



*SPOTLIGHT
ON AFRICA*

IFMBE NEWS

International Federation of Medical and Biological Engineering
NO.92, April–June 2013, ISSN: 1741–0800





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IFMBE News
No. 92,
April-June 2013,
ISSN: 1741-0800

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EDITORIAL

Opening a window for BME in Africa

Summer is coming, all the growing things stretch up to meet the hot sunshine. BME activities, it seems, are no exception to come into a busy season.

In the past three months, we are so happy to receive submissions and materials from IFMBE committees, members and more IFMBE affiliated societies. Among them, stories spotlighting Africa continent particularly drew our attention. I would like to compile them into a feature column, and share them with you to open a window for BME in Africa. I hope it can guide you to know about BME in Africa, and feel the heat of Africa.

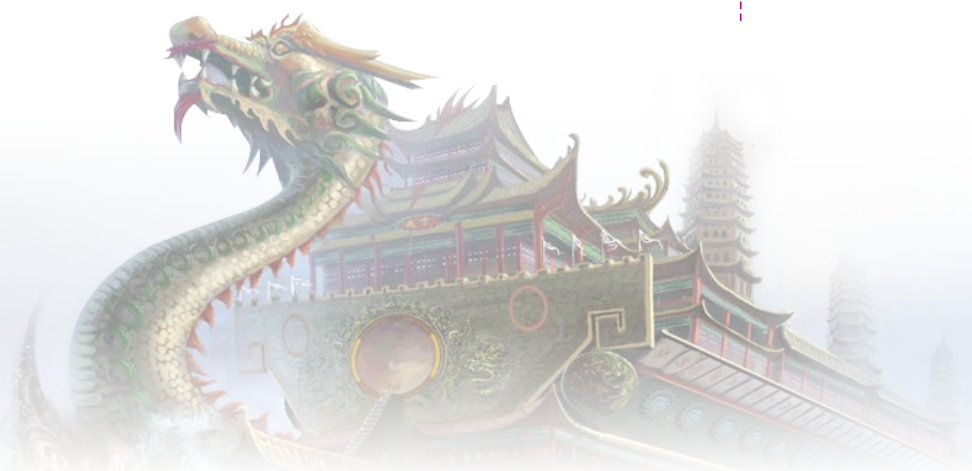
In this Issue No.92, we have updating conference report submitted by Dr. Subrata Saha from Bioethics Committee. In addition, owing to some affiliated societies delivered their various activities and information, we get chance to know about activities from Croatia, Greece and HongKong in this issue. We sincerely appreciate promotions by Ratko Magjarevic, Nicolas Pallikarakis and Arthur Mak respectively.

Specially, in the Feature Column of this issue, as mentioned above we compiled wonderful stories with perspective of Africa brought by Andrei Linnenbank and Saide Calil. Andrei Linnenbank shared his memorable experience in visiting developing countries of Africa. Saide Calil who will keep in reporting worldwide activities on Clinical Engineering, in this issue organized and brought us the stories in two developing countries from Africa: Ghana and Gambia.

With the coming event column, latest news of ICBME 2013 in Singapore was released.

All the way, IFMBE News is growing in your support. In future, we will continuously work on the News, and keep in touch with you. If you have anything, please don't hesitate to contact us at ifmbe_news@yahoo.com.

In June, the Dragon Boat Festival is a traditional Chinese festival. Here taking this opportunity to wish you a sunnier mood and healthy life.



NEWS EDITOR
Kang Ping, Lin



7th International Conference on Ethical Issues in Biomedical Engineering

7th International Conference on Ethical Issues in Biomedical Engineering was held at the State University of New York (SUNY) Downstate Medical Center in Brooklyn, New York, April 20 & 21, 2013. The conference was highly successful. Over 150 Biomedical engineers, Scientists, Medical, graduate and undergraduate students, Clinicians, Philosophers, and Industry representatives attended the conference. The sessions were: Ethical Issues in Biomedical Engineering; Ethics of Stem Cell Use; Ethics Issues in Dentistry; Medicine, Religion and Ethics; Regulation, Law and Ethics; and Research and Medical

Ethics. Dr. Subrata Saha, Research professor and Director of Biomedical Engineering Program at SUNY Downstate Medical Center and Chair of the Bioethics Committee of IFMBE was the Conference Chair. Dr. Herbert Voigt, previous President of IFMBE and Dr. Shankar Krishnan, Secretary General of IFMBE jointly chaired the session on Ethical issues in Biomedical Engineering. This conference was co-sponsored by IFMBE, AIMBE, Sigma Xi and other institutions. For more information: www.downstate.edu/orthopaedics/bioethicsconf2013.



Fig. 1. Some of the participants at the Ethics Conference. From left to right: David Dinhofer, M.D.; Herbert Voigt, Ph.D.; Subrata Saha, Ph.D.; Mircea Leabu, Ph.D.; Shankar Krishnan, Ph.D.; Andrey Galper, Pharma D.



REPORT FROM IFMBE: Committees & Affiliated Societies

International Workshop on Intrabody Communication

University of Zagreb Faculty of Electrical Engineering and Computing 27th May 2013



Workshop presenters (from the left to the right):
Branimir Ivšić, Yue Ming Gao, Mang I Vai, Toni Šarić,
Željka Lučev Vasić, Igor Vitas

The International Workshop on Intrabody Communication was held in Zagreb, Croatia, on 27th May 2013 at the University of Zagreb, Faculty of Electrical Engineering and Computing. The overall objective of the workshop was to cover the state of the art of Bilateral Croatian-Chinese Project “Research of Intrabody Communication for Body Area Networks”. We had the honor and pleasure that the workshop was endorsed by the International Federation for Medical and Biological Engineering (IFMBE), Croatian Medical and Biological Engineering Society (CROMBES), and by the Institute of Electrical and Electronics Engineers (IEEE), the Engineering in Medicine and Biology Society (EMBS), Instrumentation

and Measurement Society (IMS), and Antennas and Propagation Society (APS).

A total of six papers were presented, covering properties of the capacitive and galvanic intrabody communication channel, network modeling of intrabody communication for implanted devices, and specific applications of intra-body, on-body and off-body communications. Three of the papers were presented by graduate and PhD students. The presenters came from China (Fuzhou University and University of Macau) and Croatia (University of Zagreb).

After the workshop the participants visited some Departments of the Faculty of Electrical Engineering and Computing.

The organizing committee would cordially like to thank all the participants of the International Workshop on Intrabody Communication. Their attendance and the quality of their papers were the main factors contributing toward its success. We hope that everyone enjoyed both the scientific and social programs, established new friendships and partnerships and consider this workshop as a memorable event that stimulated their thinking and refreshed their motivation and energy.



REPORT FROM IFMBE: Committees & Affiliated Societies



4-6 April 2013
Athens, Greece



www.elevit.org.gr

5th PANHELLENIC CONFERENCE ON BIOMEDICAL TECHNOLOGY



The Hellenic Society for Biomedical Technology – ELEVIT successfully organized the 5th Panhellenic Conference on Biomedical Technology that was held 4-6 April in Athens, Greece. The Conference, which was endorsed by the Hellenic Ministry of Health, the IFMBE and the EAMBES, hosted 200 persons from both the academic and the healthcare sector.

The first day's program consisted mainly of invited presentations by recognized researchers. Professor Christopher James (University of Warwick, UK) engaged the audience with his speech entitled "B2B - Brain-to-brain Communication: science fact or fiction?" that focused on the progress of Neuroengineering. Sofia Panteliou, Associate Professor at the University of Patras, Greece, made a very interesting presentation on "Modal Damping: A Bone Quality Index", while the distinguished researcher Nikolaos Stergiopoulos, Professor at the École Polytechnique Fédérale de Lausanne (EPFL) and Head of the Laboratory of Hemodynamics and Cardiovascular Technology (LHCT), impressed the attendees with

his presentation "Development of clinically relevant medical technology in the academic lab".



Invited speech by Prof. Christopher James

The second day of the Conference ran in parallel sessions:

- Biomedical Engineering sessions gave research groups the opportunity to present their work in fields such as Bioinformatics, Medical Imaging, Bio-mechanics, Telematics and Biomedical Signal Processing. The results, that were presented either orally or by poster, proved that research carried out in the country remains remarkable, despite current difficulties.



- Clinical Engineering sessions focused mostly on the applications of Biomedical Technology in clinical practice. Through invited presentations and round tables, several critical issues were discussed, such as Innovation and New Technologies in Medicine, Standards and Quality in Medical Equipment Management, New Trends in PACS, and Project Management in Biomedical Engineering. The private sector was also actively involved, with the participation of company representatives demonstrating the state-of-the-art in products and techniques.



Session on Biomedical Engineering

This combination of topics allowed, on one hand, to present the constant research progress made in the field of Biomedical Technology in Greece, and, on the other hand, to exchange ideas and extensively discuss problems and challenges arising from the use of technology in healthcare delivery.

At the end of the third day, a Young Investigators Competition was also held. In an effort to encourage research in Greece, a Special

Committee selected, among all papers, the best 3 with Young Researchers as first authors, who were awarded prizes for their state-of-the-art research work.

1st prize: Analyzing human proteome: from protein-protein interaction prediction to protein complex prediction and function characterization of proteins

Konstantinos Theofilatos, Spiros Likothanas-sis and Seferina Mavroudi (University of Patras, Greece)

2nd prize: Mathematical modeling and electronic control of a post-trauma training unit using counter-acting multistage turbomachines

Ermioni Papadopoulou, Michail Chatzimichailidis, Anestis I. Kalfas, Alexandros Astaras and Panagiotis Bamidis (Aristotle University of Thessaloniki, Greece)

3rd prize: A smart glove navigation aid for visually impaired users (cyclops)

Barbara Salonikidou, Dimitris Savvas and Alexander Astaras (Technological and Educational Institute of Thessaloniki, Greece)

The Conference Proceedings are available at http://www.elevit.org.gr/images/elevit_docs/ProceedingsElevit2013.pdf.

Right after the end of the Conference, the election of the new Board of Directors of ELE-



VIT took place. The new composition of the 9-member Board is:

- Nicolas PALLIKARAKIS, Chairman
- Vasilis GKERGKIS, Vice-Chairman
- Dimitris KOUTSOURIS, Secretary
- Panagiotis BAMIDIS, Treasurer
- Ilias MAGLOGIANNIS, Member
- Panagiotis MALATARAS, Member
- Athanasios BIBAS, Member
- George PAPPOUS, Member
- Leontios HADJILEONTIADIS, Member

The members were appointed for the next two years and decided to renew the By-laws and Constitution of the Society.



The new Board of Directors of ELEVIT



Assist. Prof. P. Bamidis (Treasurer of ELEVIT) and Prof. N. Pallikarakis (Chairman)

The Hellenic Society for Biomedical Technology (ELEVIT) is a scientific society aiming to encourage research and promote education in the field of Biomedical Technology in Greece, through the organization of Conferences, Workshops and Seminars.

ELEVIT is an affiliated member of the IFMBE and the EAMBES.

For more information, please visit www.elevit.org.gr or send an e-mail to info@elevit.org.gr.

The 6th Panhellenic Conference on Biomedical Technology is scheduled for 2015.



REPORT FROM IFMBE: Committees & Affiliated Societies

Certificate Training Course on Medical Device Adverse Event Investigation and Management jointly by HKPC and ECRI

Hong Kong Productivity Council (HKPC) and Emergency Care Research Institute (ECRI) jointly organized a three-day certificate training course on medical device adverse event investigation and management in HKPC Building, 26-28 March 2013. It was one of the signature events of Biomedical industry in the region this year. Following the successful collaboration in 2010, the course attracted 47 participants including many members of Biomedical Division, Hong Kong Institution of Engineers (HKIE). Besides local enthusiasm from Department of Health, Electrical and Mechanical Services Department, Health Authority and private hospitals, there were also attendees from the overseas including Shanghai, Taiwan, Singapore, Indonesia, Philippines, Brunei Darussalam, Australia and New Zealand. The trainer, Dr Scott R. LUCAS, Program Manager of Engineering, Accident & Forensic Investigation in ECRI, gave a detailed curriculum on medical device accidents, hazards, and problems focusing on applicable investigation techniques, problem reporting, management, and information resources. Dr Lucas has shared his practical cases in investigation that benefit professionals from various disciplines including regulatory affairs, bio-

medical engineering, medical device design, testing, procurement, maintenance, etc.

The instruction began with a broad review of why and how medical device accidents happened were discussed, highlighting equipment design and human factors. Device testing, documentation, problem reporting programs were then addressed in detail along with incentives and methods for performing effective accident investigations. Investigation techniques for generic classes of injury or accidents including skin "burns", gas embolism, medical device fires were presented, followed by techniques for accidents and hazards specific to certain classes of technology including monitoring, respiratory care, blood processing, anesthesia. Risk management strategies for reducing harm and potential liability were also explored. Questions and case examples from the participants were encouraged within the interactive class; while case examples and hypotheses were also offered for discussion. To be more comprehensive, two simulated sessions were arranged with surgical staplers and defibrillators for hands-on investigation among participants.



Participants have been enhanced with understanding towards the techniques in investigations, identified the root causes, and facilitated the improvement in medical device design and development, as well as compliance to medical device regulatory. It also provided a golden opportunity for the exchange of ideas of sharing of cases among the multi-disciplinary audiences from different countries. The end of this successful training course was marked by the

presentation of certificates to participants by Dr Lucas, foreseeing that they were not only bringing home the certificates, but also an exceptional competence and skills in the adverse effect investigation and management of medical devices.

For further enquiry, please contact Mr. Bryan SO at bryanso@hkpc.org or (852) 27885548.



(photo1) Photo with participants: trainer Dr Scott LUCAS (1st in front left), Program Manager of Engineering, Accident & Forensic Investigation in ECRI; Mr Joseph POON (2nd in front left), Technology Branch Director of HKPC; Mr Jin LOR (2nd in front right), Vice President of Asia Pacific of ECRI; Mr Bryan SO (1st in front right), Senior Consultant of HKPC.



FEATURE COLUMN: BME in Africa

Biomedical equipment developing countries

Andrel LINNENBANK

One of the major problems of health care in developing countries is not so much the lack of equipment, but that most of it is unusable. Either because something is broken or because of lack of consumables, spare parts, or documentation. One of the NGOs that tries to solve this problem is Engineering World Health (EWH).

Last year (i.e. in 2011) members of the IFMBE have visited the summer institutes of EWH. Mario Forjaz Secca went to Honduras and Kenneth Nkuma Uday and I visited the one in Tanzania. We have reported on these visits before on the IFMBE news. In short, this summer institute is for western (mostly American and some European) students with a technical background and lasts for 2 months. The first month is electrical and mechanic training as well as language and culture courses in a central location. The 2nd month students are pairwise stationed at a hospital and their objective is to locate and repair broken equipment, using locally available parts only.

This effort is rewarding both for the students and for the hospital that gets its equipment repaired. It does, however, not solve the problem in the long run. For that the technical staff in the hospitals needs to be trained themselves. When a couple of years ago the GE-foundation wanted to donate equipment to a Rwandan hospital, the foundation and the ministry of health (MoH) or Rwanda concluded that this would indeed only make sense

if local people would be trained to maintain and repair that and other equipment. So they turned to EWH to set up and run a course for BioMedical Equipment Technicians (BMET). That course and its development was initially largely paid for by the GE-foundation, but the MoH has always paid a significant part themselves and it is scheduled to be independent from foreign donations soon.

Three years ago the first group of students started. Students enrolled were already employed by a hospital. The structure of the course is that twice a year they come to the IPRC (a local polytechnic) in Kigali for two months of intensive training. The rest of the year they work in their hospital as part of their practical training. They are regularly visited by the teachers to monitor progress and for on-site training.

This is a three year course. So on November 15th the first group of BMET students did graduate. After having visited the summer schools last year it was natural for an IFMBE representative to be there to congratulate the students and show that we are aware of the importance of this program for the health care in the region. Other persons present at the graduation ceremony were representatives of the GE-foundation, of the MoH, of the polytechnic, of course teachers and other staff of EWH, and the US ambassador. Many of whom also had some inspirational words for the graduates.



Andrei Linnenbank, Krista Bauer, Donald Koran and Ed Hutton with graduated students after the graduation ceremony of the Politechnic in Kigali

The message of my speech was that what they have achieved is vitally important for their hospitals and its patients. It is also important as a necessary step towards improving the equipment in a way that suits their local situation. Local development of biomedical equipment is necessary. One major factor is that the equipment in developed countries becomes ever more complex and dependent on other equipment. While at the same time almost every hospital has its own set of interdependencies. This makes it almost impossible to transport modern equipment to a developing country, as the infrastructure is missing there. With that in mind it is not difficult to predict that the whole practice of donating obsolete equipment to developing countries will stop within this decade.

Hence it is inevitable that a new, more sustainable branch is added to the biomedical equipment tree as soon as possible. I there-

fore also expressed hope that at least some of the graduates would continue their education and get an engineering degree. And that they are the ones everybody else that is wanting to develop sustainable equipment should contact.

In the developing countries this continuing trend of increasing complexity is just manageable in the hospitals. Yet, people are getting older and chronic diseases will become a major part of health care. Home care will become more important and for that we need easier to use, more reliable and sustainable equipment. In short, it is in everybody's interest that within the developing countries new equipment will be designed. Because there will come a day when developed countries will depend on these new biomedical equipment developing countries.



Worldwide Activities for Clinical Engineering



Saide CALIL
IFMBE CED Chairman

Sometime ago, I asked Shauna Mullally to write some short articles describing the Medical Equipment management activities she is developing in several African countries. She received quite well such request and asked John Zienna from Ghana and Ebrina Nyassi from Gambia to help her with such mission.

I also asked her to write a small presentation of herself and the wonderful work she is developing in Africa.

Clinical Engineering in the Gambia *Ebrima Nyassi*

In the Gambia, there is not any sort of program for general training on medical device maintenance that would at least provide some fundamental qualifications to safely work as biomedical technician in hospitals and other health facilities. Generally, maintenance staff working on medical devices in all healthcare facilities usually only had prior professional training on Electrical/electronic technologies.

The acceptance of CE or BME in the Gambia is very low. The Gambia MOH does not have any policy in place or budget line specifically purchases or maintenance of clinical equipment. There is no Clinical or biomedical engineer and there is about 10 equipment maintenance technicians, 5 of those that work at the main referral hospital and the rest work at the national public health Laboratories. Only

3 technicians received some manufacturer's service training on the maintenance of a CT scanner, some x-ray equipment, and a dialysis system. Direct management and supervision of the technicians fall on the Hospital's estates manager, or from the Director in the case of national public health laboratories. Resources such as suitable infrastructure, tool and test equipment, manuals, and professional training are virtually not available for the technicians.

However, Medical Research Council Unit, the Gambia has by contrast a quite successful BME program; in 2004, a Canadian biomedical engineer was hired to create a fully functional biomedical technology management program. The critical steps taken to achieve this success include; Conducting an inventory and assessment and acquired an equipment management database to populate the database, acquiring proper tools and test equipment, assessing existing assets; their status,



and estimated replacement cost to provide strategic funding to capital replacement planning. Established a departmental policy technology management, reviewed all contracts in an attempt to repatriate many of the service



agreements, established a Biomedical Capital Planning Committee to ensure effective unit-wide capital planning, organized factory service training for technologist on key technologies such as Clinical Chemistry analyzers, Haematology Analyzers, 9-colour flowcytometry equipment, radiographic equipment etc.

Today, the department consists of a Biomedical Engineer, one senior BMET, three BMETs, two assistant BMETs and two local trade students. The department now supports almost 99% of biomedical technologies “in-house” and performs regularly with measurable indicators. Very recently, the team hosted trainees from across West Africa, coming from Senegal, Benin, Mali, Burkina Faso and Guinea Bissau, as well as Ministry of Health technicians from the Gambia. (NOTE: full article about the

training is on page 26 of the MRC the Gambia newsletter here: http://cdn.mrc.gm/downloads/Tama_Vol11-Issue04_2012_LowRes.pdf. The MRC and MoH biomedical engineering staff also started a professional society in 2011 called the Gambian Biomedical Engineering Technologists Association (GambETA) and hope to scale up the association’s activities.

Evolution of Biomedical/Clinical Engineering in Ghana Health Sector

John Zienna

Just as (Dyro, J 2004) said ‘the advent of Clinical Engineering (CE) (30-35 years ago), was primarily thought of as a maintenance function something like 90% of CE activities were for example inspection & preventive maintenance (i.e., checking function & safety) and repairs consequently. CE was typically associated with maintenance department facilities or plant engineering’.

This assertion is true for the evolution of Biomedical/Clinical Engineering in Ghana health sector. This can be likened to the following example in Ghana health sector:

The maintenance needs of the Korle-Bu Teaching Hospital (KBTH), established in the 1930s were handled by the Public Works Department (PWD) then in charge of all public buildings



In Ghana, the of Biomedical/Clinical Engineering concept begun as hospital engineering maintenance department dating back to 1958 when the Komfo Anokye Teaching Hospital (KATH) in Kumasi, now a teaching hospital, was commissioned. The hospital then had had sophisticated medical equipment installed prompting the management, on the need to establish health care equipment maintenance unit, specifically for its specialized needs (Brookman and Appiah 1995).

Intervention of the CHAG

Rommelwaal indicated (1997), that towards the end of the 1970s, the Christian Health Association of Ghana (CHAG) recognized the poor state of medical equipment due to the lack of effective maintenance in health institutions in the country. This situation as, a whole prompted the Catholic Diocese of Kumasi in the 1980s to start Hospital Engineering Services (HES) with the base workshop established in the St Patrick's hospital in a town call Offinso in the Ashanti Region. And towards the end of 1980s, other HES repair units had been established in the Duayaw-Nkwanta in the Brong-Ahafo, Dodze in Volta, Domango in Northern and Assin Fosu in the Central Region.

These could still not meet the maintenance demand of the proliferation of high technology. There was pressure on the limited manpower and maintenance resources on the countries two teaching hospitals at that time. However, when the country embarked on the Economic

Recovery Programme (ERP) in mid 1980s and towards the early 1990s the two teaching hospitals (KBTH&KATH) at that time had their engineering departments rehabilitated under Hospital Engineering Rehabilitation Project (HERP) (Porter 1991).

In 1980s the maintenance units of the teaching hospitals served as the repair centres of health institutions countrywide. Prior to the establishment of equipment management structure for the healthcare system in Ghana, a country wide inventory was undertaken from 1988 -1992 to have an idea of the functional state of healthcare equipment. As a result of this inventory, a hospital equipment repair project took place due to the poor state of equipment realized after the outcome of the initial inventory (David Porter 1991 and 1992).

By 1993, equipment management was established in Ministry of Health (MoH) in Ghana, to create awareness that something has to be done to maintain hospital equipment in good working conditions, and to formulate policies for implementation, to guide the acquisition and ownership of equipment once purchased (Brookman and Appiah 1995).

The MoH, determined to implement HTM, continued collaborating with the Overseas Development Agency (ODA) then a British health partner in Ghana. And by 1995, eight Regional Equipment Management Units (REMUs) had been established as they were referred those days.



When the Ghana Health Service and Teaching Hospitals Act 525 of 1996, was passed and the Ghana Health Service started operating as a service implementing agency of the MoH, the Clinical Engineering Department (CED) was established in 2004 under the auspices of the Director General to support the Service and Hospitals in making decision on the acquisition and owning health technology.

Health Care Technical Services (HCTS) have now been established in all ten Regions of Ghana under the Regional Health Directorates, playing major roles such as planning, decision making, acquisition, utilisation, maintaining and decommissioning of obsolete medical equipment and devices. They are known and described as Clinical Engineering Units (CEUs). At national level there is the Bio-medical engineering unit (BEU) under the auspices of the MoH and the Clinical Engineering Department (CED) under the authority of the GHS. The two teaching hospitals, i.e. KBTH and KATH have well established HCTS however; the third and recently established one Tamale Teaching Hospital (TTH) is being restructured and it is expected that an ultra modern HCTS will be incorporated to make medical equipment maintenance one of the core management planning activities.

In 2009, the Ghanaian Biomedical Engineering Association (GBEA) was formed at an Advanced Clinical Engineering Workshop (ACEW). The GBEA has a partnership with the Canadian Medical and Biological Engi-

neering Society (CMBES)'s International Outreach Committee, and they have just received a grant to do a study on medical equipment donations.



Reference

Amissah-Brookman A, Appiah NSK (1995). Report of the Evaluation of the Health Technical Unit (HTU) of the Presbyterian Church of Ghana Health Institutions.

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Porter David (ODA consultant) UK Overseas Development Administration. Report on Monitoring Mission, Ghana 7-19 April 1991, Hospital Equipment Repair Project, Phase 2, and Jan 1991 - Jan 1992. West of Scotland Health Boards'. Department of Clinical Physics and Bio-Engineering, Glasgow.



Shauna Mullally is a biomedical engineer who specialises in the management of medical equipment in low-income countries. She holds an undergraduate degree in systems engineering and a master's degree in applied science (electrical engineering) both from Carleton University in Ottawa; her thesis was the largest study of the effectiveness of biomedical engineering services in low-income country hospitals done to date.

Shauna first went to the Gambia in 2006 for masters field work, and returned in 2008 to spend three years there as the Head of Biomedical Engineering at the UK's Medical Research Council Unit (www.mrc.gm). In that role she lead a team of Gambian biomedical engineering technologists, who were responsible for the maintenance of 1700 laboratory and clinical medical devices at five health and research field sites in the Gambia and Guinea Bissau. While based in the Gambia, Shauna was also a faculty member for an Advanced Clinical Engineering Workshop (ACEW) in Ghana and a facilitator for the WHO regional workshop for the presentation of tools and guidelines to improve access to medical devices in Zimbabwe in 2011.

While in the Gambia, Shauna opened a birthing house in a rural village, funded by small donations from over 200 Canadian donors and lead entirely by the women's association in the village (<http://www.penyembirthinghouse.blogspot.ca>). To date over 60 babies have been born in the birthing house. She also led the formation of the Gambia's professional association for biomedical engineering professionals, GamBETA, and advocated for and secured a full 5-year scholarship for one Gambian citizen to study biomedical engineering abroad; the awardee has just completed her

second year of university at Carleton University here in Canada and is on the Dean's List for academic success.

Since May 2011, Shauna has worked as an independent consultant with a short break to work on contract for the World Health Organization's Medical Devices Unit in Geneva. She has spent more than six months in Zambia with the Tropical Health and Education Trust, THET (www.thet.org), leading the development of a three-year new diploma program in biomedical engineering, the first in Zambia. The program is due to start in September 2013 and will train technologists to maintain medical equipment in Zambian hospitals. She has worked closely with the Zambian Ministry of Health for over two years to date, also doing a needs assessment for medical equipment training in public hospitals. Most recently, she did an audit of emergency obstetric and neonatal care equipment for the UK's Department for International Development (DFID) in Zambia.

She has also worked for THET in the UK, doing a scoping exercise of medical equipment donation organisations and other charities that provide training for medical equipment staff in low-income countries. She started a new grants program for 'medical equipment partnerships' that supports five partnerships between biomedical engineering teams in the UK and their counterparts in Ghana, Ethiopia, South Sudan, Uganda and Zambia (<http://www.thet.org/health-partnership-scheme/news/thet-launches-medical-equipment-programme>). She is currently working on a good practice toolkit for medical equipment donations for UK organisations that will be published in the fall of 2013.

Shauna was an Action Canada fellow in 2007-2008 (<http://www.actioncanada.ca/>), a past Engineers Without Borders Canada university co-president and the founder of Carleton University's Go Eng Girl! Program. She has received numerous awards for academic success and volunteerism, including the Ottawa Catholic School Board Distinguished Catholic Alumni Award (2011) and the Carleton Board of Governors Award for Outstanding Community Achievement (2007) and was named one of Canada's "Top 80 Women to Watch" by Chatelaine Magazine (2008). She has chaired numerous conference sessions and published over 10 papers on medical equipment in developing countries.



August 5-8, 2013
 Beihang University, Beijing, China
wacbe2013.buaa.edu.cn



IMPORTANT DATES

Deadline for paper submission:

March 31st, 2013

Notification of paper acceptance:

May 15th, 2013

The 6th WACBE

World Congress on Bioengineering

World Congresses on Bioengineering held by the World Association for Chinese Biomedical Engineers (WACBE) is an international conference with high academic level and worldwide impact, providing a platform for Chinese scientists, engineers and students from all over the world to share their experiences and to exchange views on the future development of biomedical engineering. The 6th WACBE World Congress on Bioengineering will be held on August 5-8 2013 in Beijing, and it will continue to offer such a networking forum for bioengineers to keep abreast of the latest development of the field as following:

SESSIONS

- Aviation and Space Medical Engineering
- Biomaterials, Tissues Engineering and Regenerative Medicine
- Biomechanics, Sports Medicine and Rehabilitation
- Biomedical Imaging, Signal Processing, and Health Informatics
- Biosensors, Bionanotechnology and Medical Devices
- Cellular, Genomic & Biomolecular Engineering, and Mechanobiology
- Neural Engineering
- Pharmaceutical Science & Biotechnology
- **Biomedical Education**
- **Biomedical Innovation Technology and Industry**

REGISTRATION FEE

Early registration due: 15th June 2013	Before	After
1. Regular Registration		-
-Life Members	USD 300	USD 350
-Members (proof required)	USD 350	USD 400
-Non-members(Full Registration)	USD 400	USD 450
2. Conference Banquet Only	USD 50	USD 60
3. Students (proof required)	USD 150	USD 200
4. Accompany	USD 150	USD 200

SPECIAL FORUMS

Biomedical Innovation Technology and Industry Forum and Biomedical Education Forum will be added as two new sessions and highlighted in the program. In the forums, special activities will be organized for young faculty and students to meet world-class distinguished scientists, industry leaders and educational experts and learn from their invited speeches. Extensive discussion will be conducted on hot topics on biomedical education, development of innovation technologies and potential industry-university-research cooperation.

PUBLICATION

Selected abstracts with solid scientific work will be invited to submit full papers and published on the chosen SCI or EI indexed journals after peer-review process

CONTRIBUTED PAPERS

All participants attending the WACBE2013 are invited to submit abstracts. Please visit the conference website: wacbe2013.buaa.edu.cn, download and complete the abstract submission form. Prepare the abstract following the abstract format. And email the abstract submission form and abstract to wacbe2013@buaa.edu.cn

YOUNG INVESTIGATOR'S AWARDS

Awards for the best papers for innovation will be set up to young investigators (the first author must be either research student or young researcher < 35 years). The abstracts will be shortlisted by a panel under Scientific Program Committee.

XIII Mediterranean Conference on Medical and Biological Engineering and Computing

Research and Development of Technology for Sustainable Healthcare

The Mediterranean Conference on Medical and Biological Engineering and Computing is a regional conference with a long tradition and high scientific level, which is organized every three years in a Mediterranean country under the umbrella of the International Federation of Medical and Biological Engineering (IFMBE). For more than 30 years, MEDICON has been a scientific forum for the presentation of the recent advances in the biomedical engineering fields. Authors are invited to submit papers before April 26th 2013 about the following topics:

BIOMEDICAL SIGNAL PROCESSING

- Biosignal processing and biological modelling
- Non linear dynamic analysis of biomedical signals
- Signal pattern classification
- Adaptive and parametric filtering
- Time-frequency and time-scale analysis
- Principal component analysis and independent component analysis

BIOMEDICAL IMAGING AND PROCESSING

- X-Ray imaging / mammography
- Computed tomography / magnetic resonance imaging / ultrasound imaging
- Optical imaging and microscopy / molecular imaging
- SPECT and PET technologies
- Multimodality imaging
- Image processing

MEDICAL DEVICES AND SENSORS

- Ambulatory point-of-care systems, home/personal/independent living
- Medical devices evaluation and standards
- Diagnostic and therapeutic devices
- Therapeutic and diagnostic techniques based on bioelectromagnetic interactions

BIO-MICRO AND BIO-NANO TECHNOLOGIES

- Internal, implanted therapeutic devices
- Diagnostic in vitro
- Bionanotechnology, biosensors, biomems and lab-on-a-chip devices
- Therapeutic nanoconjugates and drug delivery systems
- Electrical fields at the cell and protein scale

MOLECULAR, CELLULAR AND TISSUE ENGINEERING AND BIOMATERIALS

- Biomaterials cell interactions
- Scaffolds in tissue engineering
- Biomimetic, bioinspired and patterned biomaterials
- Stem cells in regenerative medicine

NEURAL AND REHABILITATION ENGINEERING

- Neural interfaces and regeneration
- Brain computer / machines interfaces
- Brain physiology and modelling
- Neural signal processing
- Rehabilitation engineering and wearable technologies

BIOMECHANICS, ROBOTICS AND MINIMAL INVASIVE SURGERY

- Cardiovascular Fluid Mechanics / Respiratory Biomechanics
- Prosthetic biomechanics / Rehabilitation robotics
- Robot-aided surgery
- Image-guided surgery
- Minimal invasive surgery and interventions
- Sports biomechanics and human performance

CARDIOVASCULAR, RESPIRATORY AND ENDOCRINE SYSTEMS ENGINEERING

- Cardiac and respiratory mechanics, function, modeling and control
- Vascular disease, mechanics and hemodynamics
- Cardiovascular and pulmonary signal processing
- Cellular and molecular cardiorespiratory engineering
- Endocrine systems, function, modeling and control
- Artificial organs
- Cardiac instrumentation and wearable technologies

CLINICAL ENGINEERING

- Clinical engineering and health technology management
- Health technology policy and assessment
- Safety and human factors engineering for medical devices and systems
- Social, societal and ethical implications of computing and networking (Compunetics) in medicine and biology / Patient empowerment

HEALTH INFORMATICS, E-HEALTH, TELEMEDICINE AND INFORMATION TECHNOLOGY IN MEDICINE, BIOINFORMATICS

- Wireless health technologies and body sensor networks, participatory and personal health systems
- mHealth, eHealth
- Telemedicine
- Ambient assisted living, smart homes
- Health information management, electronic health record
- Knowledge discovery and management for personalized health, decision support methods and systems
- Bioinformatics, biomedical informatics, computational biology, synthetic and systems biology

CONTRIBUTED PAPERS

Each contribution must be prepared according to the IFBME Proceedings Series format. Manuscripts should be up to four (4) pages long and should be submitted electronically in their final form before the paper submission deadline, including an abstract, no longer that 300 words. Submissions must include the title of the paper, each author's name and affiliation, the suggested topics in which the paper falls, and the IFBME copyright transfer form. Check the conference website (www.medicon2013.com) for specific information on the electronic submission process, detailed publication guidelines and templates. All papers will be peer-reviewed by at least three reviewers from the Scientific International Committee under the supervision of the International Program Committee. They will be judged with respect to their quality, originality, and relevance.

IMPORTANT DATES

Proposal of Special Sessions:

March 1st 2013

Paper submission:

April 26th 2013

Notification of paper acceptance:

June 14th, 2013

Final accepted paper submission:

June 28th 2013



SPECIAL SESSIONS & WORKSHOPS

Prospective organizers are invited to submit proposals for special sessions or workshops to the conference technical secretariat e-mail address (medicon2013@pacifico-meetings.com) by March 1st, 2013. Proposals must include a topical title, rationale, session/tutorial outline, contact information, and a description of how the session/tutorial will be organized.

PUBLICATION

Conference Proceedings will be published within the *IFBME Proceedings series* (Springer)

Journals

The following journals will publish a special issue with extended manuscripts from selected papers submitted to the conference: IEEE Journal on Biomedical and Health Informatics, Micro and Nanosystems Journal

Indexing

The proceedings will be indexed in the following scientific databases: ISI, INSPEC, SCOPUS



ICBME 2013

The 15th International Conference on Biomedical Engineering
4th to 7th December 2013, Singapore

www.icbme.org

The 15th International Conference on Biomedical Engineering (ICBME 2013) will convene once again in tropical Singapore this December.

This year, the conference programme is structured based on the following themes and related topics:

- Bioimaging and Biosignals
- Biomaterials and Tissue Engineering
- Biomechanics and Computational Bioengineering
- Biomedical Devices and Biomedical Instrumentation
- Biomedical Robotics and Surgical Technology
- Neuroengineering and Rehabilitation Engineering
- Special Topics
-

Visit www.icbme.org for more details

BES-SEC Design Award 2013

Jointly organized by the Biomedical Engineering Society (Singapore) (BES) and the Society of Engineers for the Community (SEC), the design award competition focus on the design of a low-cost medical device to improve healthcare in resource-scarce communities. Open to all bona-fide students with a top prize of SGD 1,500.

Young Investigator Award

We are also inviting submission of high quality papers for the 2013 Young Investigator Award. The Award recognizes the efforts and contributions of researchers in their early career who have demonstrated creativity and research excellence in biomedical engineering.



Special extension of
submission deadline for
IFMBE delegates to
12 July 2013

Submit online now!

Paper Publication

Authors of accepted abstracts will be invited to submit their final papers, which will be published by Springer in the IFMBE Proceedings Series.

Organised by

