Dr.N.G.P Institute of Technology
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
(An ISO 9001:2008 certified Institution)
Dr.N.G.P. - Kalapatti Road, Coimbatore-641048, India

DEPARTMENT OF BIOMEDICAL ENGINEERING

News Letter

Vol. 1, Issue No. 1                                                                                        April 2014

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BME ASSOCIATION INAUGURATION – B’MEDIDIANS

Biomedical Engineering Association B'Medidians was formed. Our department students and faculty members organized the inaugural function of B'Medidians on 08.08.2013. Chief Guest for the function was Shri. S. Benedict Biju, Senior Deputy Manager, Research & Development, Pricol Medical Systems Ltd., Coimbatore. Office Bearers of the association were introduced in this function for the academic year 2013-2014.

BIOMEDICAL ENGINEERING SOCIETY INAUGURATION (BMESI)

Our Faculty members and Students became members in the Nationalized Professional body “Biomedical Engineering Society of India (BMESI)”. It was inaugurated in our Institute on 28.02.2014 by Mr. V. Pragadheeswaran, Managing Director, Aries Biomed Technology Pvt Ltd, Coimbatore.
GUEST LECTURES BY HONORARY PEOPLE

- Mr. S. Benedict Biju, Senior Deputy Manager, Pricol Medical Systems Ltd, Coimbatore delivered a lecture on “Insights and Scope of Biomedical Engineering” during 8th August 2013. He gave a detailed view on the advancements in the biomedical field.

- Mr. K. Balasubramaniyam, M/s. Sam Enterprises, Coimbatore delivered a lecture on “Biomedical Engineering – Evolution, Current Trends & near Future” during 1st February 2014. The lecture was focused on technical implications and the ways for improvement in health sector.

- Guest Mr. V. Pragadheeswaran, Managing Director, Aries Biomed Technology Pvt Ltd, Coimbatore, delivered a lecture “Current Trends of Biomedical Engineering” on 28th February 2014. The lecture was mainly based on existing research and development in the field of biomedical engineering in India.

COLLABORATION WITH DEPARTMENT EXPERTS (OUTSIDE CAMPUS)

- Memorandum of Understanding was signed with Kovai Medical Center and Hospitals to use the expertise available in respective departments related to Biomedical Engineering.

- Memorandum of Understanding was signed with Dr. N. G. P. Arts and Science College to use the infrastructural and other facilities available in various departments like Biochemistry, Microbiology, and Biotechnology etc.

- Memorandum of Understanding was signed with KMCH College of Pharmacy to use the facilities available in various departments.

PUBLICATION BY FACULTY MEMBERS

International Journals


✓ D.Hemapriya, J.Karpagam, Presented and Published a paper titled “ECG QRS Detection for BSN using 3M filtering”, Presented and Published at IEEE International Conference on Green Computing, Communication and Electrical Engineering (ICGCCEE’14), organized by Dr.NGP Institute of Technology, Coimbatore on 7th and 8th March 2014.


✓ S.Gowthami, Presented and Published a paper titled “An Enhanced Automatic Image Processing Technique for the detection of fetal anatomies”, at National Conference on Industrial Technology (NCIT’14), organized by Bannari Amman Institute of Technology, Sathyamangalam on 26th and 27th February 2014.


✓ S.Gowthami, Published a paper titled “Standardization of Medical Images & MIMOSA Model”, at National Conference on Rural Health Challenges: Point of Care by Telemedicine, organized by Sri Ramakrishna Engineering College, Coimbatore on 14th and 15th March 2014.

## PARTICIPATION BY FACULTY MEMBERS

<table>
<thead>
<tr>
<th>S. No</th>
<th>Date</th>
<th>Name of the Faculty</th>
<th>Programme</th>
<th>Topic</th>
<th>Organized by/Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18.07.13 to 20.07.13</td>
<td>Ms.S.Malathi</td>
<td>FDP</td>
<td>Faculty Enrichment Programme</td>
<td>Faculty Development Cell &amp; IIPC, Dr.NGP Institute of Technology, Coimbatore</td>
</tr>
<tr>
<td>2</td>
<td>16.08.13 to 18.08.13</td>
<td>Ms.S.Malathi</td>
<td>National Workshop</td>
<td>Treatment Methodologies of Lung Cancer</td>
<td>Department of Oncology, KMCH Hospital, Coimbatore</td>
</tr>
<tr>
<td>3</td>
<td>31.08.13</td>
<td>Ms.S.Malathi, Ms.S.Gowthami, Ms.N.Priyatharsanyya</td>
<td>National Seminar</td>
<td>Medical Instrumentation Applications and Design</td>
<td>Dept. of BME, Sri Ramakrishna Engineering College, Coimbatore</td>
</tr>
<tr>
<td>4</td>
<td>11.11.13 to 15.11.13</td>
<td>Ms.S.Malathi, Ms.S.Gowthami</td>
<td>FDP</td>
<td>Instructional Design and Delivery System</td>
<td>Faculty Development Cell &amp; IIPC, Dr.NGP Institute of Technology, Coimbatore</td>
</tr>
<tr>
<td>5</td>
<td>30.12.13 to 04.01.14</td>
<td>Ms.S.Malathi, Ms.S.Gowthami</td>
<td>Training Programme</td>
<td>LabVIEW core I and II</td>
<td>Dr.NGP Institute of Technology, Coimbatore</td>
</tr>
<tr>
<td>6</td>
<td>22.01.14</td>
<td>Ms.S.Malathi</td>
<td>National Seminar</td>
<td>Computing Trends in Genetic Algorithms</td>
<td>Dept. of BME, Velalar College of Engineering, Erode</td>
</tr>
<tr>
<td>7</td>
<td>23.01.14</td>
<td>Mrs.J.Karpagam</td>
<td>National Workshop</td>
<td>Quality Improvement</td>
<td>Government College of Technology, Coimbatore</td>
</tr>
</tbody>
</table>
SPECIAL ACHIEVEMENTS BY STUDENTS


✓ Bhagyalakshmi K.M won the first prize in classical solo singing competition in TECHFEST’14 on 23rd January 2014 at Dr.NGP Institute of Technology, Coimbatore.

✓ Bhagyalakshmi K.M won the second prize in solo singing competition in TECHFEST’14 on 23rd January 2014 at Dr.NGP Institute of Technology, Coimbatore.

✓ Lakshmi T and Priya S won the third prize in flower arrangement competition in TECHFEST’14 on 23rd January 2014 at Dr.NGP Institute of Technology, Coimbatore.

✓ Nagavenkateswari S won the third prize in creative writing competition in TECHFEST’14 on 23rd January 2014 at Dr.NGP Institute of Technology, Coimbatore.
# CO-CURRICULAR ACTIVITIES BY STUDENTS

<table>
<thead>
<tr>
<th>S. No</th>
<th>Date</th>
<th>Name of the Student(s)</th>
<th>Programme</th>
<th>Topic</th>
<th>Organized by/Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16.08.13 to 18.08.13</td>
<td>Jareena Begam J, Logambika P, Lalitha Lakshmi C, Logambika P, Madhu Seguntha D, Muthuvingsh kumar M, Nabeel C K, Perumalsami R, Sruthi Sasikumar G, Subha Ranjitha S</td>
<td>National Workshop</td>
<td>Treatment Methodologies of Lung Cancer</td>
<td>Department of Oncology, KMCH Hospital, Coimbatore</td>
</tr>
<tr>
<td>2</td>
<td>31.08.13</td>
<td>Total numbers of 52 Students</td>
<td>National Seminar</td>
<td>Medical Instrumentation Applications and Design</td>
<td>Department of BME, Sri Ramakrishna Engineering College, Coimbatore</td>
</tr>
<tr>
<td>4</td>
<td>12.03.14 to 14.03.14</td>
<td>Jareena Begam J, Gurumounika S, Lalitha Lakshmi C, Perumalsami R, Vignesh V G</td>
<td>Cell Activity</td>
<td>Entrepreneurship Awareness Camp</td>
<td>Department of MBA, Dr.NGP Institute of Technology</td>
</tr>
</tbody>
</table>

"Failure doesn't mean the game is over, it means try again with experience."  
—Len Schlesinger
CLINICAL TRAINING

✓ In order to motivate the students towards the practical learning process, hands on training with the state of art equipment were given at KMCH. Second year students were taken to the hospital to gain basic knowledge of equipment used in the various departments on 1st, 2nd and 3rd of July 2013.

✓ As per the curriculum the subject areas which need detailed practical exposure were analyzed and training was planned for every week. Students were taken to hospital in two batches. In the 1st batch, the students have visited Pathology, Microbiology, Nuclear Medicine and Radiology departments on 26th July, 23rd August, 30th August and 13th September. Whereas in the 2nd batch, students have visited the Microbiology, Nuclear Medicine, Radiology and Pathology departments on 24th July, 31st July, 16th August, and 4th September.

✓ Special lecture series was arranged for the benefit of the students in the area of Microbiology. Mr. Gandhirajan, Microbiologist, Department of Microbiology, KMCH, Coimbatore has explained the working procedures of various laboratory equipment in two slots i.e. on 14th February and 29th March 2014 respectively.

VALUE ADDED COURSES

✓ “LabVIEW core I and II” was conducted by M/s. VI Solutions, Bangalore at NI LabVIEW academy in our college premises from 30th December 2013 to 4th January 2014. The students have actively participated in the training programme and gained knowledge in LabVIEW platform.

✓ “IBM CE- Software Foundation Course with C Programming” was conducted to our second year students by IBM Software Group -India from 6th to 9th January 2014 to enhance their software skills like C, C++.
INDUSTRIAL VISITS

✓ Our students had visited South Indian Textiles Research Association (SITRA) Coimbatore on 6th September 2013. The students were exposed to different technologies used in the processing of cotton and manufacturing of textile products which are used in the medical field.

✓ Also our students had visited Pasteur Institute, Coonoor as a part of their curriculum on 25th January 2014. They visited the various departments related to Antigen preparation, Animal mode of induction with various antigenic agents, Immune Response separation, Antibody characterization, Vaccine preparation, testing the quality of Vaccine and Animal handling.

EXTENSION ACTIVITIES

✓ Our students involved in EM-1(Effective Microorganism) treatment process in the sewage pond at our college premises. Through this process the students have learnt the importance of eco-friendly effective microorganism treatment process for the human well being. Students are actively participating in this long term process.

✓ Our students were taken to the Ambedhkar Nagar near Kalapatti on 2nd April 2014 to create awareness among the people about the maintenance of personal hygiene, contagious and seasonal disease. The importance of cost effective nutritious food available to eradicate malnutrition were explained by the students to economically backward people.
OBSTRUCTIVE SLEEP APNEA: A SILENT KILLER DISEASE

Unless our bed partner is disrupting our sleep, most of us don’t think of snoring as something to be overly concerned about. But frequent, loud snoring may be a sign of sleep apnea, a common and potentially serious disorder in which breathing repeatedly stops and starts as you sleep. Although sleep apnea is treatable, it often goes unrecognized. Learning how to identify the warning signs, how to distinguish it from normal snoring, is the first step to overcoming sleep apnea and getting a good night’s sleep.

Obstructive sleep apnea is the most common type of sleep apnea. It occurs when the soft tissue in the back of your throat relaxes during sleep and blocks the airway, often causing you to snore loudly. Essentially the muscles in the body relax which causes excess tissue in the back of the mouth, nose and throat to collapse and block breathing. When breathing is interrupted by an obstruction in the airway, the brain reacts by waking the body slightly to restore muscle tone and breathing starts again. This may happen several times during the night without the sufferer being aware of the snoring, choking and gasping for air associated with obstructive sleep apnea.

Some signs associated with sleep apnea include: Excessive, nightly snoring, Waking up several times during the night, Chronic daytime fatigue, Sleepiness. These problems can lead to an increased risk of high blood pressure, stroke and heart attack. Witnessing an episode can be very frightening. The patient will appear to be suffocating and gasping for air.

They will also sometimes wake up suddenly and then fall back to sleep. The diagnosis is usually apparent, especially to the family of the patient. If snoring persists, once these factors are removed, the patient should seek the help of a physician. This examination may include a sleep study to confirm or rule out sleep apnea. This is important since sleep apnea may be present in as many as 80% of all habitual “heroic” snorers.

Sleep apnea surgery as well as other medical therapy is available. The less obtrusive medical therapy consists of nightly use of a CPAP (continuous positive airway pressure devices) machine, which pumps that forces air into the nasal passages at pressures high enough to overcome obstructions in the airway and stimulate normal breathing. CPAP is not a cure and must be used every night for life, non-compliant patients experience a full return of Obstructive Sleep Apnea Syndrome and related symptoms.

A Dental Oral appliance is also a form of medical therapy. The dental device causes the lower jaw to protrude forward while the patient is asleep. This treatment is supposed to enlarge the airway opening at the back of the tongue. The problem with this treatment is that it may be ineffective, and even when the patient experiences some benefit, the long-term use may lead to drooling, tooth movement and jaw joint pain. Surgical therapy is based on identifying the sites of airway obstruction. This can include the nose, soft palate and tongue.

by
Mrs.D.Hemapriya, AP/BME
CORONARY ARTERY DISEASE

Coronary artery disease, also called coronary heart disease, or simply, heart disease, is the No. 1 killer in America and most of developed countries. Heart disease is a result of plaque buildup in your arteries, which blocks blood flow and heightens the risk for heart attack and stroke.

Heart disease is a result of plaque buildup in your coronary arteries -- a condition called atherosclerosis -- that leads to blockages. The arteries, which start out smooth and elastic, become narrow and rigid, restricting blood flow to the heart. The heart becomes starved of oxygen and the vital nutrients it needs to pump properly.

From a young age, cholesterol-laden plaque can start to deposit in the blood vessel walls. As you get older, the plaque burden builds up, inflaming the blood vessel walls and raising the risk of blood clots and heart attack. The plaques release chemicals that promote the process of healing but make the inner walls of the blood vessel sticky. Then, other substances, such as inflammatory cells, lipoproteins, and calcium that travel in your bloodstream start sticking to the inside of the vessel walls.

Eventually, a narrowed coronary artery may develop new blood vessels that go around the blockage to get blood to the heart. However, during times of increased exertion or stress, the new arteries may not be able to supply enough oxygen-rich blood to the heart muscle. In some cases, a blood clot may totally block the blood supply to the heart muscle, causing heart attack. If a blood vessel to the brain is blocked, usually from a blood clot, an ischemic stroke can result.

Cardiac ischemia occurs when plaque and fatty matter narrow the inside of an artery to a point where it cannot supply enough oxygen-rich blood to meet your heart's needs. Heart attack can occur - with or without chest pain and other symptoms. Ischemia is most commonly experienced during exercise or exertion, eating, excitement or stress, exposure to cold etc. Coronary artery disease can progress to a point where ischemia occurs even at rest. And ischemia can occur without any warning signs in anyone with heart disease, although it is more common in people with diabetes. The most common symptom of coronary artery disease is angina, or chest pain. Angina can be described as a heaviness, pressure, aching, burning, numbness, fullness, squeezing or painful feeling. It can be mistaken for indigestion or heartburn. Angina is usually felt in the chest, but may also be felt in the left shoulder, arms, neck, back, or jaw. Other symptoms that can occur with coronary artery disease includes shortness of breath, palpitations (irregular heartbeats, skipped beats, or a "flip-flop" feeling in your chest), a faster heartbeat, weakness or dizziness, nausea, sweating etc.

by

Mr.R.Karthic, AP/BME

News Letter Vol.1, Issue No.1, April 2014
Department of Biomedical Engineering, Dr.NGP Institute of Technology, Coimbatore
ARTEFACTS IN COMPUTER RADIOGRAPHY

Computed Radiography (CR), is a form of digital imaging providing enormous benefits to the end user’s. Despite the obvious benefits of digital imaging, artefacts on radiographic images are distracting and may compromise accurate diagnosis. An artifact in general is said to be any error in the perception or representation of any visual or aural information introduced by the involved equipment or technique. An image artifact is sometimes the result of improper operation of the radiographer, and other times a consequence of natural processes or properties of the human body. It is important to be familiar with the appearance of artefacts because artefacts can obscure, and be mistaken for, pathology. Therefore, image artefacts can result in false negatives and false positives.

Types of Artefacts

Understanding the potential sources of CR artefacts will aid in identifying and resolving problems quickly and help prevent future occurrences. Artefacts can be of various types based on image acquisition, processing, IP plates, cassette handling etc. This could be distinguished as exposure artifacts which are caused mostly by handling of the operator, processing artefacts/ imaging plate artefacts, and image processing artefacts caused due to the improper settings in the software. Apart from these, artefacts can also be caused due to environmental factors. But in most cases, care is not taken to prevent artefact formation.

Environmental Factors

Artefacts caused by the environmental factors may sometimes prove to be virulent. As is the case when it’s not just the modality that is the cause of the artefacts, but also external factors which add up to the case.

Causes of artefacts vary from the range of lighting to ground voltage leakage. This could be grouped as manmade factors and external factors for a better understanding of the subject. In most of cases artefacts caused by dust plays a major role. This comes under manmade factors.

Man-made Factors

Cracked or damaged cassettes will result in horizontal banding. Fine bristles as in the case of light seal may cling to the IP plate resulting in a white line in the horizontal direction. Sometimes fine threaded structures like hair get stuck to the cassette. Such particles get attached to the scanning path or the rollers while scanning resulting in a string like pattern. Interesting factor holds, if the paint from the edges of the cassettes gets peeled off. In this case, the paint gets stuck to the screen or the film resulting in dot like structures due to the electrostatic force.

The worst case of artefacts is due to a problem with the earthing voltage. This may result in home sensor problem, motor failure to the PMT board failure. There is a procedure of placing labels for markers in the cassettes. These labels may get loose and fall into the scanner. This may stick to the assemblies, get replicated in the images in a the minor case or cause assembly problems in a major case. Labels developed by image processing software tools must be used rather than using manually. If used manually frequent observation must be done.
**BIOMETRIC SECURITY**

Biometric Security is a security system that uses measurement of persons’ physical characteristics that are difficult to abuse or evade contrary to old-fashioned password or document based forms of identification. It relies on who you are on one of the numerous unique characteristics that you cannot lose or forget. It has changed the way we perceive security. Some of the biometric technologies are finger print, palm print, foot print scanning, face recognition, iris recognition, retinal recognition, hand & finger geometry, 3D finger surface, finger wrinkles, voice recognition, laughter recognition, gait recognition, age recognition, vein & vascular pattern, skin spectrum, dental radiograph, bite marks, ear canal, ear geometry, lip movement, lip shape, nail RFID, DNA, hand pressure profile etc.,

**Atm Security**

Fingerprint Scanning is one of the most common technologies used worldwide. Several Indian banks have adapted fingerprint biometrics especially for their ATM transactions that is the BIOATM. They have also adopted and developed a retro-fit kit for the conversion of regular ATMs to biometrically enabled ATMs, without any physically changes to the existing ATMs.

**Biomail**

Microsoft Outlook brings to a safe, secure and uncrackable email communication. It combines fingerprint biometric security and encryption. The document remains encrypted until your fingerprint is read on a biometric fingerprint scanner. This means that no one other than the intended receipt can open, view or copy the document.

**Biometric Car Immobilizer**

With auto theft on the rise, the market is flooded with various security options to protect your vehicle. The latest one among these is the automotive technology research and developments biometric car immobilizer system. The biometric immobilizer functions like a standard immobilizer with one difference. Drivers have to get their finger scanned before the car can be started. The vehicle is automatically immobilized 10 second after the ignition is switched off. When any of the vehicle’s doors are opened the system prepares for scanning. The finger that had earlier been scanned is placed in the centre of the scanner and within two seconds the fingerprint is scanned and confirmed against the earlier record and the vehicle is ready to start. The car immobilizer has a 30 fingerprint memory and can operate in a standalone capacity or in conjunction with existing vehicle alarm and immobilizer systems.

by S. Malathi, AP/BME
HUMANS - SOME FUN FACTS

In your lifetime, you’ll shed over 40 pounds of skin. (Every minute, 30-40,000 dead skin cells fall from your body and... Seventy percent of the dust in your home consists of shed human skin!)

The smallest bone in the human body is the stapes or stirrup bone located in the middle ear. It is approximately 11 inches (28 cm) long.

Human thigh bones are stronger than concrete. (Then why engineers use concrete. Oh right! because thigh bones are scarce).

You blink every 2-10 seconds. As you focus on each word in this sentence, your eyes swing back and forth 100 times a second, and every second; the retina performs 10 billion computer-like calculations.

by

V.G.Vignesh, II BME

6 CUTTING-EDGE TECHNOLOGIES

Current research reveals exciting possibilities as technology and healthcare continue to advance. Here’s a look at six technologies revolutionizing the medical field:

3D printing: California-based research company Organovo has printed human liver tissue to test drug toxicity on specific sections of the liver. Although printing organs for transplants may still be far off, this technology could be used in the near future with individual patients to test their toxicity reactions to specific drugs.

Artificial intelligence: IBM’s Watson is just the first step toward using artificial intelligence in medicine. The supercomputer, which defeated two human champions on “Jeopardy!” two years ago, is now being used to diagnose and manage lung cancer treatment.

Imagine a computer that could evaluate and analyze a patient’s entire genome, biometric data and environmental and personal data, including diet and activity level. The quantity of information is too much for a person to analyze efficiently, so adding an artificial intelligence component could help achieve a new level of understanding.

BCI and BBIs: As brain-computer interfaces become more advanced, healthcare will incorporate more complex human-computer connections. The uses range from helping people manages pain to controlling robotic limbs. Harvard University researchers recently created the first brain-to-brain interface that allowed a human to control a rat’s tail — and another human’s movements — with his mind, proving that controlled robotic limbs have far-reaching possibilities for patients.

Robotics: Robotics is quickly advancing medical treatment. Ekso Bionics has already launched the first version of its ekso skeleton, which enables paraplegics to stand and walk independently. This revolutionary technology allows a person who has spent 20 years in a wheelchair to stand on her own. This holds huge promise for the next generation of robotics.

Electronic diagnoses: Technology promises to put the burden of care and diagnosis directly in the hands of patients. The XPRIZE Tricorder Challenge is sponsoring a $10 million race to develop a handheld, non-invasive electronic device that can diagnose patients better than a panel of physicians could. Patients would no longer have to go to a doctor's office or hospital.
Instead, a device in their homes would analyze their data, diagnose the problem and send their information to a physician who could treat them remotely. Such a device could make healthcare more accessible in rural areas and developing nations. One of the devices up for the challenge is being developed by Scanadu, which also has an electronic urinanalysis stick, similar to a pregnancy test, which performs up to 12 different tests and sends the results through the cloud to the treating physician, eliminating the need for routine lab visits.

**Patient-physician interaction technologies:** In a typical clinic visit, which lasts just 15 minutes, the provider must evaluate electronic and paper records, check vitals, diagnose and communicate with the patient before providing effective treatment. Advancing technology means the first three of those tasks could be done automatically, giving the physician more time to interact with the patient and provide more accurate treatment. Patients will soon be monitoring their own vital signs. MC10 is prototyping a temporary tattoo (epidermal electronics) that remains for two weeks and effortlessly and continuously captures biometric data.

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**INTERESTING FACTS ABOUT BRAIN**

- Lack of oxygen in the brain for 5 to 10 minutes results in permanent brain damage.
- Your brain keeps developing until your late 40s.
- New Brain Connections Are Created Every Time You Form a Memory.
- Your brain uses 20% of the total oxygen and blood in your body.
- When awake, the human brain produces enough electricity to power a small light bulb.
- Violent homes have the same effect on children’s brains as combat on soldiers.
- It's scientifically proven that even a small dose of POWER changes how a person's brain operates and diminishes empathy.
- You have Taste receptors in the stomach, intestines, pancreas, lungs, anus, testicles and the brain.
- The pathologist who made Einstein body's autopsy stole his brain and kept it in a jar for 20 years.
- 60% of your brain is fat.

**by V.G.Vignesh, II BME**

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“Education is the most powerful weapon we can use to change the world.”

— Nelson Mandela

For more Quotes: www.InspiringQuotes.in