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Editorial

Dear BMESI members!!!

Wish you all A VERY HAPPY, HEALTHY, SUCCESSFUL life with PEACE & PROSPORITY in 2011 & years ahead!!!

This issue covers The ICEW-India, 2011 which provides common platform for experts and professionals to network and discuss challenges in clinical engineering.

Congratulations to Surekha Kamath, who has been awarded the Ph.D degree for her thesis "Robust Control Strategy for Blood Glucose Regulation System" by the Manipal University. Brief abstract is reported for the benefit of readers.

Readers! Hope that advanced medical systems and update on upcoming events are also interesting in this this issue.

best wishes ....

Dr. Bheemsain Rao PhD

International Clinical Engineering Workshop – India

February 20 – 25, 2011, College of Engineering, Pune

The main aim of ICEW-India, 2011 will be to highlight the urgent need for establishing a strong Clinical Engineering Profession in India. This Workshop will serve as a common platform for experts and professionals to discuss important challenges faced by the CE profession and identify possible ways to move forward.

This Workshop will also include training modules, which will enable Clinical Engineers (CEs) working in hospitals to learn about modern methods in Clinical Engineering Practice and thus, upgrade their knowledge and skills, and build competences in essential areas. In addition to CEs, organizers also look forward participation from hospital administrators/managers, clinicians, academic and teaching faculty, students, NGO representatives and industry personnel who will bring multiple viewpoints.

For further information logon to: http://www.icew-india.in/registration.htm

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GE Pocket Sized Ultrasound Scanner

General Electric, GE, is one of the largest companies in the world and one its best performing divisions is the Ultrasound machine division. GE offers a wide range of ultrasound equipment that covers almost every possible application. GE Healthcare has released the much awaited Vscan pocket sized ultrasound. The Vscan looks like a cross between an iPod and a cell phone, making it possibly the world's smallest ultrasound. Many in the industry hope that this device offers a chance for physicians to make a move from stethoscopes to portable imaging devices, bringing advanced visualization to any examination room.

The unit weighs one pound and is only 3 inches (7.6 cm) wide and 5.3 inches (13.5 cm) long, offering both standard black and white imaging, as well as colored blood flow Doppler. GE is touting Vscan's size and capabilities for cardiologists to transthoracically view myocardium, pericardium, and heart valves, and for primary care physicians, as well as OB, ER, and others, to scan the liver, kidney, aorta and peripheral vessels, babies in the womb, and anything else the transducer can penetrate.

Vscan pocket sized ultrasound

Courtesy: medgadget.com

For critical care clinicians, Vscan can offer an immediate look beyond patient vital signs with the potential to identify critical issues, like fluid around the heart, which could be a sign of congestive heart failure. And for cardiologists, Vscan provides a dependable visual evaluation of how well the heart is pumping at a glance, so they can treat patients more efficiently.

Features from the product:

1. An online portal provides Vscan users with training tools for the product and basic clinical applications with sections about imaging technique, anatomy and trouble shooting
2. Intuitive user interface that can be controlled using the thumb
3. Intelligent workflow enhancements
4. Battery charger station and battery life of one hour scanning - good for up to 30 patients based on average of 2 minutes per scan
5. Voice annotation
6. USB docking station
7. Link to a PC for organization and export of data
8. Gateway software with services tools and remote diagnostics

-Aishwarya Anand & Swathi Makham

Upcoming Events

National Conference on Biomedical Electronic Engineering & Bioinformatics

10 to 11 January 2011, yavatmal, Maharastra
Website: http://www.dbncoet.ac.in
Contact name: Mrs. Dhanshree Pohare/Trivedi
The conference will provide a platform for young researchers in Biomedical Engineering to interact with eminent scientist from India
Organized by: Dr. Bhausaheb Nandurkar

International Conference on Recent Advances and Future Trends in Healthcare Infrastructure and Medical Technology (HIMT 2011)

2 to 5 February 2011 New Delhi, India
Website: http://www.himt2011.org
Contact name: Lt. Col. (Dr.) Madhav Madhusudan Singh
A platform for promoters, healthcare providers, administrators, project managers, equipment manufacturers and the pharma industry in the field of healthcare infrastructure and medical technology.
Organized by: All India Institute of Medical Sciences (AIIMS)

Quicker Detection of Tuberculosis Using X-Ray Imaging

In contrast to various biochemical kits available for detection of tuberculosis (TB), researchers at Ngee Ann Polytechnic's School of Engineering and SATA CommHealth have invented a faster method to detect the disease.

These researchers have developed software that can detect TB by analyzing lung x-ray images with a success rate of over 90%. Software tools like these will also increase the efficiency of radiologists, whose dearth is felt by many healthcare institutes.

For further details contact Dr Acharya at: *aru@np.edu.sg*

TB detection software developed by Ngee Ann Polytechnic and SATA CommHealth.

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RIGHT TO HEALTH CARE: ISSUES AND CHALLENGES

4 to 5 February 2011
Gobichettipalayam, Tamilnadu, India

Website: http://gobiartscollege.org
Contact name: Dr.M.Raju
This two day conference at Gobi Arts & Science College intends to discuss and deliberate the issues and challenges in health care and suggest measures to ensure that the obstacles in the way of provision of health care are dispensed
Organized by: University Grants Commission

17th Annual Congress of the Indian Society of Critical Care & INTERNATIONAL CRITICARE CONGRESS 2011

17 to 21 February 2011
New Delhi, Delhi, India
Website: http://www.criticare2011.org
Contact name: Mr. Ankit Bhatia (Mobile No. +91 9811802174)

17th Annual Congress of the Indian Society of Critical Care Medicine & INTERNATIONAL CRITICARE CONGRESS 2011
Organized by: Indian Society of Critical Care Medicine (ISCCM)

Robust Control Strategy for Blood Glucose Regulation -PhD Thesis

Dr Surekha Kamath, Senior Lecturer, in the Department of ICE, has been awarded the Ph.D degree for her thesis "Robust Control Strategy for Blood Glucose Regulation System" by the Manipal University, Manipal. The doctoral study was carried out under the guidance of Dr V. I. George, Professor and Head of the Department of ICE MIT Manipal and Dr Sudha Vidyasagar Professor and Head of the Department of Medicine K.M.C Manipal.

Dr Surekha Kamath in her research investigates H∞ robust control theory for the design of an automatic insulin delivery device, which prevents hyperglycemic levels in a Type I diabetic patient. She also compares the results with the two well known controllers such as Proportional-Integral-Derivative (PID) and Internal Model Control (IMC) controllers. In her research, she makes use of the detailed nonlinear pharmacokinetic-pharmacodynamic model of Type I Diabetic Patient (TIDM), which is then linearized and reduced to lower order model for controller design, unlike the simplified linear models used in earlier approaches. The blood glucose regulation problem in control theory is reformulated as a tracking one and to find the reference transfer function, she has used the test data obtained from the Oral Glucose Tolerance Test (OGTT) conducted on healthy subjects. Dr Surekha Kamath says that "Robust control problem is a problem of analysis and design of an accurate control system in the presence of plant uncertainties. Because the parameters in the mathematical model of the blood glucose dynamics present a considerable amount of uncertainty, the H∞ framework is well suited for the design of controllers for Blood Glucose regulation." During her research, a robust H∞ controller was developed to deliver insulin via a mechanical pump in Type I diabetic patients. Thus, the aim of her study was directed to design a robust control strategy that could withstand parameters perturbation and practical issues like robustness of the controller in modeling uncertainties, parameter variations and disturbances. Efficacy of the controller developed was established through tracking performance of reference signal. Simulation results of her work depict more prominence of H∞ controller for Blood Glucose regulation.

-Sanjay Naidu B A S

Novel Dopamine sensor provides molecular view of the brain

Graphic: Patrick Gillooly/MIT

Advancements in fMRI technology are the need of the hour as the technology that granted access to the fundamental working of the brain is increasingly being confined by its own limitations. One of these is the inability of fMRI to provide pinpoint localization of brain activity right down to the neural level.

A research group at MIT under the auspices of the McGovern institute for brain research, headed by Associate Professor of biological engineering, Alan Jasanoff, is developing new contrast agents that respond to neural activity itself rather than to the surrounding blood vessel activity, thereby revealing a vast amount of information on localized neuron events.

One such methodology that the team developed involves a very advanced protein engineering technique named "Directed Evolution" which was used on a haem protein, which is a MRI contrast agent. The protein was evolved to bind dopamine. This breakthrough is significant since the protein contrast agents in use today fail to perform their normal function of brightening the MRI signal when in the presence of dopamine.

Thus, this modified protein contrast agent, a so-called "Dopamine sensor", finds use in studying the changes in dopamine levels upon controlled stimulations, since it actually produces signal changes in MRI.

Once this method is adopted for human subjects, the ability to detect changes in dopamine will be influential in the study of brain disorders, clinical research and drug development

-Prasanna Herle

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Need for innovation

Technologies today are driven by creativity & innovation. Healthcare system in India faces some of the toughest challenges in innovation in terms of providing basic healthcare facilities in villages, towns and to other low income groups. There is an urgent need in finding innovative technologies and solutions relevant to solving some of the most pressing challenges facing our nation. A recent issue (July 2010) of Technology Review (Indian Edition) published by MIT came up with a challenge addressing issues in Primary Healthcare Centers and those related to motherhood. I am summarizing some of those issues here:

a) How can we create healthcare targeted at Primary Healthcare Centers which would both be highly efficient and cost-effective? In addition can we do this at a quicker pace?

b) In addition to diagnostics and treatment can we think of ways of reducing the consultation charges such that even daily-wages-labourer can have easy access to experts?

c) With respect maternal healthcare can we bring down the death-rate of pregnant women due to various complications during pregnancy and child-birth; also can we register all the pregnancies such that the nutritional status of both mother and infant can be tracked and any abnormities reported and treated.

d) How effectively can we provide healthcare over phone, since mobiles have infiltrated even the remotest part of our country?

Some of the brilliant minds have come up with solutions that are promising, inspiring and are on the path of being commercialized. Among them noteworthy are:

- ✓ Novel microfluidic-chip based platform that can perform low-cost medical diagnostic tests focused on immunoassays, developed by Dhananjaya Dendukuri, PhD in chemical engineering from Massachusetts Institute of Technology. These chips, if mass-produced can address issues a) and c)
- ✓ SiteOnMobile that delivers Internet experience over low-featured phones, developed by Hewlett-Packard. Once this comes into reality it can address challenges b) and d)

With these inspirations behind us, the biggest challenge now is scaling-up of collaborative efforts by academicians, researchers and students in to bringing innovative solutions to the needy.

-Supriya Babu

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Members are requested to update their contact details with email Ids to the editor (bheemsainrao@yahoo.com) to enable us to send you the e-version of engmednews and GO GREEN!!!

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