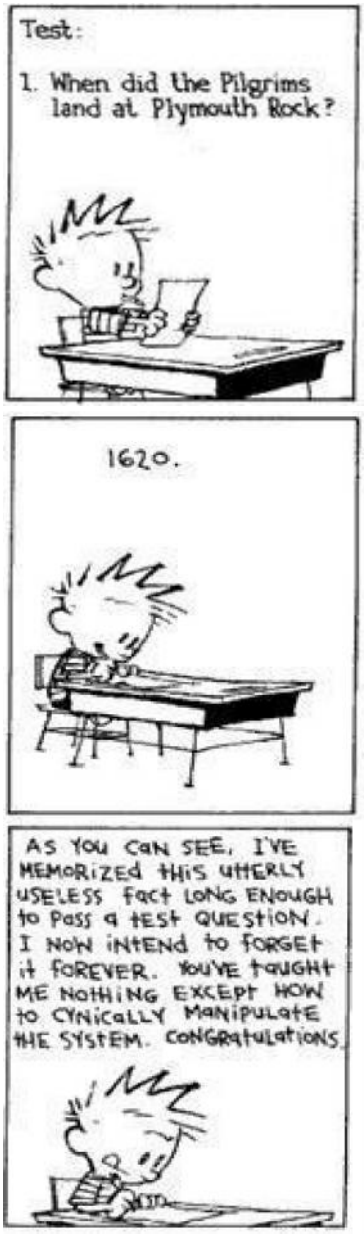
Since the topic taken into consideration is highly debatable, coming to a conclusion is not an easy task. Debugging the root cause of why these courses were preferred arises from discussions with various sections of people and through extensive Google search. The statistics clearly pointed out that student dropout rate is high in most of the above-mentioned courses. A student with a GPA of 2.5, who dropped out or was rather sent out of the college, had shared his opinion about his course. After reading about his educational journey, I wonder why his parents never realized their child's potential or area of interest. These records make it very evident that not everyone who sign up for these courses achieve something substantial.

Talking to the parents with wards enrolled in the above mentioned courses brought to light a significant number of reasons. Of the lot, the most common reason turned out to be the

need for a secure life. The feeling that obtaining a professional degree would provide a head start and help in one's economic success was prevalent. When we think it over, it may sound very apt and realistic. A question though, still remains unsolved. "Why do the other streams not flourish?" A talk with my cousin who resides in "The States" left me with a sense of awe, for the career opportunities that they have were unbelievable. She informed me about the importance and due respect that biomedical engineers as professionals were given bringing to light the bias in India towards certain streams of engineering. Everyone in India wants to get into the IT industry, the pay being a major factor.

The other factor being the widespread ignorance in the community and the attitude of not being in tune with the advancements in their respective fields. "I would love to pursue statistics as my UG degree, but I under pressure by the society to pursue engineering", said a young man. A fashionably dressed girl said, "I wanted to do fashion designing, but my parents feel that it doesn't complement our family tradition." If one opts for a stream other than CA, Engineering, a comment is often passed about the academic caliber of the individual. Others opt for such courses just to obtain such an alluring degree. Increasing importance is being given to pursuing a career matching individual interests with the old notion of going for highly paying salaries taking the back seat.. The response that one gathers from the various sections of the society with this regard is rather mixed thus making the issue difficult to handle. The idea of causing a change in the society may often sound impossible but allowing one's child to pursue and excel in their interests is the right step in that direction. Becoming Sachin is often considered an impossible dream. A dream though difficult requires hard work, focus and a push in the right direction.Changing times has lead to an increase in liberal thinking among the people of the society at large. Also, every change must be first from within. This is no exception!

MEENAKSHI K, III Year



THE HEART-BREAK MISCONCEPTION

'

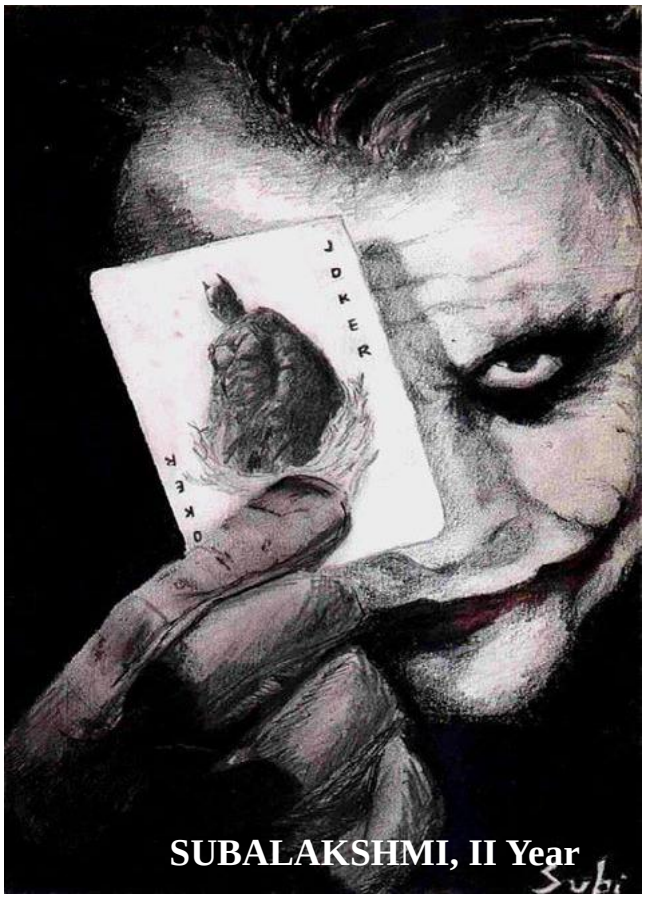
Heart-break' is the popular term on someone's lips when they face rejection. I feel sorry for them, not for the situation they are in but for their ignorance. Yes. Heart is only associated with the physiological process of pumping blood and it is like the CPU without which the functioning of human body fails. On the other hand, Brain, not only is associated with intelligence and memory, but also plays a vital role in controlling different emotions of people.

If our body was an organisation, then the Chief Executive Officer would be the Prefrontal cortex, PFC. The part of the brain which controls emotions is divided into different departments (lobes), such as the “gear shifter” (anterior cingulate gyrus), the anxiety and pleasure centre (basal ganglia), and the emotional centre (deep limbic system), that play powerful roles in making and shaping your life. So, if you don't make efficient use of your brain, you are bound to fail at controlling your emotions. To be successful in life, you need both your I.Q (Intelligence Quotient) and E.Q (Emotional Quotient). Think deeper and use your PFC that houses your conscience and in order to successfully achieve goals. You might have heard a 'little voice in your head' that encourages you in adverse times, "You can do it. Go with it." Next time, apart from thanking god for the strength, thank your PFC as well.

What makes you a pessimist or an optimist? Deep Limbic System, DLS. If your DLS is working well and is in a good shape, you will have an optimistic state of mind and if it is 'overheated', you become a pestering pessimist. DLS has two structures, the amygdala and hippocampus. They act like the cashiers which collect your experiences and account for your personality. In short, hippocampus is the compiler and amygdala is the interpreter. That is why you must remember the compliments and forget the insults. Hormones like testosterone, oestrogen, epinephrine, norepinephrine, dopamine, serotonin, phenylethylamine (PEA), oxytocin, and vasopressin play a crucial role in shaping your emotional quotient.

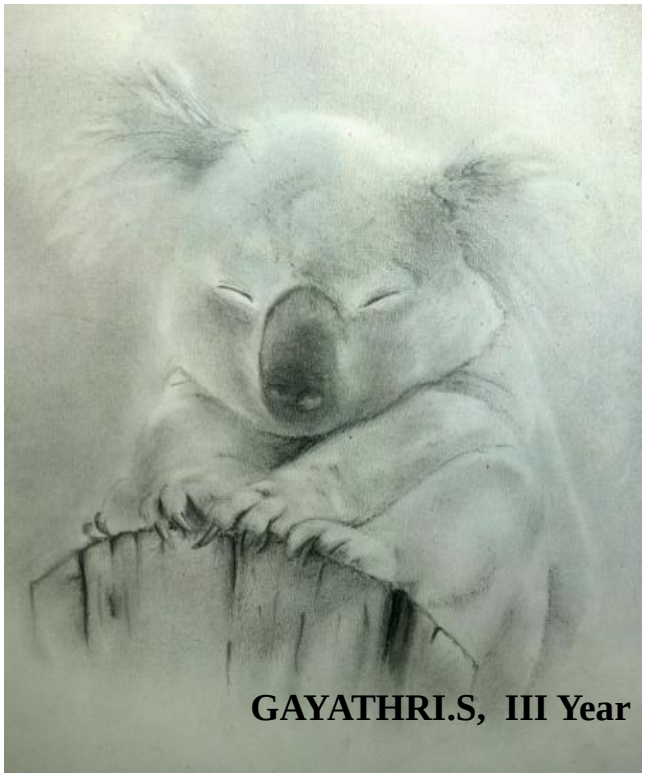
Last but not the least, the communication to various parts of the brain is established by the 'messengers' which are essentially neurotransmitters like acetylcholine and GABA. They carry messages between different parts of your brain as well as spur some cells to be more active and responsive while forcing others to calm, slow down, and remain quiet. This leads to the different emotional responses encountered during stressed situations. These are the reasons why ‘heart-break’ gives a wrong meaning, even metaphorically. Rather it is a ‘mental breakdown’.

SADHANI L KANNAN, IV Year

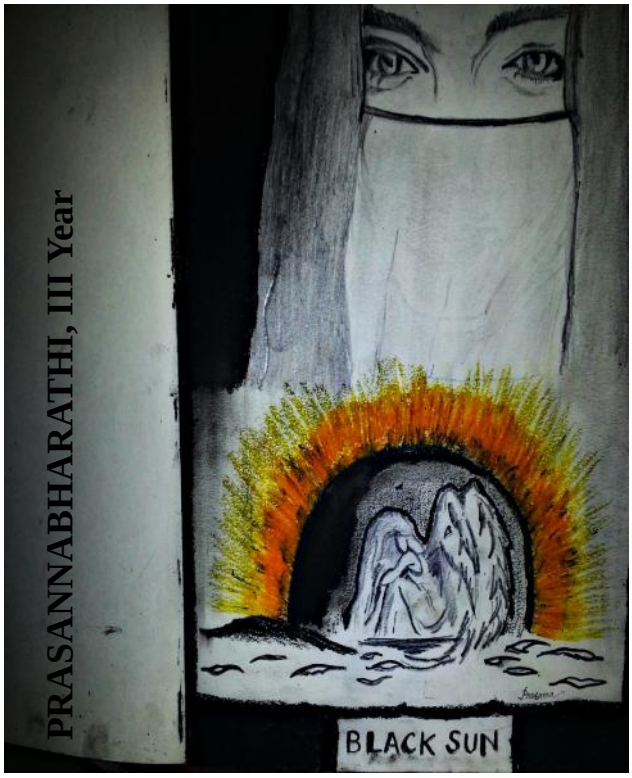


SUBALAKSHMI, II Year

BHAVANA VENKAT, II Year



GAYATHRI.S, III Year



PRASANNABHARATHI, III Year

தமிழ்ச் சரம்

விந்தை

எத்தனையோ அற்புதங்களை உலகில் நிகழ்த்துகிறாய் நீ
ஆனால் உன்னை புரிந்து கொண்டவர் எவரும் இலர்...
மனிதர்களின் எண்ணங்களோ பல வண்ணங்களின்
அதற்கு காரணமும் நீ!
பற்பல ஆராய்ச்சிகள் உலகில் உன்னை புரிந்து கொள்ள
ஆனாலும் புரியாத புதிர் நீ!
வானையே அளவிடும் ஆராய்ச்சியாளர்களால் கூட
உனது ஆற்றலை அளவிட இயலவில்லையே!
உலகை ஆளும் மனிதனையும் ஆட்டிவைப்பது நீ!
அனைவருக்கும் புதிராக இருந்து உலகின்
புதிர்களை விடுவிக்கும் நீதான் அற்புத மூளை..!!!

-க.சோனா ,

4 ஆம்ஆண்டு

நம்பிக்கை

காலம் போனால் திரும்புவதில்லை.....!
கவலைகள் ஒரு போதும் நிலைப்பதில்லை.....!
தோல்விகள் என்றும் நிறந்தரமில்லை.....!
தோற்றுப்போவதில் தவறும் இல்லை.....!
வெற்றிப்படிகள் தூரம் இல்லை.....!
அதில் ஏறத்துணிந்த எனக்கு இனி தோல்வி இல்லை.....!

க .மாரீஸ்வரி,
3 ஆம்ஆண்டு

எண்ணங்கள்

மனித மூளை மிக விசித்திரமானது,அவற்றில் எழும் எண்ணங்களும் விசித்திரமானவையே. நல்ல எண்ணங்கள் உடையவர்களது பாதை வெளிச்சமாகவும், மகிழ்ச்சியாகவும் இருக்கும், தீய எண்ணங்கள் உடையவர்களது பாதை இருளடைந்ததாகவே இருக்கும்.

"நீ எதை நினைக்கிறாயோ அதுவாக ஆகிறாய், உன்னை வலிமை உடையவன் என்று நினைத்தால் வலிமை படைத்தவன் ஆவாய்!"என்பது விவேகானந்தரின் வாக்கு.

நமது மேம்பட்ட எண்ணங்கள் நம்மை மேன்மேலும் வாழ்வில் உயர்த்தும். எண்ணங்கள் வலிமையானால், அவையே ஒரு உந்துசக்தியாக மாறி நம் வாழ்க்கை பாதையை அமைக்கும். எடுத்துக்காட்டாக, நம் முன்னாள் குடியரசுத் தலைவர் திரு.அப்துல்கலாம் அவர்கள் ஒரு சாதாரண மீனவக் குடும்பத்தில் பிறந்தார். வறுமையில் வாடினாலும் அவர் தான் ஒரு விஞ்ஞானியாக வேண்டும் என்ற இலட்சியத்தை மட்டும் கைவிடவில்லை .அந்த எண்ணத்தில் உறுதியாக நின்று சாதித்தும் காட்டினார்.இன்று அவர் ஒரு உலகம் போற்றும் விஞ்ஞானியாக உள்ளார்.

அதே போல்,மாவீரன் நெப்போலியன் உலகத்தையே ஒரு குடையின் கீழ் ஆள நினைத்தார் . அதற்காக கண்டங்கள் தாண்டி கண்டங்கள் போர் புரிந்தார் ,அவரது போர் வீரர்கள் துவண்டாலும் அவர்களுக்கு ஊக்கமளித்து மேலும் போர்கள் செய்து வென்றாரே தவிர அவரது எண்ணத்தை இலட்சியத்தை கைவிடவில்லை.

நல்ல எண்ணங்கள் வலிமையானால் குறிக்கோள் ஆகிறது.குறிக்கோள் இலட்சியம் ஆகிறது . அந்த இலட்சியத்தை அடைய போராடும் குணம் வேண்டும் .எத்தனை இடர்பாடுகள் வந்தாலும் இலட்சியத்தை தவறவிடாமல் மேலும் மேலும் முயற்சிகளை செய்து கொண்டே இருக்க வேண்டும். முன்னாள் அமெரிக்க ஜனாதிபதி ஆபிரகாம் லிங்கன் பல முறை ஜனாதிபதி தேர்தலில் தோற்றார். ஆயினும் தான் ஜனாதிபதி ஆக வேண்டும் ,கருப்பர்கள் அடக்கு முறை ஓய வேண்டும் என போராடி ஜனாதிபதியாக தேர்ந்தெடுக்கப்பட்டார்.

சிலரது தீய எண்ணங்கள் பொறாமை,ஆசை,ஆறியாமை இவற்றையே வளர்க்கும்.ஒருவனது தீய எண்ணம் அவனை மட்டுமல்லாமல் அவனை சுற்றி இருப்பவரையும் அழிக்கும்.அதுமட்டுமன்றி,நல்ல எண்ணங்கள் ஆன்மாவை தூய்மைபடித்தும்.தீய எண்ணங்கள் மன அழுத்தத்தை தருவதோடன்றி மற்றவர்களை பார்த்து பொறாமைப்பட வைக்கும். எண்ணங்கள் பல வண்ணங்களாயினும் அவ்வண்ணங்கள் நமக்கும் மற்றவர்களுக்கும் நன்மை தருவனவாக இருக்க வேண்டும் .!!

சீ .ரேணுகா தேவி,

4 ஆம் ஆண்டு

இன்றையமனிதன்

இயந்திர மயமான உலகில்
இயந்திரமாய் வாழும் உயிர்..!

அறியாத அவன் அருகில் உள்ளவனைப் பற்றி
அறிய விரும்புகிறான் அமெரிக்காவில்
உள்ளவனை..!

அன்று உலகை உருவாக்க இறைவனால்
படைக்கப்பட்ட அவன், இன்று
உலகையே அழித்துக் கொண்டிருக்கின்றான்..
பழமைகளை புதுமைகளாக்குகிறேன் என்றும்,
மூடநம்பிக்கையை முழுதாய் மாற்றுகிறேன்
என்றும்..!

உயிரை உருவாக்கும் வழி கண்டறியும் முன்
அதை அழிக்க வழி கண்டறிந்தவன்.!!

படைத்தான் இறைவன் பகுத்தறிவை
பகுத்து அறிய இவனோ,

அலைகிறான் நிலங்களையும்,
உயிர்களையும் பகுக்க..!!

ஒருபக்கம் வானுயர உயர்ந்து நிற்கும்
கட்டிடம் உல்லாச வாழ்க்கை.!
மறுபக்கம் வானம் பார்த்த பூமி
கேள்விக்குறியான வாழ்க்கை...!!

அன்று நீ மாறினாய் சூழ்நிலையால்
இன்று உன்னால் மாறியது சூழ்நிலை...!!!

வே.வெண்ணிலா,

4-ஆம்ஆண்ட

இயற்கையின் ஏக்கம்

படைத்தல் , காத்தல், அழித்தல் என
பாரில் மூன்று பேர் உள்ளார்
படைப்பவன் விகிதம் பல மடங்கு
காப்பவன் காணாமல் போய்விட்டான்
அழிப்பவன் மட்டும் அளவில்லை
அது தான் மனித சமுதாயம்

என்ன இதுயெனன வியக்காதீர் !
இதோ வருகிறது ஈமெயிலில்
விஞ்ஞானம் என மார்தட்டி
விண்ணைச் சல்லடையாய்த்
துளைத்துவிட்டோம்
மண்ணையாவது விட்டோமா
மாறி மாறி துளைத்துவிட்டோம்
மறந்தே போனோம் நம் நிலையை
மரங்களை வெட்டிச் சாய்த்துவிட்டோம்

மானாவாரியாய் வந்ததய்யா
மழையும் , வெள்ளமும் ,சுனாமியும்
இது போதாதென சூரியனும்
சூரியப்புயலென சுழன்று வந்து
சுடுகாடாய் மாற்ற நினைத்து விட்டான்
வேண்டாம் இந்த விபரீதம்

விட்டு விடுவோம் இந்த விலையாட்டை
நடுவராக விளங்கிடுவோம் "அதுதானய்யா"
காத்தல் தொழிலைக் கையில் எடுத்துக்
காற்று , தண்ணீர் , ஆகாயம் , நிலம் ,
நெருப்பு
இவை அனைத்தும் மாசு படாமல்
காத்திடுவோம்
மாணவ சமுதாயம் மார்தட்டி இந்த
மாபெரும் தொண்டினைச் செய்திடுபவாம்

-ர . சிவராமகிருஷ்னன்
உதவி பேராசிரியர்

alumni

Biomedical Engineering is one of the best Undergraduate programs to pursue at the Freshmen Level. The course helps to create a hybrid Engineering student focused on the development in the areas of Signal Processing, Instrumentation, Device development, Programming, Understanding the concepts of Human Physiology, Hardware & Software, etc. to the process of development of new Bio-devices to improve the quality of life. Looking back, I feel it is one of the best decisions I have made, for the program helped me to switch streams to Electrical Engineering where I could focus particularly on Signal Processing and Instrumentation. I realized that almost all the courses pursued in the UG program helped me approach any interdisciplinary problem with much greater confidence in any future specializations like EE,CS or BME.

\

Ashwin Sivakumar

My journey at SSN started on August 10th, 2009 and with a lot of trepidation I stepped into the college. I started my journey at a time when less than a handful of people knew about the existence of Biomedical Engineering as a stream. A year passed and we finally stepped into the department. My four-year stint at @ SSN-BME has done a lot in making me what I am today. I learnt loads of interesting stuff and got the opportunity to intern at two biomedical companies. Apart from academics, the HOD and the department faculty were kind enough to allow me to participate in other extracurricular activities. I was an active volunteer for Youth Red Cross in the college, which gave me a great exposure to the other side of life. I believe that “college” is not just about academics, it is the period of life which contributes enormously to who you become and what you are in life. In that way, I should say that every experience has definitely been an educative one in my life. I would like to thank each and every one @ SSN-BME who made my time there as beautiful as wonderful they were.

Swetha Sridharan

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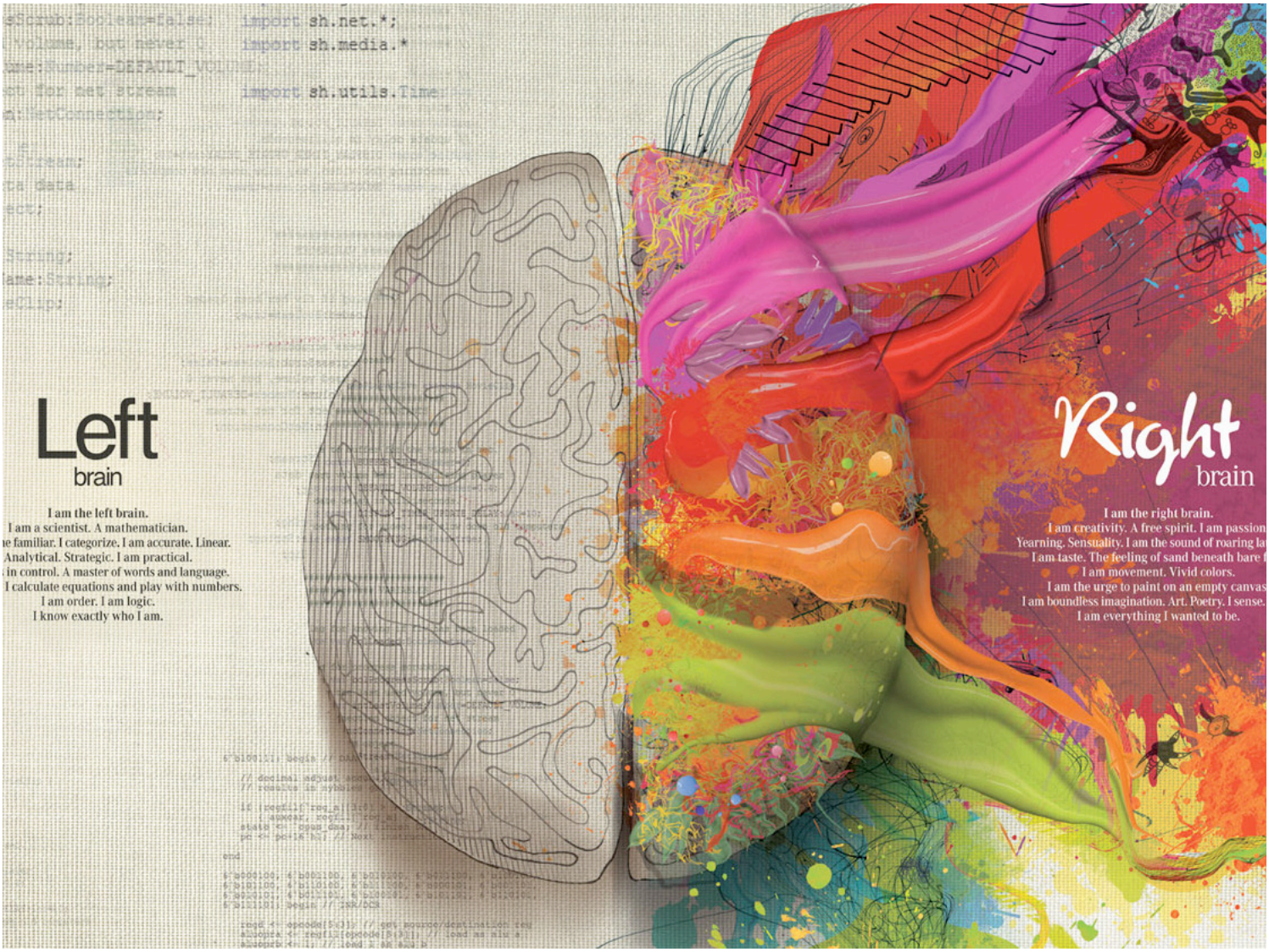
The making of a magazine is certainly not an easy task. A lot of creativity, contribution and the patience are required for the completion of such a steep task.

First and foremost, a big thank you to the head of the department, Dr. A Kavitha for her constant support and encouragement, which always inspired us and made us constantly strive harder to achieve better results. Dr. Mallika Jainu, for her timely suggestions without which none of this would have been possible.

A sincere thanks to the entire faculty at the Department of Biomedical Engineering. Their contributions played an important part in the success of the magazine.

Thanks to our peers and the junior students who contributed in every way they could. Their creativity and constant help shaped the magazine to its present shape.

The Student Editorial Team



Send us your feedback at
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Always take the most unexpected route

When you blame others, you give up your power to change

You're never as good as everyone tells you when you win, and you're never as bad as they say when you lose

Innovation distinguishes between a leader and a follower.

Action is the real measure for intelligence.

Don't find fault find a remedy.

The slow of one warm thought is to me worth more than money

If you cant do great things, do small things in a great way

I intend to live forever, or die trying!

Knowing too much of your future is never a good thing.

The way to get started is to quit talking and begin doing

Our lives are defined by opportunities, even the ones we miss.

Whatever you do will be insignificant, but it is very important that you do it.

It is an ironic habit of human beings to run faster when they have lost their way.

If the road is easy, you're likely going the wrong way.

Out of clutter, find simplicity.

Simplicity is the key note of all true elegance.

Intellectuals solve problems, geniuses prevent them!

A leader is one, who knows the way, goes way, shows the way.

Failure is simply the opportunity to begin again, this time more intelligently!

Taking no chances means wasting your dreams

If opportunity doesn't knock, build a door.

Whatever it is you're seeking won't come in the form you're expecting

There's never enough time to do all the nothing you want.