

INTERNATIONAL FEDERATION FOR MEDICAL AND BIOLOGICAL ENGINEERING

IFMBE News

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UN Millenium Development Goals - Improving Health R&D

BME People

Bob Nerem — An Icon of
American Biomedical Engineering



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H. Terio, Sweden

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Every effort has been made by the publisher to acknowledge organizations and individuals with regard to the supply of written contributions, photographs and illustrations. The publisher apologizes for possible omissions which will be corrected in future editions.

EDITORIAL

THE ROLE OF TECHNOLOGY IN NATURAL CATASTROPHE RELIEF

Less than a year after the Tsunami hit large coastal areas in South-East Asia killing and injuring thousands and causing a lot of pain and suffering, another natural disaster of similar magnitude, Hurricane Katrina, struck the South of USA. Although it is hard to compare the devastation left after the tsunami with the destruction brought by Katrina it is evident that it caused the loss of too many lives and property. It was most astonishing how much time it took the administration of the country considered to be the most developed and powerful in the world to react and organize help for their own citizens. And though scientists confirm that the direction of a hurricane is unpredictable it had been obvious that Katrina would not move away from the Gulf of Mexico and disappear. For this reason the US Government was strongly criticized from all sides. The political pressure resulted in 10.5 millions of dollars promised as the first aid measure.

As early as August 25, at the time Hurricane Katrina struck the south of Florida as a category 1 storm, it had already killed 11 people. Four days later, Katrina gained on its power and became a category 4 storm. It made landfall in New Orleans, Louisiana, leaving nearly 80% of the city under water and devastating the surrounding coastal communities. Katrina is regarded as the strongest and most destructive hurricane to strike the United States since 1935. More than a million people left or were evacuated from the area, and more than 75,000 people decided to stay in approximately 240 shelters across the region. 'But Katrina will not be remembered just for its strength and size - this was the biggest category 5 hurricane that ever hit the US- but but because it demonstrated weaknesses in public system and planning. The administration declared a public health emergency for the entire Gulf Coast in an effort to stop the spread of disease in the storm's wake.

Following the hurricane, flooding was identified as the biggest danger. The pumps failed, causing the effects of the flooding water to become even more disastrous and resulting in a devastation of the city difficult to imagine. With dehydration as one of the dangers due to the hot climate in the region, diseases that the survivors could face, mostly caused by standing flood water, were serious too: gastro intestinal illnesses, salmonella, hepatitis.... The quantities of bottled drinking water and any other treated water were limited. The flood water was not safe even for washing. Medical doctors reported that patients were dying from lack of water. Unfortunately, pills and shots cannot replace treated water. In addition, many pollutants dissolve in the water, and remain in the soil for a large number of years.

Like in the first post-tsunami days, the safe source of water became the priority in care. Access to clean water as a concern was followed by access to food, medication, communication. High temperatures and humidity affect the safety and sterility of medical devices and equipment. Re-establishment of services for patients in need of care for chronic diseases, such as dialysis, diabetes and infusion therapy was most urgent. However, care for all these patients requires medical products and devices in order to carry out the therapy. Healthcare facilities affected by the disaster were also left with incomplete inventory and had to find a way to replace the missing medical devices. ECRI (Emergency Care Research Institute), an American health services research agency, announced the launch of an Internet database with information on disaster-related medical device relief. Over 8,000 device manufacturers contacted aid healthcare facilities affected by the hurricane. In addition to dialysis equipment and infusion pumps, the products most demanded were, according to ECRI, portable ventilators,

patient warmers, medical device batteries, mobile hospitals and outdoor shelters. Clinical engineering repair services were on the top of the list of needs. Clinical engineers were included into the emergency teams sent to the Gulf at that critical time. There was a lack of instructions for cleaning and repairing water-damaged products and for operating devices from backup generators. Medical device companies donated more than 24 million USD in money and supplies and some companies sent their employees directly to the region to help re-establish medical services.

The lack of information and communication is something that primarily effects the developed world. People who are used to simply pressing buttons either on their cellular phone or computer keyboard in order to get information or service, find themselves lost in many situations after a disaster. When Katrina hit, virtually all communications were completely out, including satellite communications and cellular phones. Since there was no electricity and other infrastructure, computers and e-mail service were down for at least four days.

In such an environment, the most effective way to use technology was to transport the injured and ill persons from the region hit by the disaster. However, there are records of the use of advanced medical technology in response to Katrina. The infrastructure for these efforts was provided by the army – a system called "Knowledge On-line". Mostly,

tele-consultation services and handheld PDA's were used. The tele-consultation service was used primarily in order to provide support for combating infectious diseases and in dermatology. Other specialties that were available for e-mail consultation included ophthalmology, infectious diseases, pediatrics, intensive care, nephrology, burn/trauma and cardiology. The handheld PDA's provided (military medics only) instant access to patient records and potential treatment plans.

There is a professionally justified question whether these examples are all technology can offer in cases of natural or man made disasters. This matter has to be addressed globally and international organizations must give their contribution in proposing and finding solutions.

The IFMBE working group on Medical and Biological Engineering Contributions to the Safety and Security of Individuals and Society is responsible within the Federation for developing a strategic vision in matters of safety and security of citizens based on medical and biological engineering and sciences, and information and communication technologies. The strategic vision embraces all aspects of health care including the effects of environmental and biological hazards affecting the global critical infrastructures like food, water, and air quality resources.

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Satellite photo of the Hurricane Katrina on August 25, 2005 (from www.fresh99.com/hurricane-katrina-pics.htm)



FROM IFMBE

REPORT FROM THE IFMBE ADMINISTRATIVE COUNCIL MEETING IN UMEÅ

The IFMBE Administrative Council (AC) met in Umea, June 12-13, 2005, in conjunction with the 13th Nordic – Baltic Conference. The IFMBE President, Prof. Joachim Nagel was chairing the meeting, almost all AC members were present.

Starting January 1, 2006, Professor Jos Spaan will take over the position of editor in chief of the IFMBE journal from Alan Murray, whose term has expired. At the same time Springer will take over the publication not only of MBEC but also the IFMBE News, the IFMBE Book Series and the IFMBE Proceedings. Following the tender procedure to find a new publisher the IFMBE had received several excellent proposals by very well reputed companies and after a thorough review of these submissions the Federal Journal Committee decided to accept the offer by Springer. Prof. Nagel was able to negotiate a contract with the new publisher that not only is financially attractive for the Federation, but contains the best services to the IFMBE publications and includes a considerable number of benefits for all IFMBE members.

Springer will do what they call a 'branding' of all our publications, meaning that the covers of MBEC, News, books and Proceedings will all look alike and easily be recognized as IFMBE publications. Authors can count on fast publication times with "Online First", easy submission through the Editorial Manager and maximum exposure more via Springerlink. All articles will contain Digital Object Identifier (DOI) for citation as well as cross reference links into and out of electronic content. In addition there will be an online Journal archive-retro-digitization of MBEC going back to the first issue of our Journal. Starting January 2006, there will be 12 MBEC issues published per year.

All our members will be able to enjoy free access to the online version of "Medical

and Biological Engineering & Computing", "Biomechanics and Modelling in Mechanobiology", "Cardiovascular Engineering", "Biomedical Microdevices" and to all IFMBE conference proceedings published within the IFMBE Proceedings Series from 2006. A personal subscription to the printed version of the Journal will be available at the discounted rate of EUR 130 (plus postage and handling) in 2006 and for all IFMBE members a 25% discount on Springer books and on personal subscription rates for the "Annals of Biomedical Engineering" will apply. Of course free access to the IFMBE News, the electronic newsletter of the IFMBE, will continue.

In order to enable IFMBE members to effectively use all these benefits the IFMBE will establish a permanent office. Since the IFMBE publications will be password protected, access will require the registration of individuals and confirmation of membership status by the IFMBE affiliated societies. After confirmation of membership a username and password will be provided. Only registered IFMBE members will be able to receive the benefits. The permanent office will be taking care of collecting, keeping and maintaining individual membership data. Through its affiliated societies the IFMBE has approximately 120.000 members and several thousand registrations are expected in the first year. In order to cover the administrative cost there will be a fee, the amount of which will be determined once the permanent office is set up and the cost of administration is known. It will be based on a two tier principle: regular fee and reduced fee for members from low income countries. A new web site of the Federation will support individual membership registrations and will have password protected areas.

Recent IFMBE activities have led to an enhanced visibility of the Federation and to an increased expression of interest for affiliation to the IFMBE. Currently, two societies have

been approved for membership by the Constitution & Bylaw Committee; another 5 societies have expressed their interest but have not yet sent complete documentation.

The IFMBE homepage is now updated on a weekly basis and contains a lot of new information. The IFMBE secretariat started sending alerts regarding all major events regarding IFMBE (in addition to alerts regarding MBEC and IFMBE News) to the secretaries of all national constituent societies. Calls for Nominations for IFMBE elections and for the IFMBE and IUPESM awards have been sent out and published.

J. Nagel has revived the IFMBE's status of a non-governmental organization (NGO) at the WHO and the UN. The Federation became one of the founding organizations of the "World Alliance for Patient Safety", a WHO initiative that was launched in October 2004. Prof. Nagel has represented the IFMBE at the launch and has been invited to give a presentation at the World Alliance Health Summit in London in November. The IFMBE president also participated in the WHO General Assembly in May 2005.

Further activities in cooperation with WHO are in preparation for 2005 and 2006. BIOMEDEA III (www.biomedea.org) will be held in September 23 - 25, 2005 in Stuttgart and will include a symposium on patient safety, organized in cooperation with WHO. At the meeting guidelines for biomedical engineering programs, specific criteria for the accreditation of BME programs, protocols for clinical engineering education, training, certification and continuing education will be discussed. The IFMBE stresses the necessity and advantages of global mandatory certification of clinical engineers and will reestablish its international register for certified clinical engineers.

R. Magjarevic will represent the Federation at the UN meeting in New York and the World Summit on Information Society under the UN Civil Society initiative in Tunis in November 16 - 18, 2005. There will be a discussion on e-health, access to health care information and services which is considered a basic human right. Dov Jaron represented the IFMBE and IUPESM at the Global Health Summit that was held in Philadelphia on June 5th. The summit was organized on behalf of the US Surgeon General to address health issues around the world.

The AC has received a large number of reports on ongoing, past and future conferences. The general feeling was that the conferences are gaining international visibility. From January 1, 2006 the IFMBE conference proceedings will be available through Springerlink which will improve their importance in the BME community. The IFMBE supports all IFMBE co-sponsored conferences by organizing and funding young investigator competitions, and encouraging the organization of special symposia like the one on BME education at the Asian Pacific Conference. The main conference in 2006 is, of course, the World Congress in Seoul.

The Asian Pacific Working Group proposed the establishing of an Asian Pacific Travelling Fellowship for young faculties in order to enable them mutual scientific visits. The AP societies and the IFMBE will equally share the costs.

W. Chang presented a proposal for establishing a new Working Group on Physics and Engineering in Oriental and Alternative Medicine. J. Nagel appointed M. Lee as Chair of the new Working Group. Read more on the new working group in the July 2005 issue of the IFMBE News.



IFMBE DIVISION FOR HEALTHCARE TECHNOLOGY ASSESSMENT A VIDEO CONFERENCE FOR A NEW START



DHCTA meeting in Umea. L-R : Profs. Herman Gilly, Joachim Nagel, Heikki Terio, Jan Persson and Kaju Meigas.

During the 13th Nordic - Baltic Conference held in Umea, Rosimary Almeida, Chair of the Division for Healthcare Technology Assessment (DHCTA), organised a meeting of the IFMBE Division and invited the IFMBE Officers to attend. Since Dr. Almeida was not able to travel to Sweden, the meeting included a video link from the local hospital in Umea to the hospital in Brazil where she works.

The present members of the Division decided that Jan Persson should chair the meeting. He summarised the history and the visions of the Division. He reminded the participants that the Division should promote awareness of assessment, collaboration and exchange of information among engineers and between engineers and specialists. At their last meeting the members of the DHCTA had already pointed out their awareness that the gap between the achievable and the affordable in healthcare has become quite evident and demanding for everyone. Governments have taken actions in several countries and established agencies for HCTA. For example in many European Union Member States HCTA is a response policy to the

common challenge of providing efficient allocation of healthcare budgets. Generally, systematic assessment of the needs, assessment of the medical technology and the use of evidence-based healthcare and early warning systems are of increasing importance. In addition to the policy makers, actors in this development are healthcare providers, the drug and medical device industry, all those concerned with the legal issues and regulations and lately also patient organizations. The challenge for the biomedical engineering community and especially to the DHCTA is to increase the participation in these activities and contribute to efficient policy making.

J. Persson also noted that the Division has problems with distributing information to the members, arranging sessions in conferences and creating task forces in different topics and new technologies. Dr. Rosimary Almeida pointed out that one of the main reasons for these difficulties is that the work is on voluntary basis and that the members come from geographically distant areas which sometimes makes the communication hard.

Joachim Nagel, the IFMBE President, reminded of the IFMBE position on the international scene and of its strong ties with WHO. In his opinion the Division has the knowledge and human resources to take the leadership in HCTA in the world. IFMBE will have a major boost in membership services in the near future and this will facilitate the efforts to reach this leadership role. There are a number of activities where the Division should actively participate in future. One of them is the (recently founded) World Alliance for Patient Safety, where IFMBE is one of the founding organisations. Prof. Nagel also gave a short description of the goals of the BIOMEDEA project and the expected activities of the Clinical Engineering Division within the project. DHCTA should find a possibility to arrange activities in connection with different meetings and conferences, for example the BIOMEDEA III in Stuttgart in September 2005 or EMBEC '05 in Prague in November 2005

Collaboration and networking with other professional groups in field of HCTA shall be strengthened in future. A new working group in Asia announced its foundation early in September. Contacts have already been established and the IFMBE may expect close collaboration with the new organisation. The HCTA group in Africa is also active and Mr. Peter Heimann, who is an active member of

the Clinical Engineering Division was found to be the right person for establishing the contacts. Collaboration with the Health Technology Assessment International (HTAi) shall also be re-established at their meeting in Rome in June 2005. Jan Persson said that it would be feasible to strengthen the contacts with people working in economics.

All necessary preparations were made for the elections of new Division members in 2006 at the General Assembly in Seoul. The Division should handle nominations for the candidates. In practice, Rosimary Almeida initiated the call for nomination and asked the Secretary General to handle the correspondence i.e. to post the Call for Nominations on the web and distribute it to the National Societies. Rosimary Almeida should also collect all the nominations that are submitted and send them to prof. Ratko Magjarevic, Secretary General, so that he can prepare the documentation for the General Assembly in Seoul.

In conclusion, it was found that the field of HCTA is very important for the IFMBE. The Division shall find more effective ways for disseminating information on HCTA as well as for providing examples from the fields of medical devices and IT. The Board felt that at the present it is not appropriate to invite a large group to work within the Board, but

DHCTA should start linking interested professionals to the Division through engagements in demanding tasks.

The next meeting will be held in November in Prague in conjunction with the European Medical and Biological Engineering Conference EMBEC'05, November 20-25, 2005.



The Chair of the Division for Healthcare Technology Assessment, Dr. Rosimary Almeida speaking to Prof. Jan Persson during the video conference.

CALL FOR EXPRESSION OF INTEREST FOR ORGANIZING THE WORLD CONGRESS OF MEDICAL PHYSICS AND BIOMEDICAL ENGINEERING IN 2012



Past world congresses of the IUPESM have reaffirmed the unifying concepts of physical and engineering sciences in medicine. The next two Congresses in Seoul in 2006 and Munich in 2009 will strengthen the co-operation within IUPESM.

I am pleased to invite countries interested in hosting the 2012 Congress to submit the enclosed expression of interest form to me by 31 January 2006.

Upon receipt of the letter of interest we will place your country on the list of applicants to host the 2012 World Congress. You may then submit an application with the complete proposal to organize the 2012 World Congress. The documents are attached to this letter and they are also available on the IUPESM home page <http://www.iupesm.org/>. Note that applications to host the Congress must represent both the biomedical engineering and the medical physics National Societies from the host country. **The deadline to submit a complete proposal is April 15th 2006.**

The IUPESM Administrative Council is concerned with the amount of work associated with the planning, preparation and management of a World Congress. To address this problem and give "smaller National Members" the opportunity to host Congresses in the future IUPESM is preparing to develop capacity to offer support if required. Such support could be in the form of IUPESM organization of the scientific program, help in preparation and running of the Congress, proactive financial support and/or other assistance as requested. Alternatively, groupings of National Members may wish to consider submission of collaborative bids to share the extent of the workload. The level of support, if needed, will be negotiated between the host country and the IUPESM Congress Coordinating Committee prior to the selection voting process in Seoul. The written procedures for the selection of the World Congress site are enclosed.

The Committee eagerly awaits your letter of interest and stands prepared to assist you in preparing a proposal that clearly highlights the advantages and potential of your setting for the Congress.

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CRITERIA FOR SELECTION OF SITE FOR WORLD CONGRESS Approved 1990, Amended 1997, Amended 2002

1. The proposal for the World Congress shall include a preliminary budget, an estimate of delegate numbers and geographic distribution, and a description of the meeting facilities. The proposal shall include a list of meetings, similar in size to the World Congress, together with names of the organisers that have used the facilities in the previous 5 years. The site must be accessible by air at reasonable prices during the proposed time period of the Congress.
2. The Organising Committee shall endeavor to observe the tenets of the International Council for Science on the free movement of scientists and to arrange the granting of visas to bona fide scientists who wish to participate.
3. We expect the host country to be ready to accept delegates from all the IFMBE and IOMP affiliate nations.
4. Applicants shall be prepared to post their approved completed application material, including a summary questionnaire, on the web no later than 2 months prior to the current World Congress.
5. English is the official language of the World Congress. Host organisations must be capable of producing the necessary advertising and materials for the World Congress in this language, and have staff able to respond to correspondence in this language.
6. On site staff must be able to provide services in English, and it is helpful if they can provide some services in other languages of the affiliates.
7. The IUPESM expects that the host organisations have the commitment of other national organisations in its region, not just that resident at the proposed site. It expects a reasonable involvement on the part of the host affiliate societies. We prefer an intimate meeting of the family of the Union rather than an impersonal convention even if commercial planners are employed.
8. The meeting should contain invited and peer-reviewed accepted papers in parallel sessions; symposia; workshops; plenary sessions; educational courses; scientific and commercial exhibits; social functions and a Companions' Program.
9. A Plenary Session should be provided for the awarding of prizes of the IUPESM, IFMBE and IOMP and Award addressees.
10. A Special Session should be provided for the IUPESM Young Investigator's Symposium (presenting papers and posters).
11. General Assemblies and Council Meetings: The program must provide for a clear time period for General Assemblies and Council Meetings of the IFMBE, IOMP and the IUPESM.
 - a) **General Assembly.** The General Assemblies shall be scheduled to minimize conflict with scientific sessions. Meeting rooms to accommodate at least 250 attendees shall be provided for the General Assemblies of the IFMBE and IOMP and 350 for the IUPESM General Assembly meeting. The General Assemblies of the IFMBE and IOMP shall be scheduled to run simultaneously for approximately 90 minutes. The IUPESM General Assembly shall be scheduled to follow the IFMBE and IOMP Assemblies following a short break and shall be scheduled for approximately 90 minutes.
 - b) **Councils.** Each organization has two Council meetings during the World Congress. Rooms for the Council meetings shall be of sufficient size to accommodate at least 30 participants for IFMBE and 70 participants for IOMP. Rooms shall have seating around a U-shaped table arrangement and shall be equipped with an overhead projector. The first series of Council meetings usually takes place just prior to the beginning of the Congress and the second meeting of each organization on the last day of the Congress. Specific arrangements for the times of Council meetings shall be coordinated well ahead of time with the Secretary General of each organization.
12. Opening Ceremonies: The Presidents of IUPESM, IFMBE and IOMP shall be invited to address the opening ceremonies.

13. Provisions must be made for general services to the delegates, e.g. money exchange, travel agent, message centre, facsimile, photocopy, e-mail, telephone etc
14. Accommodation should be available in medium and lower priced hotels and in dormitory style for the attendees. This should be reasonably close to the meeting facility.
15. The Organising Committee shall provide free registrations and accommodation to the IUPESM Merit Award winners.
16. The Organising Committee shall provide free accommodations for the Presidents and the Secretary Generals of the IUPESM, the IFMBE and the IOMP as well as the IUPESM Secretary for the entire course of the meeting (usually from the complimentary rooms provided by the hotels). This commitment should encompass 5 x 7 = 35 room nights to support the responsibilities of these officials.
17. Equipped office space shall be provided for the IUPESM and its affiliates IFMBE and IOMP, and access to word processing computer, e-mail, telephone, facsimile and photocopying services to support their meetings.
18. Adequate meeting space in close proximity to the Congress venue shall be provided for the meetings of the IUPESM and its affiliates (Board Rooms).
19. A booth shall be provided free of charge to the IUPESM for display of materials of the IUPESM, IOMP and IFMBE. The size of the booth shall be no less than 200 sq. ft (20x10).
20. A meeting room to accommodate at least 100 attendees shall be provided for the presentation of applications to host the World Congress (six years later). This session must precede the IFMBE General Assembly and the IOMP Council Meeting. The time for the meeting shall be arranged in co-ordination with the IUPESM Congress Co-ordinating Committee.
21. World Congress policy requires a return of US\$50,000 for division between IFMBE and IOMP to reimburse these Organisations for expenses related to the execution of the Congress (e.g. advertising, corporate sponsor recruitment, interest on seed money and Congress promotion worldwide). In addition, the IFMBE and IOMP shall share equally between them one-third of profits after all accounts have been paid. The proposed budget must include provision for the US\$50,000 IFMBE/IOMP expense disbursement. The proposal must address how the payment of this US\$50,000 shall be ensured. If the Congress fails to make a profit on this basis, then a discounted return may be negotiated with IUPESM.
22. Discounted (non-profit) registration should be available to the Honorary Life Members of the IFMBE and the IOMP; for retirees and selected delegates from developing countries.
23. Travel grants for selected delegates from developing countries should be provided on a competitive basis.
24. The Congress Organising Committee shall repay all loans advanced by IFMBE and IOMP no later than 3 months after completion of the Congress.
25. The official journals of IFMBE and IOMP may negotiate through the IUPESM Congress Co-ordinating Committee for first choice on publication of the full papers of the Congress.
26. A Digest of Papers must be published and carry an ISBN number. The format, as outlined by the IUPESM Congress Coordinating Committee shall be used. The cover design shall carry the logo and name of the three sponsoring organisations: IUPESM, IFMBE and IOMP.
27. Within 18 months of the completion of the Congress, the Congress Organising Committee shall submit a completed World Congress Report Form to the CCC. This must include an Audited Financial Report, which must be reviewed and approved by the CCC before any monies are distributed.

THE WORLD CONGRESS APPLICATION FORM MUST BE COMPLETED AND ACCOMPANIED BY THE SIGNED STATEMENT OF INTENT OF THE ORGANISING COMMITTEE.

ELECTIONS 2006

ORDINARY MEMBERS OF IUPESM COUNCIL AT LARGE

To: NATIONAL SECRETARIES and their delegates

I have the pleasure to inform you that there will be elections of **2 new Ordinary Members of Council at large** at the General Assembly in Seoul, Korea in August 2006.

Each member Society is entitled to nominate candidates for the election. These nominations are given to the Nominating Committee who will - in conjunction with the Council of the IUPESM - prepare the slate to be included on the ballot at the General Assembly.

In selecting nominees, please be sure that they are aware that the Council Members at large are expected to travel to Council Meetings at their own expense - where possible - or at least to cover half of the ticket price.

In order that an informed decision can be made by the General Assembly when voting, we must have some information on your nominations. Enclosed are the following forms:

1. CALL FOR NOMINATIONS:

For your society, **signed by you**, giving the names of the people your Society would like to nominate for the various positions.

2. NOMINEE INFORMATION:

Is to be completed with the required information about your society's nominees and **signed by the nominees** expressing their willingness to serve should they be placed on the ballot and elected.

PLEASE, COMPLETE THE FORMS AND RETURN TO THE SECRETARIAT BY
December 31, 2005

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GENERAL INFORMATION

IUPESM COUNCIL ELECTIONS 2006

Officer Positions for 2006-2009*:

President: This position is to be filled (alternating) by the IFMBE -President.

Vice-President: This position must be filled (alternating) by the IOMP-President.

Secretary General: This position must be filled (alternating) by the Secretary General of IOMP.

Treasurer: This position must be filled (alternating) by the Secretary General of IOMP.

Officers of Council 2003 - 2006:

1. Prof. Colin Orton - president (IOMP)
2. Prof. Dov Jaron - vice president (IFMBE)
3. Prof. Jean-Pierre Morruci - past president (IFMBE)

4. Dr. Heikki Terio - secretary general / treasurer (IFMBE)
The position of the officers will be filled according to the outcome of the elections of IFMBE and IOMP 2006.

Ordinary Members of Council 2003 - 2006:

1. Prof. Joachim Nagel - president IFMBE
2. Prof. Azam Niroomand-Rad - president IOMP
3. Prof. Makoto Kikuchi - vice president IFMBE
4. Prof. Barry Allen - vice president IOMP
5. Prof. Ratko Magjarevic - Secretary General IFMBE
6. Prof. Peter Smith - Secretary General IOMP

The position of these members will be filled according to the Bylaws of IUPESM.

Ordinary Members of Council at large 2003 - 2006:

1. Prof. Inger-Lena Lamm (IOMP) **
2. Prof. Nandor Richter (IFMBE) *
3. Prof. Kwan-Hoong Ng (IOMP) **
4. Prof. Joe Barbenel (IFMBE) *

The two members are still eligible for nomination for Ordinary Council Member at large positions for another 3-year period; if elected at the 2006 General Assembly.

* eligible for nomination for Ordinary Council Member at large

** not eligible for nomination for Ordinary Council Member at large

- See the Bylaws of the IUPESM art. 3, 4 and 5

Paragraphs of the IUPESM Bye-Laws dealing with nominations and the procedure in seeking nominations, processing them and running the elections at the General Assembly

3. Officers

3.1 The officers of the IUPESM are:

- a) The President
- b) The Vice-President
- c) The Secretary-General
- d) The Treasurer
- e) The Past-President

3.2 The office of the Treasurer may be held by the Secretary-General.

3.3 The President shall be Chairman of all meetings of the General Assembly, and the Council. He or she shall be responsible for the implementation of the policy of IUPESM.

3.4 The Secretary-General shall be responsible for all matters concerning the administration of IUPESM and, in particular, for the conduct of correspondence, the preparation and distribution of publications and the safe keeping of the archives of IUPESM.

- a) He or she shall prepare the Annual Report of the IUPESM for distribution to all members.
- b) The Secretary-General may be assisted by such staff as may be approved by the Council. The salary and terms of appointment shall be approved by the Council.

3.5 The Treasurer shall be responsible for the preparation of the Annual Budget of the IUPESM, an audited statement of accounts.

3.6 The Vice-President shall be Chairman of the Awards Committee.

3.7 The Past-President shall be Chairman of the Nominating Committee.

3.8 With the approval of the Council, responsibility for a particular duty normally discharged by an Officer of the IUPESM may be delegated to another person.

4. Elections of Officers and Ordinary Members of Council

The terms of Office for Officers and Ordinary Members of Council, where succession is not automatic, shall normally be for the period between General Assembly meetings, with renewal for elected Ordinary Members by General Assembly vote, for a maximum of one extra period.

- 4.1 The President shall be the retiring President of one of the Constituent Organizations, and the Vice-President shall be the retiring President of another of the Constituent Organizations, these offices to be alternated between the organizations to give equal representation. They shall be designated one term prior to assuming offices, such recommendation to be the responsibility of the Nominating Committee.
 - a) Where circumstances make the alternate appointment of President or Vice-President impossible, the Nominating Committee shall be empowered by Council to nominate a candidate for election.
- 4.2 The offices of Secretary-General and Treasurer shall alternate between the Constituent Organizations in a manner parallel to those of President and Vice-President.
 - a) The incumbent Secretary-General or Treasurer may, however, be re-elected to their respective offices, by the General Assembly, for up to three terms.
- 4.3 The Vice-President or, failing this, the Past-President shall normally fulfil the duties of the President should he or she become unable to discharge them. If the Past President is unable to fulfil the duties of the President, the Council shall decide who is to undertake these.
- 4.4 The Council shall also decide who shall undertake the duties of any other Officers if they are unable to discharge such duties.
- 4.5 Ordinary Members of Council
 - 4.5.1 Ordinary Members of Council shall be the immediate Presidents, Vice-Presidents and Secretaries-General of the Constituent Organizations (if not already Officers as in Bylaws 4.1 and 4.2) plus four (4) Ordinary Members elected by the General Assembly, with due consideration to a balance among the Constituent Organizations and National Members.

5. Elections Procedures

- 5.1 Election of Officers and Ordinary Members of Council shall be from a slate prepared by the Nominating Committee in accordance with Bylaws 4 and 5.
- 5.2 Council shall appoint a Nominating Committee and Chairman immediately after each ordinary General Assembly meeting.
- 5.3 The Nominating Committee shall nominate one candidate for each of the Offices of President and Vice-President in accordance with Bylaw 4.1.
- 5.4 The Nominating Committee shall nominate one candidate for the Offices of Secretary-General and Treasurer in accordance with Bylaws 3.2 and 4.2.
- 5.5 For the four elected Ordinary Members of Council, The Secretary-General shall solicit names of candidates from the Constituent Organizations and National Members one year before the ordinary meeting of the General Assembly.
- 5.6 The Nominating Committee shall nominate at least one candidate for each position in the Council from the list of names resulting from the application of Bylaw 5.5 and in accordance with Bylaw 4.5.1 In addition, each Constituent Organization has the right to nominate one candidate.
- 5.7 The Nominating Committee shall conduct the election procedure, and shall have the authority to recruit assistants where required. Scrutineers, appointed by the Nominating Committee Chairman, shall check the voting credentials of delegates and supervise the balloting procedure.

FROM THE SOCIETIES

IFMBE INTRODUCES A NEW AFFILIATE

**POLISH SOCIETY FOR
BIOMEDICAL ENGINEERING**
- FROM THE 2004 ANNUAL REPORT



In 2004 the Polish Society for Biomedical Engineering actively supported the publication of a monograph entitled "Biocybernetics and Biomedical Engineering 2000" edited by Prof. Maciej Nałęcz (PSBE member). The monograph reflects activities in the field of biomedical engineering in Poland and is intended as a help for the lecturers and students in our country. Members of our society served as editors, authors and reviewers of the papers included in the monograph. We directly co-sponsored volume 1, entitled Biosystems, which was edited by Prof. J. Doroszewski, Prof. R. Tarnecki and Prof. W. Zmysłowski. The volume contains 6 chapters and counts 410 pages.

Four issues of the PSBE Bulletin were prepared and published annually in 2004 and 2005 on our web site and in paper format as a supplement to our journal Acta Bio-Optica et Informatica Medica.

The official web page of the Society was re-designed and substantially extended in the year 2005. The previous static web page of the Society was transformed into an interactive service. Currently, all visitors of the web page are able to add details of the future biomedical conferences to the database, which is available for on-line browsing on the web page. It is also possible to browse the database of the members of the Society. Additionally, members of the Society are able, after an on-line authorisation, to:

- ◆ submit proposals of the articles to be published in the Newsletter of the Society,
- ◆ use the electronic bulletin board of the Society,
- ◆ edit their personal records and control the balance of their membership fee.

**POLISH SOCIETY FOR BIOMEDICAL
ENGINEERING**

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AUSTRALIAN FEDERATION FOR MEDICAL AND BIOLOGICAL ENGINEERING

ANNUAL REPORT 2005

This year's Engineering and Physical Sciences in Medicine Conference, EPSM 2005, will take place in Adelaide from October 23rd to 27th. This meeting will incorporate the inaugural Australian Biomedical Engineering Conference (ABEC).

The theme of the ABEC meeting is AGEING – PEOPLE, PRACTICE & TECHNOLOGY.

Population ageing is a major concern in Australia and for many more developed regions of the world. Currently, 12% of the Australian population is aged 65 years and over. It is predicted that this will increase to 22% by 2031. The meeting will focus on topics such as;

- ◆ People: Ageing technical staff - ongoing CPD& accreditation. The impact of ageing on people with disabilities.
- ◆ Practice: Industry/professional self regulation, risk management. Vendor support – what works and what doesn't.
- ◆ Technology: Ageing hospital assets and infrastructure – asset replacement management practices nationally and internationally.
- ◆ Biomedical technology impact- healthcare in the home.

Invited speakers include:

Dr Tony Easty, Director of the Department of Medical Engineering at the University Health Network (Toronto General Hospital, Toronto Western Hospital and Princess Margaret Hospital) and at Mount Sinai Hospital, Toronto.

Dr Geoff Fernie, Vice President, Research at Toronto Rehab and professor in the Department of Surgery at the University of Toronto.

Dr Bill Gentles, vice president of BT Medical Technology Consulting.

The conference will also include one-day symposia on *Anaesthetic Workshop*

Further details can be found at <http://www.sapmea.asn.au/conventions/epsm/>

Dr Richard Kirsner
Hon Secretary, AFMBE



THE DAVID DEWHURST AWARD

AWARD OUTLINE

The Award is presented annually for outstanding service to Biomedical Engineering. The Award consists of a framed bronze medal and certificate and is presented at a special meeting or function of the College selected as appropriate by the Board of the College of Biomedical Engineering.



Award Criteria

The Award is presented for outstanding service to biomedical engineering through:

- ◆ A highly significant contribution, or contributions, through technical innovation relating to the science or practice of biomedical engineering; or
- ◆ Long standing eminence in biomedical engineering science or practice; or
- ◆ Exceptional and sustained management or leadership relating to biomedical engineering; or
- ◆ A notable combination of the aforementioned qualities and achievements.



The then College Chairman, Bruce Morrison (left) presents Prof. Mark Percy (right) with the Award



Mark Percy Wins Australian BME Societies BME Award "David Dewhurst" for 2004

The College awarded the 2004 David Dewhurst Award for outstanding contribution to the profession of Biomedical Engineering to Prof Mark Percy from QUT. As a very worthy winner, the Board presented Mark with the award for:

- The academic engineering quality and clinical relevance of his research has impacted not only on the practice of biomedical engineering but also on the practice of our clinical colleagues.
- Mark's bi-planar radiographic studies of intervertebral movements have led to definitive measurements which are referred to in all texts on the lumbar spine. His studies into alterations in the mechanics of the spine following degenerative changes in the disc are used by researchers and clinicians alike.
- Mark has been recognized internationally for his research with numerous awards and keynote speaker invitations at international conferences. He chaired the biomedical engineering scientific program at the 2003 World Congress on Medical Physics and Biomedical Engineering in Sydney and has served on the editorial boards of several national and international journals. Mark has 130 refereed papers in international biomedical engineering journals and has been a member of the Biomedical College Board.
- Since his appointment as Foundation Chair in Medical Engineering at Queensland University of Technology in 1996, Mark has developed a world class undergraduate program. He has supervised successful Masters and PhD students and largely due to his efforts QUT now hosts four major orthopedic research units in collaboration with three Brisbane hospitals.

The Award was presented at the Conference Dinner of the 2004 Engineering & Physical Sciences in Medicine (EPSM) Conference, held in Geelong VIC from the 15th - 18th November 2004.

From: <http://www.ieaust.org.au/>



WHO JOINS UNITED NATIONS CALL FOR CONCERTED ACTION TO ACHIEVE THE MILLENNIUM DEVELOPMENT GOALS

10 JUNE 2005 | GENEVA - The World Health Organization (WHO) today joins the United Nations in supporting the main message of the Millennium Development Goals Report 2005: Despite uneven progress towards achieving the global development goals, they are still achievable with determination, renewed commitment and immediate concerted action from global leaders.

Progress on the health-related Millennium Development Goals (MDGs) is mixed and if current trends continue, most poor countries will not meet these goals. However, investing in proven solutions can still turn the tide and help to achieve the goals.

"We have the means to achieve those goals. We have the technology. What we need are the resources and the political will," said Dr LEE Jong-wook, WHO Director-General. "We cannot wait any longer to do what we have promised to achieve in the coming decade."

No region of the developing world is currently on track to meet the child mortality target of reducing by two-thirds the mortality rate of children under the age of five. For maternal mortality, evidence indicates that declines have been limited to countries with lower levels of mortality; countries with high maternal mortality are experiencing stagnation or even reversals.

Data on coverage of some health interventions are more hopeful. For example, the proportion of women who have a skilled medical person with them during delivery has increased rapidly in some regions – especially in Asia, albeit from a low baseline; use of insecticide-treated bednets has risen; and coverage of effective tuberculosis treatment has expanded.

Later in June 2005, WHO will launch its own MDG report, Health in the Millennium Development Goals, which looks beyond the target-by-target information and identifies trends, successes and failures which are currently affecting the health sector as a whole.

In September 2000, 189 world leaders signed the Millennium Declaration, and made a commitment to achieve the Millennium Development Goals by 2015. Three of the eight goals relate directly to health: to reduce maternal mortality by three-quarters, child mortality by two-thirds and combat HIV/AIDS, malaria and other diseases. Health is an essential component of three further targets: to halve the proportion of people who suffer from hunger, improve access to safe drinking water and sanitation and ensure affordable, safe access to essential drugs.

RELATED LINKS

- WHO and the Millennium Development Goals (<http://www.who.int/mdg/en/index.html>)

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IMPROVING HEALTH R&D TO REACH THE MILLENNIUM DEVELOPMENT GOALS

58TH ANNUAL DPI/NGO CONFERENCE
UNITED NATIONS, NEW YORK, SEPTEMBER 7-9, 2005

The 58th Annual DPI/NGO Conference will be organised one week before the World Summit of the heads of UN affiliated states or their governments in order to contribute to preparing the declaration the leaders are supposed to sign at the World Summit 2005. This year the meeting at the East Bank is entitled "Our Challenge: Voices for Peace, Partnership and Renewal". The number of representatives of Non-Governmental Organisations (NGO) that are expected to gather this year is more than 2.000 due to high expectations of the outcomes of the event itself, but also due to the 60th Anniversary of the UN. The UN has accepted the NGOs as partners in implementation of ambitious and important projects like the program "Millennium Development Goals".

WHO LAUNCHES PROJECT TO MINIMIZE RISK OF RADON

In an effort to reduce the rate of lung cancer around the world, the World Health Organization (WHO) is launching the International Radon Project to help countries reduce the health risks associated with radon gas. The Project will identify effective strategies for reducing the health impact of radon, promote sound policy options for countries and increase public and political awareness about the consequences of exposure to radon.

Radon is a natural radioactive gas that emanates from the ground into the air. Radon gas in the air is present worldwide, its concentration depending on the highly variable uranium content of the soil. It is the second most important risk factor for lung cancer, causing between 6 and 15% of all cases. Yet, there is little public awareness of radon as a threat to human health, that can be mitigated with relatively simple measures.

"Radon poses an easily reducible health risk to populations all over the world, but has not up to now received widespread attention," said Dr Mike Repacholi, coordinator of WHO's Radiation and Environmental Health Unit. "Radon is all around us. Radon in our homes is the main source of exposure to ionizing radiation, and accounts for 50% of the public's exposure to naturally-occurring sources of radiation in many countries."

Although the average exposure to radon

varies enormously, recent studies have shown that, when exposed to a radon concentration of 100 Bq (Becquerels)/m³, a non-smoker's risk of lung cancer by age 75 years increases by 1 in a 1000 compared to non-exposed persons. Among those who smoke and are exposed to the same radon concentration, the risk of lung cancer is about 25 times greater. On a global level, tens of thousands of lung cancer deaths annually can be attributed to radon. Most of the radon-induced lung cancer cases occur among smokers.

Radon is a chemically inert, naturally occurring radioactive gas without odour, colour or taste. It is produced from radium in the decay chain of uranium, an element found in varying amounts in all rocks and soil. Radon gas escapes easily from the ground into the air and emits heavily ionizing radiation called alpha particles. These particles are electrically charged and attach to aerosols, dust and other particles in the air we breathe. As a result, radon progeny may be deposited on the cells lining the airways where the alpha particles can damage the DNA and potentially cause lung cancer.

Due to dilution in the air, outdoor radon levels are usually very low. Radon can also be found in drinking water, the concentration depending on the water source, and this can sometimes present a hazard. Radon levels are higher indoors, and much higher radon concentrations can be found in places such as

mines, caves and water treatment facilities, and an increased lung cancer risk has been found in uranium miners. For the average citizen, by far the greatest exposure to radon comes in the home.

The concentration of radon in a home depends on the amount of uranium producing the radon in the underlying rocks and soils as well as the routes available for its passage into the home and the rate of exchange between indoor and outdoor air. Radon gas enters houses through openings such as cracks at concrete floor-wall junctions, gaps in the floor, small pores in hollow-block walls, and also sumps and drains. Consequently, radon levels are usually higher in basements, cellars or other structural areas in contact with soil, and the radon concentrations in houses directly adjacent to each other can be very different.

Radon exposure in homes can be easily mitigated during the construction of new homes, but existing buildings can also be protected from radon. Most measures such as increasing under-floor ventilation and sealing cracks and gaps in the floor require simple alterations to the building, but other approaches may have to be taken in areas with high radon concentrations. Overall, reducing radon exposure is an important contribution to the goal of good quality indoor air.

The project is initially expected to run for three years (2005-2007). As a first step, the WHO International Radon Project is setting up a global network of radon scientists, regulators and policy makers to collaborate in the project. Coordination will be provided by WHO. Working groups will focus on risk assessment, exposure guidelines, measurement and mitigation of radon levels, investigations of cost-effectiveness and risk communication. WHO guidelines based on this work will help national authorities to develop, promote and strengthen activities at country or regional level. The WHO fact sheets produced in the course of the Project will be a central communication tool to increase public awareness about radon. The WHO International Radon Project also aims to create a global radon database and provide improved global estimates of the disease burden associated with radon worldwide. Overall, together with global tobacco control activities and initiatives on healthy indoor air, the Project is expected to be a key step towards reducing lung cancer risk world wide.

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From Note for the media WHO/15
 21 June 2005

As an essential activity of the International Radon Project, WHO is setting up a global radon data base.

A global radon map will be developed, displaying up-to-date information on radon levels, prevention and mitigation actions etc. in countries participating in the IRP. Information contributing to this database is welcome and should include the following points:

- Your Country.
- National authority dealing with radon Issues.
- Contact information of National Radon Authority.
- Average radon level at homes.
- Radon action levels.
- Mitigation measures.
- Research centre/institution conduction studies on radon.
- Other.

BOB NEREM AN AMERICAN ICON OF BIOMEDICAL ENGINEERING



PROF.
ROBERT NEREM

Undeniably, Biomedical Engineering is one of the big success stories of the 20th century. It took dedicated and energetic people, many of whom originally came from completely different scientific areas, to make that possible. One of these people is Bob Nerem, "one of the individual academicians most readily associated with the rise to prominence of biomedical engineering in the United States" (IB2 News – Spring 2002).

From Aeronautical Research to Tissue Engineering

Prof. Nerem's degrees are all in aeronautical engineering. After he received his Ph.D. at Ohio State in 1964 with a thesis about '*Heat Transfer During Reentry into the Atmosphere of Space Vehicles*' he became a faculty member at the Ohio State University in the Department of Aeronautical and Astronautical Engineering continuing his research. Part of his grant support came from NASA which, at the same time, supported a research project by Ohio's State College of Medicine to study vibration effects on human physiology. They were having a major vibration problem on the Saturn launch vehicle for the Apollo program and needed to understand what the effects of these vibrations might be on the astronauts. The medical people doing the research did not know anything about the launch and reentry of space vehicles, so in 1966 NASA asked Bob Nerem to act as a consultant to the project. He did not know anything about medicine and biology at the time but accepted the challenge and, as he put it himself, 'it was a window on a whole new world'.

In 1970 Bob spent almost a year at the Imperial College, London, working with 'The Physiological Flow Studies Unit' headed by professor Colin Caro and upon his return to Ohio State's Aeronautical and Astronautical Engineering Department he was certain that he wanted to get out of aerospace research and go into Biomedical Engineering. In 1971 he received a proposal to move his laboratory with his students to the Department of Veterinary Physiology and Pharmacology, the concept being that the veterinary physiologists would teach the engineers physiology and the engineers would teach the physiologists how engineering can be used to better understand physiology. This interdisciplinary cooperation obviously worked very well, and Prof.

Nerem, still academically an aerospace engineering professor, remained in the department until 1979 when he accepted the position as Chair of Mechanical Engineering at the University of Houston with a secondary appointment at the Texas Medical Center. By then he had begun to move more and more into biology and in 1980 Prof. Nerem set up a cell culture facility and began to culture vascular endothelial cells, his research focus being on the role of hemodynamics in atherosclerosis. By 1985 he realized he needed to learn molecular biology and worked out an arrangement to go on a sabbatical to the University of California, San Diego, well known for its strong bioengineering as well as an extremely strong biology department. When the faculty at the Mechanical Engineering Department in Houston did not want to let him go as long as he was the department chair, he decided to resign from the chair's position and handed in his letter of resignation.

In 1987 he accepted the position of Professor and Parker H. Petit Distinguished Chair for Engineering in Medicine at Georgia Tech in Atlanta, part of the negotiations being that he would be able to first go to San Diego for 3 months. For the last few months at the University of Houston all his salary was paid from research grants, so Prof. Nerem was able to go to San Diego for a total of 6 months to learn molecular biology, 23 years after he had finished his Ph.D and after studying physiology at Ohio State and cell biology at the University of Houston.

By now Prof. Nerem has been at Georgia Tech for 18 years, taking on the additional tasks of being Director of the Georgia Tech / Emory Center for the Engineering of Living Tissues that is funded by the National Science Foundation as well as joint appointments in the Georgia Tech/Emory Biomedical Engineering Department and the School of Chemical Engineering. During those 18 years, bioengineering at Georgia Tech has added about 50 faculty, being very well funded with a total of about \$25 million from the Whitaker Foundation, another \$25 million from the Coulter Foundation and \$10 million from Mr. Parker H. Petit. So the bioengineering program at Georgia Tech has been built with about \$60 million dollars in donor funds. Half of the bioengineering faculty members are working in the Biomedical Engineering Department which is actually a joint department between Georgia Tech and Emory University School of Medicine and the other half are in traditional engineering departments. The Department of Biomedical Engineering is offering unique academic programs, but concerning research the strategy is that all engineering departments should be involved in bioengineering since 'bioengineering is too important to be left to the bioengineering departments', as Prof. Nerem likes to point out.

IFMBE and other Professional Organizations

In 1982, Bob Nerem had planned to attend the IFMBE Meeting in Hamburg, Germany, but was unable to go. After the meeting he was talking to Lester Goodman, the IFMBE President from 1974-1979, then a member of the US delegation, and was casually informed that he had been elected to the IFMBE Administrative Council. Prof. Nerem had never even been asked to be a candidate. He joined the Council and in 1985 a discussion started about him running for the office of the IFMBE vice president. He believed this to be premature, having been on the Council for only three years, and attending his first IFMBE Meeting in 1985. But then the lead candidate for the vice presidency dropped out, and in 1985 Bob Nerem ended up being elected Vice President of the Federation and became President in 1988, at the meeting in San Antonio. Up to 1988 the joint meetings of the IOMP and the IFMBE had simply been called joint meetings; however, for San Antonio the two Conference Co-Presidents, Gary Fullerton (IOMP) and Bob Nerem (IFMBE) created the name we all are very familiar with by now: World Congress of Medical Physics and Biomedical Engineering.

During Prof. Nerem's term as president, the membership category of transnational societies was created and IEEE/EMBS became a member of the Federation, the idea in creating this new category of membership being to bring people together. IFMBE and EMBS decided to reach out to South America and a joint initiative led to the foundation of the Latin American Regional Council on Biomedical Engineering (CORAL). The idea of an Asian-Pacific Conference was born and the first meeting was held in 1990.

During a meeting at the National Science Foundation (NSF) in 1988 it became apparent that, in order to have any influence in Washington, it would be necessary for the American Biomedical Engineering Community to start a process to unify. With the financial support of NSF, Bob Nerem began to organize a series of three workshops that would ultimately lead to the foundation of AIMBE in 1991. At the first AIMBE meeting in February 1992, he became AIMBE's founding president. All the preparatory work was done while Bob Nerem was still president of

the IFMBE. In 1991 he became president of IUPESM, so for two years he wore two hats, one as president of the union, one as president of AIMBE.

As past president and a member of the IUPESM council, Bob Nerem had the idea of creating the IFMBE International Academy of Medical and Biological Engineering. He felt that there were so many really good people who intersected with the IFMBE for a while, e.g. through the journal, by being council members, by organizing conferences or by being part of a working group, but in almost all cases they ended up losing contact with the Federation as they went on to other activities. In creating an Academy to honor people who have been leaders in the field it would be possible to keep them involved in IFMBE. In addition the Academy is dedicated to encourage young people entering the field and their development in the early stages of their career. The Academy had its first meeting in 1997.

Professor Nerem's scientific achievements as well as his efforts for advancement of the biomedical engineering profession have been recognized through many awards in the United States and abroad. Some of his most significant honors are the election to become a member of the National Academy of Engineering in 1988 and a member of the Institute of Medicine of the National Academy of Sciences in 1992. Recognition he received from several different countries abroad include an honorary doctorate by the University of Paris, Val de Marne, in 1990. And most of our readers probably remember Bob Nerem's receiving the IUPESM Award of Merit for "Outstanding Achievements in Physical and Engineering Sciences in Medicine" at the World Congress in Sydney 2003.

Bob Nerem – the Person

It takes a special person to achieve a career like Prof. Nerem. He gave up his very successful aerospace research in order to transition into the new world of biomedical engineering. He stepped down from a department chair's position in order to learn molecular biology – at a time where nobody had even thought of the concept of life long learning. For 18 years now he has been at Georgia Tech helping to build bioengineering, leading the Parker H. Petit Institute for Bioengineering and Bioscience at Georgia Tech since 1995 and the Georgia Tech/Emory Center for the Engineering of Living Tissues since 1998. He is the author of more than 200 publications and still has found the time to be President of the Federation and IUPESM, the creation of AIMBE as well as the International Academy of Medical and Biological Engineering. How does a single person muster this energy and dedication?

Bob Nerem's parents were both born and raised in Norway. His father went to engineering school there and in 1925 the couple immigrated to the United States where Bob was born in Chicago. When World War II was over and with his father having longed to go back home for many years, the family took the first ocean liner back to Norway in 1946. However, it was not very long before Mr. Nerem senior realized it had been a mistake to return, and they probably should not have come back. But since they did, they would stay a couple of years, so the children could get to know their Norwegian roots and learn the language. The family moved back to the US in 1948!

Meanwhile, Bob went to school in Norway from September of 1946, having picked up the foreign language easily and doing well. One day in the fall of this year his geography teacher started to talk about the Philippines. And she commented that the Philippines were a colony of the United States. Bob raised his hand, he was recognized, stood up and said, well, the Philippines used to be a colony of the United States but they are no longer a colony of the United States, they are a free country. The teacher told him to sit down and that he was wrong. About 10 minutes later she again made a comment about the Philippines being a colony of the United States. Bob again stood up and said: "you know, I feel quite sure that they are no longer a colony of the United States, my father made a big point of their becoming a free country, in fact, their independence day is July 4 and their independence actually was this year July 1946". The teacher again said he was wrong and made him sit down. So he sat down and about 20 minutes later she again made this comment and Bob decided it was clear that he was not going to win this argument but there was no reason why he had to stay around for it. So he simply stood up, picked up his books, walked out of the classroom, walked out of the school and walked home. And when he got home – the family was living at the time with his Norwegian aunt who was a school teacher - she was absolutely embarrassed. How could her nephew so embarrass the family as to walk out of a classroom, walk out of the school! And Mr. Nerem senior told Bob he would have to go back and apologize. "Don't apologize for being right, because you were right. But you need to apologize for walking out of the classroom and out of the school". So that's what he did, he went back and apologized.



Prof. Robert Nerem was one of plenary speakers at the Asian Pacific Conference in Tsukuba

When the Nerems returned to the United States in 1948, they settled down in Evanston, Illinois. Prior to moving to Norway they also had lived in Evanston, a community where at the time only about 15% of the population was African-American. Bob had not encountered Blacks until he went to school. He came home his first day from school and his father asked him how was school and he said, school is fine, but there are these children in the classroom and they have this black skin. His father realized that Bob was sort of wondering what that was all about and he said, you know, you have to understand that skin is white on one side and black on the other side. And some people have the white side out and the black side in and some people have the black side out and the white side in. But really, there is no big difference except that some people have the skin turned the other way around. At this young age that was all the explanation Bob needed about the races.

Maybe being brought up by parents courageous enough to move to the US, then back to Europe and back to the US again at a time when it was so much more difficult than today and being wise enough to teach their children to stand up for themselves when they were right, apologize where they were wrong and able to offer such a warmhearted explanation about an issue as difficult as the racial one contributed to Bob Nerem's always having had a world wide view of things, as he phrases it. He believes research is a people business and he does have an interest in people. Because of his interest in people he enjoyed his IFMBE days, working with the Council, traveling to more than 20 foreign countries to make sure the face of IFMBE would appear in all member countries, forming AIMBE, and creating the International Academy for Medical and Biological Engineering.

Activities like Bob's require not only powerful commitment to the profession, strong motivation and lots of energy, but solid support at home. He quite obviously received this reinforcement; Marilyn and Bob Nerem celebrated 27 years of marriage this fall.

He is a faculty member at heart, caring deeply about the students. And Bob Nerem told me the story about an airline conversation a few years ago when he was asked by the person next to him what he was doing for a living. And Bob answered: "I am in a fascinating business. My business is creating opportunities for young people". His neighbor agreed it did sound fascinating and asked for the name of Bob's company. The answer: Georgia Tech.

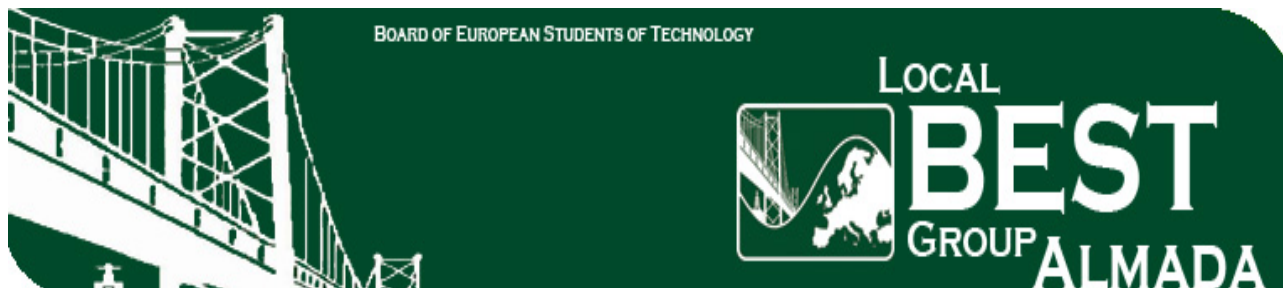
He thinks it is important that there be a federation of societies, the idea behind it being to bring people together. At the same time he finds it unfortunate to have no direct contact to the members.

Bob Nerem believes it is exciting to witness a new engineering discipline being borne and he feels that his field is actually not biomedical engineering; it is a biology-based engineering that he calls bioengineering. Certainly the primary area of application at the moment is the biomedical field but that will change as we move further into the 21st century. There will be many more applications emerging outside the medical field. There are a lot of things that we don't think of as being something that could be made using biological processes; things that we don't realize in fact can be done through biology. And as a result we are going to see brand new industries appear that we cannot even fathom today that will need engineers, ones that can integrate biology and engineering. And the fields of application will not be medical fields, though there still will be an important need for people in medicine with an engineering background. There are some obvious things: agriculture, the environmental area, manufacturing organic substances like paper in a laboratory, but there will be things we cannot even think of today.

Monika Nagel

This article is based on an interview that Professor Bob Nerem granted the author on the occasion of the APCMBE 2005 in Tsukuba, Japan.

HIGH-TECH ENGINEERING IN MEDICINE BEST SUMMER COURSE @ ALMADA PORTUGAL, 2005



BEST – Board of European Students of Technology - has been active during the past summer organizing many interesting courses around Europe, some of which also covered Bio-medical Engineering. The course organized by the local BEST Group Almada in Portugal, which took place from 26th August to 10th September, had the topic: "High-Tech Engineering in Medicine". The course was prepared for engineering students with some physics background and also for medical students who understood the physics principles of BME technology. It was centered on the applications of Physics and Engineering in the Human Body and other biological systems. All the lectures were held at The New University of Lisbon with Prof. Pedro Vieira as a main coordinator and one of the ten lecturers who gave lectures on topics in which they specialize. In such a manner, the variety of topics was covered, and some of these were:

✦ Radiation and its Applications to Medicine;



*High-Tech Engineering
in Medicine*

- ✦ Radiation in Biological Tissues;
- ✦ Molecular Image;
- ✦ Lasers and Optics;
- ✦ Biomechanics and Hemodynamics;
- ✦ Magnetic and Nuclear Resonance;
- ✦ Bio-Magnetism and Magnetic Stimulation;
- ✦ Electro-Physiology;
- ✦ Computers in Medicine.

The focus was not only on the theoretic physical principles applied to the new existing technologies but also their applications and functioning in modern medicine.

Besides lectures held daily

before noon, there was a field trip to the laboratories of the Optoelectronics' Department of INETI (National Institute of Engineering, Technology and Innovation). Laboratory classes were both for helping in understanding the course concepts and providing the materials for writing a final project by two students each. The evaluation was done by presenting the experiments performed, and it was fun to see how students from various countries adapt to a multinational working environment and communicate with ease. 25 students from 15 European countries took part in the



Students working in the laboratory



Course, supported by a dozen organizers - also students- and some 20 local participants from the hosting University.

Between academic activities, it is fair to say there was enough time for social and recreational activities, so organizing students took us to many interesting places and prepared many wild parties. Some of the places we visited were Arrábida (one of the beautiful natural parks), Cabo da Roca (the most western point of Europe), Sintra (Mountain of the Moon), Óbidos (considered World Heritage by UNESCO), Nations Park and Oceanarium, Planetarium... It would be wrong not to men-

tion the beautiful Portuguese coastline, sandy beaches of Costa da Caparica and wavy Atlantic where we enjoyed swimming and surfing. As one could imagine, that did not leave much time for sleeping, but nobody minded.

After two beautiful weeks, planes took us to our homes with a "Hope to see you again somewhere in Europe" on everyone's mind. Our time together ended, but memories and things we learned will last on.

Zoran Novaković
Faculty of Electrical Engineering & Computing
University of Zagreb



Participants of the BEST Summer School in Almada

13TH NORDIC – BALTIC IFMBE CONFERENCE



The venue of the Nordic – Baltic Conference: a modern and well equipped congress centre

The 13th Nordic – Baltic IFMBE Conference was very successful both as a scientific event and as a social event. Organizers were from the Umea academic community and the Swedish Biomedical Engineering Society hosted the conference. It seems that all participants enjoyed staying in Umea, a very young and modern city which is developing very fast thanks to the academic community that is successfully pushing research and development, and a large number of high technology companies, many of them working in the field of biomedical engineering. The participants have all learned a lot about the activities of national societies from the Nordic Baltic region, and much of the experience achieved could be implemented in other regions too. Many of the activities are in line with the current activities of the Federation, globally and in cooperation with international organizations like the WHO or UN, particularly in the field of patient safety, e-health and human resources.

Every third presentation at this conference was done by a young investigator, shortly a student. This fact speaks for itself; the young discipline biomedical engineering is largely carried by young people. Therefore, the decision of the IFMBE to establish Young investigator competitions and award the most successful students can be considered as one of the good policies. The organizers of the 13th Nordic – Baltic conference have followed this lead. The international award committee, chaired by Prof. Ake Oberg, had a very hard job to evaluate the papers and later also the presentations.

IFMBE officers and the IFMBE Administrative Council had their meetings in Umea too. Please read more on pages 5-6.

At the meeting of the Nordic Baltic secretaries, excellent ideas on regional collaboration were presented, e.g. the idea that national societies organize several tracks, according to the expertise of their members, no matter where the next conference is organized. In such a way, development of much stronger collaboration may be expected, both scientific collaboration which is so important in the frame of the enlarged united Europe, and professional, in finding common denominators for accreditation of educational programs, their harmonization and certification of clinical engineers, so important for all those colleagues who are employed in the health care system. This conference has given a significant contribution to those developments.



At one of the sessions of the Nordic–Baltic Conference

THE 7TH INTERNATIONAL CONFERENCE ON CELLULAR ENGINEERING - ICCE2005

The 7th International Conference on Cellular Engineering (ICCE2005) was held at the Centennial Hall, Yonsei University, Seoul, Korea from 6 to 9 September 2005 under the theme of "From DNA to CLINICS."

Subject Categories:

- Cell Engineering for Biosensors
- Cellular Mechanics
- Cell to Cell Interactions
- Cell to Extracellular Matrix Interactions
- Cell to Materials Interactions
- Cell-Based Therapy
- Multipotent Cell Engineering
- Tissue Regenerative Engineering
- Stem Cells and Clinics
- Cell and Tissue Preservation
- Genomics-Proteomics-Cellomics

Hosted by:

- The International Federation for Medical and Biological Engineering (**IFMBE**)
- Korea Society of Medical and Biological Engineering (**KOSOMBE**)

In particular, since the first meeting in Keele, United Kingdom, in 1993, ICCE has been held biannually concerning the science and technology from molecular event to developing biologically active sensors/ reactors, biological chips, cell-based medical implants from gene modified cells to the preserved banked tissue and engineered tissue for transplantation, and all relevant disciplines including biologists, biomedical engineers, and medical doctors around the world have presented the cutting-edge research features in this highly advanced scientific technology area.

In conclusion, a total of 75 papers were presented during the Congress and 200 participants took part in the Congress from 10 countries around the world.

The total of 82 papers was presented at the Congress as follows:

- ➔ Plenary Session (6)
- ➔ Invited Session (4)
- ➔ Podium Session (25)
- ➔ Poster Presentations (47)



Poster Session

Honorary Convener

Moon - Hi Han, PhD, Emeritus Researcher, Korea Research Institute of Bioscience and Biotechnology, Daejeon, Korea

Convener

Hwal Suh, DDS, PhD, Professor, Yonsei University College of Medicine, Seoul, KOREA

Co-Convener

Toshihiro Akaike, PhD, Professor, Graduate School of Bioscience, Tokyo Institute of Technology, Yokohama, Japan



Convener Prof Hwal Suh

President of IFMBE

Prof. Joachim H. Nagel, Stuttgart University, Germany

President of KOSOMBE

Prof. Myoung - ho Lee, Yonsei University, Seoul, Korea



The venue of the ICCE, Centennial Hall at Yonsei University

Plenary Speaker Prof. Peter Leikes



THIRD INTERNATIONAL CONFERENCE ON ETHICAL ISSUES IN BIOMEDICAL ENGINEERING

The 3rd International Conference on Ethical Issues in Biomedical Engineering was held in Rochester, New York, June 4-6, 2005, at the Crowne Plaza hotel. Following a welcome by the Conference Chairman, Dr. Subrata Saha, the participants were also formally welcomed by Dr. Alastair Cormack, Dean of the School of Engineering, Alfred University and by Dr. Charles Phelps, the Provost of the University of Rochester. Welcoming notes from Senator Charles Schumer of New York and Mr. John R. Ryan, acting Chancellor of the State University of New York & Vice Admiral, USN (Ret.) were also distributed to the registrants. In his letter Senator Schumer mentioned that "Bringing together biomedical engineers, philosophers, research scientists, students, clinicians, and representatives from the biomedical engineering industries and federal agencies is essential when discussing the ethical issues that surround the development of new implants, devices and treatments that will improve the quality of life of many". In his welcoming note, Chancellor Ryan perhaps expressed the feelings of many at this conference that "As society awakens to the great power of biomedical science, those of us who are exploring, discovering and creating this new knowledge must exercise extraordinary care to ensure that we have anchored our work in equally as powerful and thoughtful ethical foundations".

At this lively two-day conference, biomedical engineers, clinicians, research scientists, biomedical company representatives, attorneys, patient advocates, and graduate and undergraduate students from biomedical engineering programs discussed a large number of diverse topics. The authors came from many of the states in US as well as several foreign countries. Forty formal papers were presented in seven sessions covering a wide range of topics. The sessions were: 1) *Advances in Biomedical Technology: Ethical Concerns*; 2) *Ethical Issues in Biomedical Engineering*; 3) *Ethics Education in Biomedical Engineering*; 4) *Biomedical Research: Ethical Issues*; 5) *Animal Experimentation: Ethical Issues*; 6) *Medical Practice Ethical Concerns*; and 7) *Nanotechnology and Ethics*. In addition, there were two panel discussions, one on *Regulation and Marketing of Medical Devices: Ethical challenges* and the other on *Ethics Education in Bioengineering*.

The keynote speaker for the conference was Dr. David Williams, Professor of Tissue Engineering and the Director of the UK Centre for Tissue Engineering, University of Liverpool. The title of his talk was *Global Dimensions to the Ethical Aspects of Regenerative Medicine*. He discussed the multiple ethical considerations including "the philosophical and spiritual facets of using cells and tissues derived from other humans and animals to treat individuals, the implications of using donated cells without donor consent, some of the logistical aspects of mass production of tissues and organs, problems of intellectual property rights, and problems of health economics associated with high cost treatments". The conference opened with another invited talk, *Who's Responsible here? Ethics and Duties in Human subject Research*, by Dr. Gary Chadwick from the University of Rochester and Chair of their Institutional Review Committee. In his talk, Dr. Chadwick discussed the role of the investigator when conducting human subjects research, ethical principles described in the Belmont Report, i.e., respect for persons, beneficence, and justice that should serve as the basis for defining the roles and duties of the investigators when planning, designing, conducting and reporting research.



Alfred University, Polytechnic University and the University of Rochester sponsored this conference. This conference was co-sponsored or endorsed by most major biomedical engineering societies, including: 1) American Association of Physicists in Medicine (AAPM), 2) American College of Clinical Engineering (ACCE), 3) American Institute of Chemical Engineers (Food, Pharmaceutical and Bioengineering Division), 4) American Institute for Medical and Biological Engineering (AIMBE), 5) American Society of Agricultural Engineers (ASAE), 6) American Society of Mechanical Engineers (ASME, Bioengineering Division), 7) Biological and Agricultural Engineering Society (BAES), 8) Biomedical Engineering Society (BMES), 9) IEEE/Engineering in Medicine & Biology Society (EMBS), 10) Insti-

tute of Biological Engineering (IBE), 11) Sigma Xi, 12) Society for Biomaterials and Artificial Organs- India, and 13) Rehabilitation Engineering and Assistive Technology of North America (RESNA). In addition, the conference was also co-sponsored by the Healthcare Technology Policy Committee of IEEE, Ethics & Professional Responsibility Committee of EMBS and the Biotechnology Council. This conference was supported by grants from the Conversations Across the Disciplines Program of the State University of New York (SUNY), the Whitaker Foundation, the Center for Advanced Technology in Biomedical & Bioengineering Development at the University of Buffalo, the Center for Advanced Ceramic Technology at Alfred University, and several industrial companies. The abstracts of the talks presented at this conference were published in a special issue of the International Journal of Medical Devices and Implants, Vol.1, No. 2, 2005, published by the Medical and Engineering Publishers, Inc. (www.mepublishers.com) that was distributed to the registrants at the meeting. Those interested in obtaining this special issue can contact the publisher or the Conference Chair, Dr. Subrata Saha. At a future date, selected full-length papers from this conference will be published in a special issue of the journal, Medical Engineering & Physics. At the end of the conference, many of the participants expressed a strong desire to continue the dialogue on these important topics and encouraged Dr. Saha to plan for the 4th such conference in about two years. A planning Steering Committee is being formed and if anyone is interested, please contact Dr. Saha.

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STUDENT ACTIVITIES

IFMBE YOUNG INVESTIGATOR AWARD IN CONJUNCTION WITH NBC 2005, UMEÅ, SWEDEN JUNE 13 - 17, 2005

The IFMBE has sponsored the Young Investigators Competition in conjunction with the 13th Nordic—Baldic IFMBE Regional Conference held in June in Umea. Based on the reviews during the reviewing process, 10 young investigators who got the best scores of their papers, entered the competition as finalists. The Award Committee chose the winners of the first three prizes and presented them to the young investigators during the Closing Ceremony. The members of the Young Investigator Awards Committee were Profs. Åke Öberg, Chair, Sweden; Alan Murray, UK and Jari Hyttinen, Finland

The finalists were:

C. Fors, 1st prize winner for the paper «Myocardial Perfusion Assessment Using an ECG Triggered Laser Doppler Technique»

C. Grönlund, 2nd prize winner for the paper «Muscle Architecture and Fibre Types Using Spatiotemporal Information of Propagating Motor Unit Action Potentials Recorded by 2-D Multichannel Surface EMG»

V. Jalkanen, 3rd prize winner for the paper «Detection of Prostate Cancer with a Resonance Sensor»

C. Ahlstrom for the paper «Wheeze Analysis and Detection with Non-Linear Phase-Space Embedding»

A. Jonsson for the paper «Skin Temperature Effects on Skin Blood Flow at Areas Prone to Pressure Sore Development»

M. Nilsson for the paper «Versatile Microchip Utilising Ultrasonic Manipulation of Microparticles»

K. Solem for the paper «Evaluation of an Efficient Method for Handling Ectopic Beats in HRV»

N. Östlund for the paper «A Technique for Evaluating Infants Muscle Activity Using Surface EMG»

D. Zacà for the paper «High Resolution Venography as a Vascular Mask for Activation Sites of Auditory Cortex AT 3T»

CARINA FORS

Carina Fors was born in Sweden in 1978. In 2003 she received her M.Sc. in applied physics and electrical engineering from Linköping University. Since then she has been a research engineer and from 2005 a PhD student at the Department of Biomedical Engineering at Linköping University. Her research interests comprise laser Doppler flowmetry, biomedical optics, digital signal processing and cardiovascular physiology.



CARINA FORS

MYOCARDIAL PERFUSION ASSESSMENT USING AN ECG TRIGGERED LASER DOPPLER TECHNIQUE

C. Fors¹, M.G.D. Karlsson¹, H. Casimir-Ahn²
and K. Wårdell¹

¹Department of Biomedical Engineering,
Linköping University, Linköping, Sweden

²Linköping Heart Centre, University Hospital,
Linköping, Sweden

Abstract

A new method to assess myocardial perfusion during and after heart surgery has been developed. Laser Doppler perfusion monitoring is used in combination with ECG triggering to minimize movement artifacts in the recorded signal. The method has been evaluated during coronary artery bypass surgery and interesting findings from the measurements are presented. The evaluation proved the method to be feasible for measuring myocardial perfusion of the beating heart, provided that the ECG is sufficient for triggering.



CHRISTER GRÖNLUND

CHRISTER GRÖNLUND

Christer Grönlund received his M.Sc. in engineering physics at the University of Umeå, Sweden, in 2002 and is currently a Ph.D. student at the Department of Biomedical Engineering, University Hospital, Umeå, Sweden. His research interests are biomedical signal processing and multichannel surface electromyography.

MUSCLE ARCHITECTURE AND FIBRE TYPES USING SPATIOTEMPORAL INFORMATION OF PROPAGATING MOTOR UNIT ACTION POTENTIALS RECORDED BY 2-D MULTICHANNEL SURFACE EMG

C. Grönlund

Abstract:

The muscle fibre conduction velocity (MFCV) of a motor unit (MU) is related to its fibre-type and together with architecture they are the main determinators of muscle function. In this paper we propose a method to determine muscle function using 2-D multichannel surface EMG recordings. A previously developed method detects propagating MU action potentials (MUAPs), and estimates their corresponding MFCV, muscle fibre orientation (MFO), and spatial onset-position of propagation. In an attempt to separate the estimates of simultaneously active MUAPs, we propose to examine 2-D probability distributions of MFCV and MFO estimates, respectively, against onset-position estimates. The method was tested on recordings from biceps and trapezius.

VILLE JALKANEN

Ville Jalkanen was born in Umeå, Sweden, in 1978. He received his MSc degree in engineering physics from Umeå University in 2002. His master thesis concerned resonance sensors and instruments for detecting cancer in the human prostate. Currently he is a PhD student in applied electronics/biomedical engineering at the department of applied physics and electronics at Umeå University, where he continues with his work on resonance sensors for the detection of prostate cancer. His research interests are in general biomedical instrumentation and sensors, data analysis and processing.



VILLE JALKANEN

DETECTION OF PROSTATE CANCER WITH A RESONANCE SENSOR

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B. Ljungberg³ and O.A. Lindahl^{1, 4}

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Abstract: Prostate cancer is the most common cancer for men and tumours are generally regarded as harder tissue than surrounding normal tissue. In this study we used a resonance sensor system for measurements on in vitro prostate tissue stiffness to detect if tumours could be separated from normal tissue. A morphometric investigation was performed for comparison with tissue stiffness data and we proposed a new parameter that could differentiate between tumour and normal tissue in three out of seven cases. Further studies are needed to examine the full value of the resonance sensor.

Introduction

Prostate cancer is the most common cancer for men in Europe and the US. It is usually diagnosed by a high blood PSA, rectal palpation and ultrasound examination of prostate followed by histological examination of biopsies. Malignant tumours are generally regarded harder than normal healthy tissue [1].

A non-invasive tactile resonance sensor that measures physical properties of soft material e.g. human tissue has been presented [2]. This technique measures the change in resonance frequency, Df , when a vibrating ceramic rod touches the surface of an object as human tissue. The ceramic rod is set to vibrate with its resonance frequency through an electronic feedback circuit and the

resonance frequency change has been shown to describe the stiffness of an object [1,2].

It has earlier been shown that harder tissue like prostate stones can be detected with resonance sensors on fixed human prostate tissue from a patient with benign prostate hyperplasia with good reproducibility [1]. The aim of this study was to investigate if a resonance sensor system could detect cancer in human in vitro prostate tissue and compare with morphometrical investigations.

Material and Methods

A resonance sensor system, Venustron[®] (Axiom Co., Ltd., Koriyama Fukushima, Japan), was used in the experiments. It consists of the vibration sensor for measuring the resonance frequency, a force sensor and a position sensor; all arranged in a motorized mounting attached to a stable stand and connected to a computer. The sensor tip could be lowered towards an object with the motor. The resonance frequency change (Df), the force (F) and the impression depth were sampled with 200 Hz during both the impression and the retraction of the sensor tip. A maximum preset impression depth was set to 2 mm and the impression speed was set to 1 mm/s. Data were saved on a file with Venustron[®] software and processed in MATLAB[®] (Comsol AB, Sweden).

Measurements were performed on ten 1-1.5 cm thick prostate tissue slices from radical prostatectomy. Each tissue slice was

pinned onto a foam plastic plate and kept moist with regular application of saline solution. Reference markings were marked on the foam plastic and thereafter a picture was taken with a digital camera. The position of reference markings and measurement points on the tissue surface relative the sensor tip were controlled with a linear XY-precision positioning stage (Parker Hannifin Corporation - Daedal Division, Irwin, PA, USA). 12-20 measurements were done on the surface of each slice, and on 4-6 of these measurements five repeated measurements were performed. After the measurements the tissue was fixed in formalin and thereafter embedded in paraffin.

A morphometric investigation was performed on the most superior 5 mm cut section from each tissue slice. Reference markings and the digital photo were used to locate the measurement points on the 5 mm cuts. The hit percentage for the sensor tip on a tumour area was determined and a hit percentage of >75% was considered as a secure hit on tumour, while a hit percentage of <25% was considered as a hit on normal tissue. Hit percentages in between were excluded from further analysis. The parameter $d\Delta f/dF$ was used for analysis, but a new hypothesis was created: Tumour tissue differs from the mean value of normal tissue and thereby the relative deviation for measurements on tumour from the mean of measurements on normal tissue is:

measurement_{tumour}/mean(measurements_{normal})
 Wilcoxon rank-sum test was used to test for differences between two groups and $p < 0.01$ was considered significant.

Results

The Wilcoxon rank-sum test showed that in three prostates there was a significant difference between measurements on tumour and normal tissue, see Figure 1. The

percentage deviation was positive, thereby indicating on harder tumour tissue compared to normal tissue. Similar analysis showed that for four prostates no differences were found between tumour and normal at $p < 0.01$. For three prostates no hits were found on tumour tissue.

Figure 2 shows results from repeated measurements on five measurements for one prostate. From morphometric investigation,

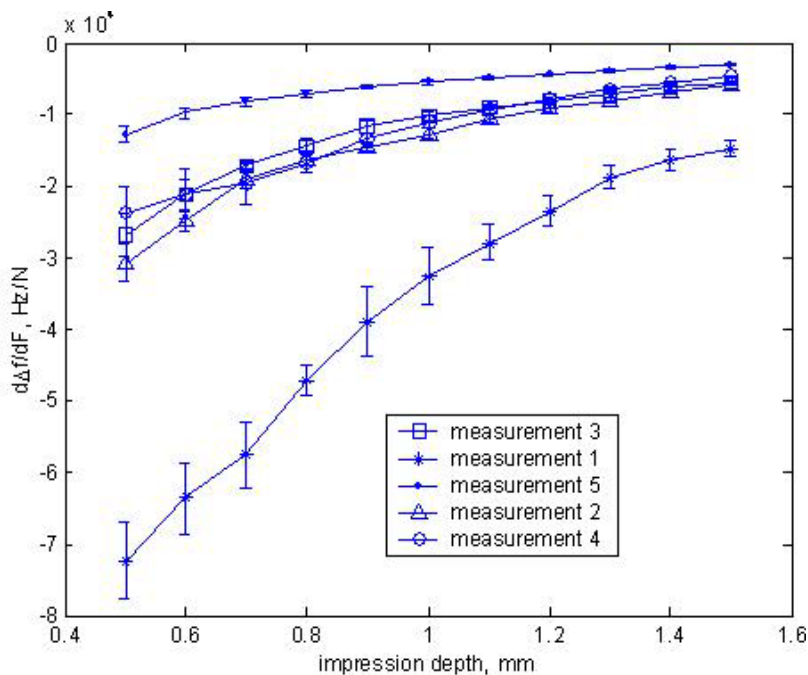


Figure 2: Five measurements with repetitions ($m \pm SD$, $n=5$) for one prostate. Measured parameter against impression depth.

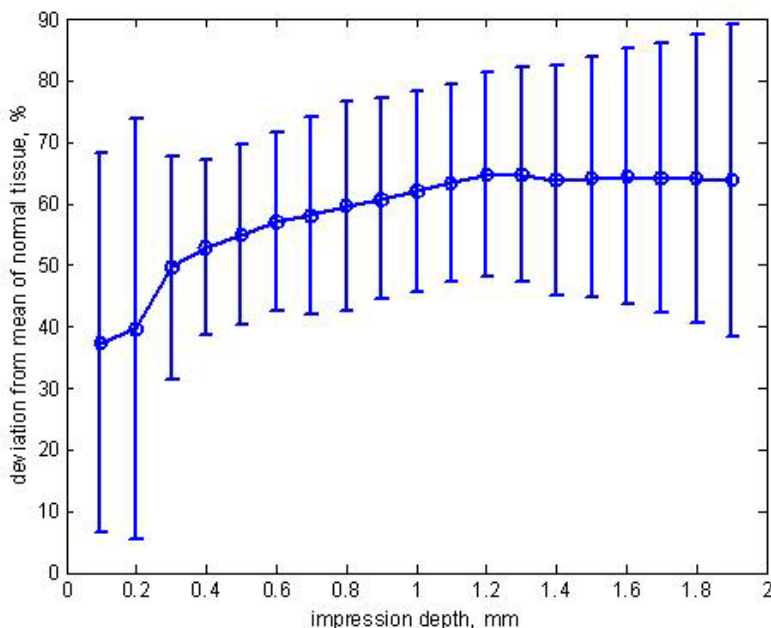


Figure 1: The percentage deviation of measurements on tumour ($mean \pm SD$, $n=10$) from mean of measurements on normal tissue ($n=27$). Data from three prostates.

Table 1: Relative amount (%) of tissue content of five measurement points on one prostate tissue slice. Hit on normal (N) and tumour (T).

Meas.	Stone	Epithel	Lumen	Stroma	N/T
1	1.7	27.3	18.2	52.9	N
2	0.83	5.8	5.0	88.4	N
3	5.0	9.9	9.1	76.0	N
4	0	58.7	13.2	28.1	T
5	0	43.0	3.3	53.7	T

the tissue content was determined for the five measurements and seen in Table 1. Measurements on tumour tissue (measurement 4 and 5) have less stroma and no prostate stones and sensed as harder than normal tissue, which have a larger amount of stroma and prostate stones (measurement 1-3).

Discussion

This preliminary analysis of tissue stiffness of in-vitro human prostate tissue shows that there are variations in tissue stiffness between tumour tissue and normal tissue. There are also variations among the prostates from each individual. The thickness of the tissue slice might affect the felt hardness. Also the level of dehydration among the prostates might influence the results, less fluid giving less contact with the sensor tip and thereby decreasing the Df. Another source for error is the unknown contact area due to irregular surface of the prostate slice. Variations both within normal and tumour tissue such as the amount of prostate stones, epithelial tissue and stroma affect the

resonance sensor signal as seen for few measurements, see Figure 2 and Table 1. Therefore it is of interest to study in more detail how the tissue content influences the stiffness. Here it is importance to note that the preliminary morphometrical investigation was done on a single 5 mm superior cut section of the prostate slice, which means that the distribution of tumour and normal prostate tissue deeper in the tissue slice was not considered.

Conclusion

The resonance sensor system can differ between tumour and normal tissue for three out of seven prostates, but further studies must be done to determine to what extent variations in tissue content deeper in the tissue affects the measured signal and tissue stiffness.

Acknowledgement

The study was supported by EU objective one, Northern Sweden.

References

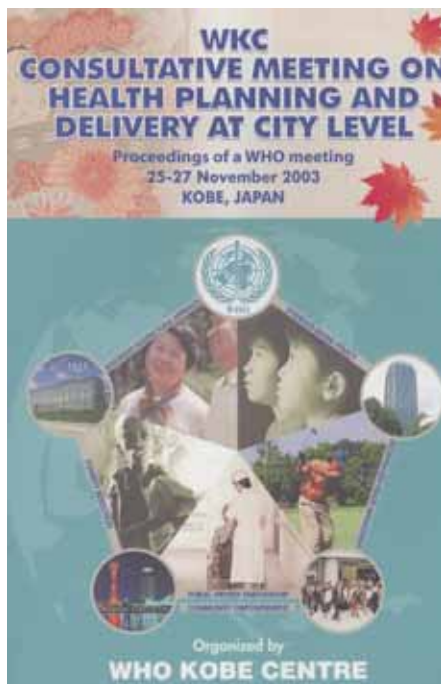
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Presentation of the IFMBE Young Investigators Awards: Left: Profs. A. Berg, R. Lindstrom and C. Fors. Right, above: C. Gronlund, R. Magjarevic and R. Lindstrom; right, below: V. Jalkanen

BOOK REVIEWS

CONSULTATIVE MEETING ON HEALTH PLANNING AND DELIVERY AT CITY LEVEL NOVEMBER 25 - 27, 2005, KOBE JAPAN



Publisher: WHO Kobe Centre
Activity Report 74E, WHO/WKC/SYM/04.3, 2004

Bringing together 25 participants including mayors, city development authorities and researchers from 10 partner cities of the World Health Organization Centre for Health Development (WHO Kobe Centre – WKC), this Consultative Meeting was held to consolidate and exchange information on city health and welfare systems development issues. The Meeting provided an important platform for WKC partner cities to share their experiences on health policy, strategy and systems development from practical perspectives.

In his welcome address, Dr Yuji Kawaguchi, Director of WHO Kobe Centre emphasized that the strategy for "Health for All" and the primary health care approaches were as applicable today as when they were launched by WHO and UNICEF in Alma-Ata in 1978. However, he stressed that there was a need to advance community involvement which up to now had been inadequately addressed in a scientific manner.

The Director expressed his confidence that, as this Meeting was taking place at a very critical juncture, when significant information was available from a number of WKC partner cities in different parts of the world, the Meeting would be able to work out the best line of action for WKC partner cities and other cities to set their targets, goals and strategies hopefully for the next 10 to 15 years.

Following the Director's address, Mr Hideo Kajimoto, Deputy Mayor, City of Kobe, Japan welcomed the participants from various countries. He also extended his thanks to Dr Kawaguchi and all WKC staff members for their contribution in priority areas of health development and producing recommendations of global significance.

The main themes of the Meeting were (1) strategic health planning and policy-making and (2) health care and services delivery at city level and all participating cities presented their experiences in these areas. The impact of rapid urbanization on health and quality of life was a common concern. Air quality, safe drinking water, waste disposal, clusters of people with low socioeconomic status, and increasing populations diversity were some of the areas posing challenges for city planning and management. It was discussed that as citizens expect their community authorities to be responsible to meet the health challenges, a governance model that reflects the characteristics of the population, the political circumstances, funding and other resources of each city was important.

The participants stressed the importance of pursuing evidence-based health policy strategies and systems development, public-private partnership in urban health development, an integrated multisectoral approach to urban health development (health impact assessment – HIA) with access to relevant, timely, cost-effective and quality data, and meetings with citizens' participation and political leaders.

On the last day, recommendations for future action were developed and endorsed by the participants. These consisted of seven practical strategies that provide guidance for city authorities towards an integrated policy framework that also reflects the role of central and regional government agencies, nongovernmental organizations, the private sector and the community.

The Meeting participants acknowledged the vision and leadership of Dr Kawaguchi, Director of WHO Kobe Centre, in bringing partner cities together to explore practical ways in which city governments can work with their communities and with each other to improve the health and welfare of all citizens.

In closing, Dr Kawaguchi said that although this was a short meeting, the issues that had been discussed also reflected the central themes of various international strategies and goals. With the good collaboration of the partner cities, WKC would continue to provide a platform to generate innovative ideas and draw up guidelines and recommendations for future action. The follow up action will be reported at the Third Global Meeting on Cities and Health: Strategies for Health and Welfare Promotion and Management in Cities, planned to be held in June 2005.

The full report of this Meeting will be available through WKC web site in the near future.

ANNOUNCEMENTS

FIRST ANNOUNCEMENT

ICMCC EHR STANDARDS CONFERENCE

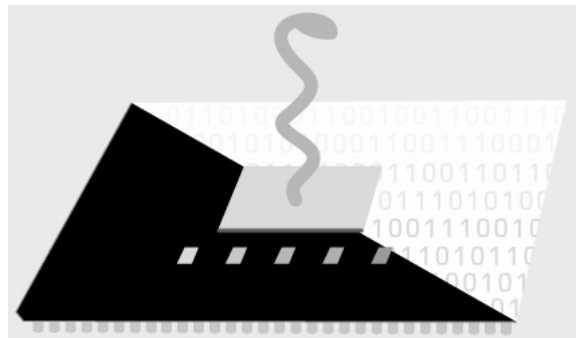
FEBRUARY 6 – 7, 2006
WORLD FORUM CONVENTION
CENTRE,
THE HAGUE, THE NETHERLANDS

On February 6-7, 2006, ICMCC organizes a conference on Standardization and Interoperability, "Putting EHR Standards to Work - Implementing the E-Health Society".

During this conference, to be held in The Hague, we will want to bring together all those international organizations and solution providers that are involved in EHR standardization and interoperability solutions. Representatives of the following standardization communities have already agreed to participate:

HL7, ISO, OpenEHR, IEEE.

Speakers from companies and organizations involved in the development of standards as well as those implementing them will be presenting during this two day event, highlighting industrial, medical and patient related aspects.



Please refer to our website <http://www.icmccstandards.org/> for the latest updates on the conference program. Registration will open on November 15.

More information at: standards@icmcc.org

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www.icmcc2005.com

FOURTH IASTED INTERNATIONAL CONFERENCE ON BIOMEDICAL ENGINEERING BIOMED 2006

FEBRUARY 15-17, 2006
INNSBRUCK, AUSTRIA

CALL FOR PAPERS

SPONSORS

The International Association of Science and Technology for Development (IASTED)

Technical Committee on Biomedical Engineering

World Modelling and Simulation Forum (WMSF)



PURPOSE

Medicine began with intuition, imagination, observation, and experience in ancient times, gradually evolving into a science over the centuries. In recent years, with the aid of engineering and information technology, biomedical engineering has emerged as a high-tech field generating innovation in such areas as medical imaging, bioinformatics, MEMS and nanotechnology, new biomaterials and sensors, medical robotics, and neurobiology. Scientists and engineers in this field have recently been working towards such advances as developing artificial organs that mimic natural human organs, conducting telemedicine and performing surgeries with robots, creating a laboratory-on-a-chip, and controlling robots through natural animal brain matter.

BioMED 2006 is intended to be an international forum for researchers and practitioners interested in the advances in, and applications of biomedical engineering to exchange the latest research, results, and ideas in these areas.

All papers submitted to this conference will be peer evaluated by two reviewers. Acceptance will be based primarily on originality and contribution.

LOCATION

Innsbruck is nestled in the valley of the Inn River and tucked between the Austrian Alps and the Tuxer mountain range. It has twice hosted the Winter Olympics and is surrounded by the eight ski regions of the Olympic Ski World, including the Stubai Glacier, which offers skiing year round. Climbing the 14th century Stadtturm on Herzog Friedrich Strasse provides a stunning view of the town and the breathtaking scenery that surrounds it. Concerts at Ambras Castle provide listening pleasure in a beautiful renaissance setting. The sturdy medieval houses and sidewalk cafés of Old Town Innsbruck beckon you to sit for a while and watch people stroll by.

Innsbruck, with its unique blend of historical, intellectual, and recreational pursuits, offers something for every visitor. BioMED 2006 will be held at the world-famous Congress Innsbruck, located in the heart of the city near the historical quarter. This facility won the prestigious 'Best Conference Center in Europe Award' in 2000.

SCOPE

BioMED 2006 will highlight the latest research and developments in the fields of biomedical engineering. The topics to be covered include but are not limited to:

Medical Imaging, Image Processing, and Signal Processing

Computed Tomography
 Data Representation and Visualization
 Integrated Medical Image Analysis
 Magnetic Resonance Imaging
 Medical Data Storage and Compression Techniques
 Medical Image Processing
 Nuclear Medicine
 Optical Imaging
 Signal Processing
 Ultrasound Imaging

Medical Devices, Measurement, and Instrumentation

Biosensors and Transducers
 Data and Signal Acquisition
 Electronic Medical Devices
 Intelligent Instrumentation
 Lasers and Optical Systems
 Measurement and Instrumentation
 Microtechnology and BioMEMS
 Noninvasive Measurement
 Reliability and Failure
 Robotics

Modelling, Simulation, Systems, and Control

Biomedical Computing
 Biological Effects of Electromagnetic Radiation

Biomechanics
 Control Systems
 Electromagnetic Field Simulation
 Hemodynamics
 Sports and Ergonomics Simulation
 Surgery Simulation and Simulators
 Virtual Reality

Health Care Technology

Clinical Assessment and Patient Diagnosis
 Artificial Organs
 Computer-aided Surgery
 Electrotherapy
 Health Care Information Systems
 Implant Technology
 Patient Monitoring
 Prosthetics and Orthotics
 Radiotherapy
 Rehabilitation Engineering
 Telemedicine

Molecular Bioengineering

Labs-on-Chips
 Bioinformatics
 Biomaterials
 Bio-nanotechnology
 Drug Delivery and Pharmacokinetics
 Gene Therapy
 Molecular and Cellular Engineering
 Tissue Engineering

SUBMISSION OF PAPERS**Initial Papers**

Submit your paper via our website at:

<http://www.iasted.org/conferences/2006/Innsbruck/submit-519.htm>. All submissions should be in Adobe Acrobat (.pdf), Postscript (.ps), or MS Word (.doc) format. The IASTED Secretariat must receive your paper by **November 1, 2005**. Receipt of paper submission will be confirmed by email.

Complete the online initial paper submission form designating an author who will attend the conference and providing four key words to indicate the subject area of your paper. One of the key words must be taken from the list of topics provided under Scope. Initial paper submissions should be approximately four pages. Formatting instructions are available at: <http://www.iasted.org/formatting-initial.htm>.

Notification of acceptance will be sent via email by **December 1, 2005**. Final manuscripts are due by **January 3, 2006**. Registration and final payment are due by **January 10, 2006**. Late registration fees or paper submissions will result in the papers being excluded from the conference proceedings.

Final Papers

Send your final manuscripts via email to: finalpapers@iasted.org. The subject line for the final manuscript submission must include your six-digit paper number. The formatting instructions can be found at: <http://www.iasted.org/formatting-final.htm> and must be strictly followed. The page limit for final papers is four single-spaced pages in 10 point Times New Roman font. Only one paper of up to six pages is included in the regular registration fee. There will be an added charge for extra pages and additional papers.

TUTORIALS

Proposals for three-hour tutorials should be submitted online by **November 1, 2005**. Tutorials are to be submitted via the following website address:

<http://www.iasted.org/conferences/2006/Innsbruck/tutorialsubmit-519.htm>. A tutorial proposal should clearly indicate the topic, background knowledge expected of the participants, objectives, time allocations for the major course topics, and the qualifications of the instructor(s).

SPECIAL SESSIONS

Persons wishing to organize a special session should submit a proposal via email to: calgary@iasted.org. Proposals should include a session title, a list of the topics covered, and the qualifications and brief biography of the session organizer(s). Papers submitted to the special session must be received by **November 1, 2005**, unless otherwise stipulated by the Special Session Organizer. A minimum of five papers must be registered and fully paid in order for this session to be included in the conference program. More information on special sessions is available at:

<http://www.iasted.org/conferences/2006/Innsbruck/sessionsubmit-519.htm>.

IMPORTANT DEADLINES

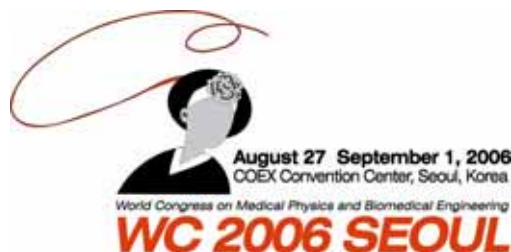
Submissions due	November 1, 2005
Notification of acceptance	December 1, 2005
Final manuscript due	January 3, 2006
Registration and full payment	January 10, 2006

For more information, or to be placed on our mailing list, please contact:

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E-mail: calgary@iasted.org
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WORLD CONGRESS ON MEDICAL PHYSICS AND BIOMEDICAL ENGINEERING

SATELLITE EVENT



7TH CONFERENCE ON BIOMEDICAL APPLICATIONS OF ELECTRICAL IMPEDANCE TOMOGRAPHY - EIT AUGUST 27 – SEPTEMBER 1, 2006

The 7th Conference on Biomedical Applications of Electrical Impedance Tomography will be held at COEX, Seoul, Korea as a joint conference of the World Congress on Medical Physics and Biomedical Engineering.

Following the tradition of the conference, topics will be limited to biomedical EIT including the following subjects:

- Reconstruction algorithms
- Instrumentation
- Clinical applications
- New developments including MREIT and MIT

To submit an abstract, please follow the registration and abstract submission procedure on [the](#)

[World Congress 2006 website](#). When you submit an abstract, you can choose this conference title instead of a general track title of the World Congress 2006. Once you are registered for the World Congress, there will be no additional registration fee for any joint conference. For general information on the conference including important dates, hotels, tours and others, please visit [the World Congress 2006 website](#).

The conference is organized and supported by

Impedance Imaging Research Center (IIRC)
Kyung Hee University
1 Seochun, Kiheung, Yongin
Kyungki, S. KOREA 449-701
Tel: +82-31-201-2538, Fax: +82-31-201-2378
E-mail: iirc@khu.ac.kr,
URL: <http://iirc.khu.ac.kr/>



For further information, please contact one of the conference organizers.

[Jin Keun Seo](#), Yonsei University, Korea
[Eung Je Woo](#), Kyung Hee University, Korea

WORLD CONGRESS ON MEDICAL PHYSICS AND BIOMEDICAL ENGINEERING

SATELLITE EVENT



THE 2ND ASIAN INTERNATIONAL CONFERENCE ON COMPUTER-AIDED SURGERY - AICAS

This conference was organized to exchange novel approaches from Asian countries for computer-aided surgery with the surgical robot, surgical navigation, and medical imaging techniques. And the 1st conference was held on Apr. 28 2005 at AIST in Japan.

The 2nd conference will be held on September 1st 2006 at COEX, Seoul, Korea as a joint conference of the World Congress on Medical Physics and Biomedical Engineering.

Topics of this conference are surgical robot, image-guided surgery and medical imaging techniques.

To submit an abstract, please follow the registration and abstract submission procedure in [the World Congress 2006 website](#). When you submit an abstract, you can choose this conference title instead of a general track title of the World Congress 2006. Once you are registered to the World Congress, there will be no additional registration fee for any joint conference. For general information on the conference including important dates, hotels, tours and others, please visit [the World Congress 2006 website](#).

The conference is organized and supported by
Center for Intelligent Surgery System
Hanyang University
#17 Haengdangdong Sungdonggu
Seoul, Korea, 133-792

If you have any question, please contact to Prof. Young Soo Kim
email : ksy8498@hanyang.ac.kr
tel : 82-2-2220-1553, Fax : 82-2-2291-8498

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- IFMBE Proceedings EMBEC'05 "3rd European Medical & Biological Engineering Conference, IFMBE European Conference on Biomedical Engineering" Vol. 11, 2005, Prague, Czech Republic, CD
- IFMBE Proceedings ICCE 2005 "The 7th International Conference on Cellular engineering", Vol. 10, 2005, Seoul, Korea, CD, 33 papers
- IFMBE Proceedings NBC 2005 "13th Nordic Baltic Conference on Biomedical Engineering and Medical Physics", Vol. 9, 2005, Umeå, Sweden, 175 papers on more than 300 pages, including table of contents
- IFMBE Proceedings APCMBE 2005 "6th Asian-Pacific Conference on Medical and Biological Engineering", Vol. 8, 2005, Tsukuba, Japan, CD, more than 300 papers
- IFMBE Proceedings BioMED 2004 – "Kuala Lumpur International Conference on Biomedical Engineering", Vol. 7, 2004, Kuala Lumpur, Malaysia
- IFMBE Proceedings MEDICON and HEALTH TELEMATICS 2004 "X Mediterranean Conference on Medical and Biological Engineering", Vol. 6, 2004, Ischia, Italy
- IFMBE Proceedings CLAEB 2004 "III Latin American Congress on Biomedical Engineering", Vol. 5, 2004, João Pessoa, Brazil
- IFMBE Proceedings WC2003 "World Congress on Medical Physics and Biomedical Engineering", Vol. 4, 2003, Sydney, Australia
- IFMBE Proceedings EMBEC'02 "2nd European Medical and Biological Engineering Conference", Vol. 3, Parts 1 & 2, 2002, Vienna, Austria
- IFMBE Proceedings 12NBC "12th Nordic Baltic Conference on Biomedical Engineering and Medical Physics", Vol. 2, 2002, Reykjavik, Iceland
- IFMBE Proceedings MEDICON 2001 – "IX Mediterranean Conference on Medical Engineering and Computing", Vol. 1, Parts 1 & 2, 2001, Pula, Croatia

CALENDAR

2005

**27th Annual International Conference of the IEEE Engineering in
Medicine and Biology**

Society: Innovation from Biomolecules to Biosystems

September 1-4, 2005 Shanghai, China

<http://www.ee.cuhk.edu.hk/EMBC05shanghai/>**8th Japanese-Polish Seminar on New Engineering
Methods Supporting Human Life**

September 5 - 8, 2005, Yokohama, Japan

www.Frontier.dendai.ac.jp/JPS2005/**5th International Workshop on Biosignal Interpretation**

September 6 - 8, 2005, Venue Hosei University, Tokyo, Japan

<http://www.bsi2005.org>**The 7th ICCE****The 7th International Conference on Cellular Engineering**

September 6 - 9, 2005, Seoul, Korea

www.2005icce.info**I SEM 2005****12th International Symposium on Interdisciplinary Electromagnetic,
Mechanic & Biomedical Problems**

September 12-14, 2005, Bad Gastein, Austria

<http://www.magnetics-group.org/isem2005>**BIOMEDEA Conference - MBES Certification, Registration
and Continuing Education**

September 23-25, 2005, Stuttgart, Germany

<http://www.bmt.tue.nl/biomedea>**Computers in Cardiology 2005**

September 25-28, 2005 Lyon, France

<http://cinc2005.insa-lyon.fr>**BUDAMED'05**

October 13, 2005, HUNGEXPO, Budapest, Hungary

<http://www.mate.mtesz.hu/hun/Budamed2005/index.php>

2005 NSS/MIC

2005 IEEE Nuclear Science Symposium and Medical Imaging Conference

October 23-29, 2005, Wyndham El Conquistador Resort, Puerto Rico

<http://www.nss-mic.org>

ABUJA 2005

6th National Biomedical Engineering Conference of the Nigerian Institute for Biomedical Engineering

"Appropriate and Affordable Bio-Medical Technology for Nigeria"

October 27 and 29, 2005, Abuja, Nigeria

World Conference on Physics and Sustainable Development

October 31-November 2, 2005, Durban, South Africa

<http://www.wcpsd.org/>

CASEIB2005

23rd Spanish Conference on Biomedical Engineering

November 2-4, 2005, Madrid, Spain

www.caseib2005.gbt.tfo.upm.es

ECT 2005

Electroporation based Technologies and Treatments

International Scientific Workshop and Postgraduate Course

November 14-20, 2005, Ljubljana, Slovenia

<http://www.cliniporator.com/ect>

EMBEC'05

3rd European Medical and Biological Engineering Conference

November 20 – 25, 2005, Prague, Czech Republic

<http://www.embec05.org>

12th ICBME

The 12th International Conference on BioMedical Engineering

Theme: "Unleashing Minds, Transforming Lives"

December 7 – 10, 2005, Singapore

<http://www.icbme.org>

2006

ICMCC EHR Standards Conference

February 6 – 7, 2006

World Forum Convention Centre, The Hague, The Netherlands

<http://www.icmccstandards.org>

**IAESTED International Conference on Biomedical Engineering
BioMED 2006**

February 16-18, 2006. Innsbruck, Austria

<http://www.iasted.org/conferences/2006/innsbruck/biomed.htm>

AISCMP 2006

**2nd Austrian, Italian, Slovenian and Croatian
Medical Physics Meeting**

April 29 – 30, 2006, Opatija, Croatia

<http://www.crombes.hr/aiscmp>

29th Canadian Medical and Biological Engineering Conference

June 1 - 3, 2006, Vancouver, BC, Canada

<http://www.cmbes.ca>

**WC 2006 – World Congress on Biomedical Engineering
and Medical Physics**

August 27 - September 1, 2006, Seoul, Korea

<http://www.wc2006-seoul.org>

WC 2006 Satellite Event

**EIT-7th Conference on Biomedical Applications of Electrical
Impedance Tomography**

August 27 – September 1, 2006, COEX, Seoul, Korea

<http://www.wc2006-seoul.org>

WC 2006 Satellite Event

**AICAS - 2nd Asian International Conference on Computer-Aided
Surgery**

August 27 – September 1, 2006, COEX, Seoul, Korea

<http://www.wc2006-seoul.org>

2007

MEDICON 2007

**11th Mediterranean Conference on Medical and Biological
Engineering and Computing**

June 26 – 30, 2007, Ljubljana, Slovenia

<http://www.medicon2007.com>

2009

World Congress on Medical Physics and Biomedical Engineering

September 13 – 18, 2009, Munich, Germany

<http://www.vde.com/VDE/Fachgesellschaften/DGBMT/Aktuelles/2003-Oeffentlich/default.htm#CurrentSelection>



International Federation for Medical and
Biological Engineering

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transnational organizations.**

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in medical and biological
engineering.**

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the application of knowledge,
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Articles and news for *IFMBE News* should be sent to Prof. Ratko Magjarevic, Faculty of Electrical Engineering & Computing, University of Zagreb, Unska 3, HR-10000 Zagreb, CROATIA, Phone: +385 1 6129 938, Fax: +385 1 6129 652, E-mail: ratko.magjarevic@fer.hr

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World Congress on Medical Physics and Biomedical Engineering

WC 2006 SEOUL

**DEADLINES FOR SUBMITTING
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