



# IFMBE News

## Number 47 March 2001



### *Number 47*

### *March 2001*

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*International Federation for Medical & Biological Engineering*

*Encouraging research and the application of knowledge,  
disseminating information, and promoting collaboration in the  
field of medical, clinical and biological engineering*

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## **President's Column**

### **A Leap Forward for Biomedical Engineering**

During the last days of the year 2000, the United States Congress passed legislation to create a new Institute for Biomedical Imaging and Bioengineering at the National Institutes of Health (NIH). NIH is the major federal government agency that funds biomedical research in the United States. President Clinton signed this legislation into law on December 29, thus directing NIH to establish the new institute with its own director, administrative structure, budget and grant-making authority.

This legislation is likely to have profound implications for the future of biomedical engineering in the United States. I am very pleased and thrilled by the passage of this legislation, having actively participated in a major effort over many years to convince Congress and the NIH of its importance. This legislation also has potential impact on our profession world-wide. As President of IFMBE I believe that the international biomedical engineering community outside the United States can achieve similar support in their own regions and countries and I urge all of us to learn from the US experience.

The new Institute was created with the recognition that engineering, and physical and computational sciences have become essential to progress in biomedical research. It was brought about with the realisation that biomedical engineering approaches and techniques and interdisciplinary efforts are needed for future research advances and for healthcare delivery in the 21st century. The new institute will facilitate basic bioengineering research, assist in establishing strong collaborations between engineers, biologists and medical researchers and accelerate the application of engineering techniques to health research, healthcare and to quality of life.

The new institute was not created overnight. It took many years of hard work and an ongoing dialogue with the NIH and with Congress. This took many forms: from

individual discussions with senators and members of the House of Representatives and funding agencies to group efforts by professional societies, working with the medical industry.

In 1994, as a result of pressure by the biomedical engineering community, Congress asked the NIH to conduct a study on the status of funding for research in biomedical engineering and to submit the result of the study to Congress. The NIH convened a group of consultants from the biomedical engineering community to perform the study.

The report contained the following five major recommendations:

- NIH should establish a central focus for basic bioengineering research. This central focus should be at the highest level and should include resources for the collaborative support of extramural research.
- The NIH should significantly expand representation of the medical and biological engineering community on advisory groups and in the peer review process.
- NIH should establish an intramural bioengineering research program. This program would focus on cutting-edge research of national significance that complements ongoing intramural and extramural programs.
- Communication and co-operation should be enhanced among governmental agencies with significant research activities in health-related bioengineering.
- The public sector should increase efforts to foster greater private sector participation in determining basic research needs and in facilitating technology transfer.

A year later, the NIH submitted its report to Congress. The NIH report incorporated some but not all of the recommendations of the external consultants. The most important part of the report included the following statement: that the "NIH should establish an



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Interagency Bioengineering Coordinating Committee.” Clearly, the agency was not in agreement with the recommendations of the external consultants report, insisting that biomedical engineering research is embedded in many of the projects that are already funded by the agency and that the profession is already receiving its fair share of funding. Most importantly, however, it was evident that, at that time, biomedical engineering was unlikely to achieve representation at the “highest level” of the agency.

Nevertheless, as a result of mounting pressure from Congress, the NIH Director established in 1997 an internal consortium – the Bioengineering Consortium (BECON) – to improve co-operation among the various NIH institutes and find ways to increase funding for biomedical engineering research. BECON was composed of one representative from each NIH institute. Its function was to make recommendations for a number of trans-NIH symposia and funding initiatives, and assist in establishing collaborations between the various NIH institutes and with other federal agencies in the area of biomedical engineering. BECON had, however, no budget or funding authority by itself.

The biomedical engineering community increased its lobbying efforts. At various times in the ensuing years, Congress attempted to pass different legislations to improve the standing of the field at the NIH. Those legislative attempts included a Center for Bioengineering at the National Heart, Lung and Blood Institute; an Office of Bioengineering and Bioimaging; and an Institute for Bioimaging. These initial attempts at legislative actions did not receive sufficient support in Congress.

Pressure intensified when the biomedical engineering community, represented by the American Institute for Medical and Biological Engineering, joined forces with the Academy of Radiology Research, and in 2000, both the Senate and the House of Representatives passed a bill to establish within NIH the Institute for Biomedical Imaging and Bioengineering. The reasons that Congress listed for establishing the new institute were based on eight major findings:

- Basic research in imaging, bioengineering, computer science, informatics, and related fields is critical to improving healthcare but is fundamentally different from the research in molecular biology on which the current national research institutes at the National Institutes of Health (NIH) are based. To ensure the development of new techniques and technologies for the 21st century, these disciplines therefore require an identity and research home at the NIH that is independent of the existing institute structure.
- Advances based on medical research promise new, more effective treatments for a wide variety of diseases, but the development of new, noninvasive imaging techniques for earlier detection and diagnosis of disease is essential to take full advantage of such new treatments and to promote the general improvement of healthcare.
- The development of advanced genetic and molecular imaging techniques is necessary to continue the current rapid pace of discovery in molecular biology.
- Advances in telemedicine, and teleradiology in particular, are increasingly important in the delivery of high quality, reliable medical care to rural citizens and other underserved populations. To fulfill the promise of telemedicine and related technologies fully, a structure is needed at the NIH to support basic research focused on the acquisition, transmission, processing, and optimal display of images.
- A number of federal departments and agencies support imaging and engineering research with potential medical applications, but a central co-ordinating body, preferably housed at the NIH, is needed to co-ordinate these disparate efforts and facilitate the transfer of technologies with medical applications.
- Several breakthrough imaging technologies, including magnetic resonance imaging and computed tomography, have been developed primarily abroad, in large part because of the absence of a home at the NIH for basic research in imaging and related fields. The establishment of a central focus for imaging and bioengineering research at the NIH would promote both scientific advance and US economic development.



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- At a time when a consensus exists to add significant resources to the NIH in coming years, it is appropriate to modernise the structure of the NIH to ensure that research dollars are expended more effectively and efficiently and that the fields of medical science that have contributed the most to the detection, diagnosis, and treatment of disease in recent years receive appropriate emphasis.

- The establishment of a National Institute of Biomedical Imaging and Bioengineering at the NIH would accelerate the development of new technologies with clinical and research applications, improve co-ordination and efficiency at the NIH and throughout the federal government, reduce duplication and waste, lay the foundation for a new medical information age, promote economic development, and provide a structure to train the young researchers who will make the path-breaking discoveries of the next century.

The legislation spells out the purpose of the new institute.

“The general purpose is the conduct and support of research, training, the dissemination of health information, and other programs with respect to biomedical imaging, biomedical engineering, and associated technologies and modalities with biomedical applications.”

The activities of the new institute are to include:

- research into the development of new techniques and devices;
- related research in physics, engineering, mathematics, computer science, and other disciplines;
- technology assessments and outcomes studies to evaluate the effectiveness of biologics, materials, processes, devices, procedures, and informatics;
- research in screening for diseases and disorders;
- the advancement of existing imaging and engineering modalities, including imaging, biomaterials, and informatics;

- the development of target-specific agents to enhance images and to identify and delineate disease;

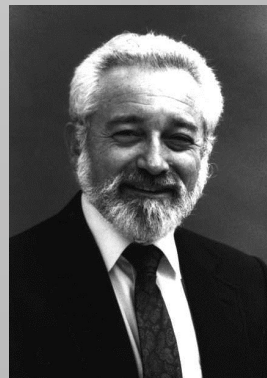
- the development of advanced engineering and imaging technologies and techniques for research from the molecular and genetic to the whole organ and body levels;

- the development of new techniques and devices for more effective interventional procedures (such as image-guided interventions).

To establish the new institute, Congress authorised NIH an amount equal to (plus inflation) the amount currently spent by NIH institutes for imaging and engineering programs. The NIH Director was authorised to transfer personnel, use appropriate facilities to house the new institute, and obtain administrative support from other agencies of NIH.

The biomedical engineering community is now looking forward to the implementation of this legislation. We hope and expect that it would improve collaboration and integration between engineers and biomedical scientists, increase funding for basic biomedical engineering research, open up new areas of cutting edge biomedical research, enhance existing areas, and accelerate the transfer of research results into the clinical setting. We also hope that it can be used as a model by other countries to work toward establishing mechanisms for enhanced visibility of the profession and for a greater role in biomedical research and healthcare.

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IFMBE President  
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### IFMBE Seeks Editor of IFMBE News

IFMBE is looking for an editor of its newsletter, IFMBE News. The newsletter is published bi-monthly. Starting from this year it appears only in electronic format both on the web (<http://ifmbe-news.iee.org>) and as a PDF file. The latter is distributed to the members of IFMBE affiliate societies by email through the secretariats of the respective member societies. Peter Peregrinus Ltd publishes the newsletter.

We hope to be able to fill this position starting from the beginning of 2002.

Applications and nominations for this position are invited. These should be sent together with a CV to the chairman of the Federation Journal Committee, Professor Bonfield.

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## IFMBE AC Members Presentation Part 4

I first introduced myself to the IFMBE community after being elected to the Administrative Council in 1994 and thereafter when I was elected Treasurer in 1997. So, for those of you who know me by now, this is your chance to go and do something else!



I was born in Johannesburg, South Africa to parents of Croatian extraction. The first four letters of my name (“mlad”) mean “young” and I try to live up to my name, at least in outlook if not in other respects! I was introduced to the field of biomedical engineering during a vacation job as a third-year electrical engineering student. My first task was to collect an intra-aortic balloon pump from a tertiary hospital for an emergency repair; notwithstanding the serious nature of my assignment – or perhaps because of it – it was “love at first sight”. After graduating I joined the medical equipment industry and thereafter worked in an academic

hospital setting, with a special interest in electrocardiology (incidentally, I remember first meeting Dov Jaron, current IFMBE President, after his talk on intra-aortic balloon pumping at the 1979 World Congress). Since 1987 I have been with the Department of Biomedical Engineering at the University of Cape Town, the only such department in Sub-Saharan Africa. I am currently director of UCT’s Healthcare Technology Management Programme (HTM) and head of its participating centre in the MRC/WHO Collaborating Centre for Essential Technologies in Health. My current research interests include:

- constraint-driven management of healthcare technology interventions;
- development of effective and sustainable HTM tools and appropriate HTM “best practice”;
- competency profiling in healthcare technology management;
- sustainability indicators for clinical engineering departments;
- essential health technology packages.

As HTM Programme Director I also wish to contribute to the building of HTM capacity and generation of new knowledge at the levels of both individuals and regional networks of HTM practitioners, focusing on the needs of the African Sub-Saharan region particularly but not exclusively, since countries in this region have much in common with other developing and emerging economies.



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As IFMBE Treasurer I have an onerous – and perhaps unenviable – responsibility. Nevertheless I feel greatly privileged to serve in this role and see myself as part of a much larger team, together steering the IFMBE away from rocky shores and keeping the good ship “full steam ahead” (please refer to my report elsewhere in this issue).

I am equally privileged to serve on the executives of the African Federation for Technology in Healthcare (AFTH) and the South African biomedical- and clinical-engineering societies (BESSA and SAACE). As IFMBE Regional Liaison for Africa/AFTH I wish to contribute to bridging the “professional divide”, in part by encouraging and assisting both societies and individuals in the African Region to see themselves as members of an international family, even though they may be poorly resourced and often feel isolated from peers elsewhere. I also strongly support the concept of regional alliances – such as the AFTH – able to focus on region-specific needs within a global environment, as well as close collaboration with organisations such as the World Health Organisation (WHO). Africa – and the Sub-Saharan Region in particular – faces tremendous healthcare challenges exacerbated by the HIV/AIDS pandemic. Biomedical and clinical engineering and HTM practitioners can make an important contribution to the cost-effectiveness and sustainability of healthcare technology interventions, as well as improved performance of healthcare delivery systems. I call on the IFMBE family to remember their colleagues in the African Region, even though they may not be formal members of that family.

As an “African” and as chair of the IFMBE Working Group for Developing Countries (WG/DC) I also see the tremendous opportunities offered by the internet to bridge distances and to create virtual communities of practitioners, as well as to share resources and provide essential support. With this in mind I invite all those interested to join us in the ICHTM (International Centre for Healthcare Technology Management) initiative. The vision is that of a truly collaborative and appropriate web-based resource centre and meeting place for HTM practitioners. This initiative was approved formally in Chicago at WC2000 and already

has a number of strategic partners. We hope to receive substantial funding and other support from outside IFMBE during 2001.

In closing may I add that during the last six years I have come to greatly admire the dedication and efforts of my IFMBE colleagues, all of whom do so voluntarily over-and-above their own demanding jobs. I have also had the opportunity to meet and get to know many of you and this has truly been a rewarding and enriching experience – I look forward to meeting so many more. On a personal note I mentioned in my 1997 introduction that I was enjoying the marvel of a true biomedical engineering creation, my little daughter Katherine (who was three months old when she attended the opening plenary at the Nice World Congress!). Sadly in 1999 she lost her radiant and beloved mother, Helga, whom some of you have met. Perhaps this is the downside to the “engineering of life”. Nevertheless I am grateful for the many happy moments that Helga shared with the many people she met via the IFMBE – those memories live on. C’est la vie!



*IFMBE Administrative Council members relaxing at the outdoor symphony concert in Evanston just before the Chicago 2000 World Conference. Persons around the table from left to right: Peter Heiman (only hands showing), Chairman of the Clinical Engineering Division, Alan Murray, Editor of MBEC, Marc Nyssen, AC Member, Mrs Hutten, Helmut Hutten, AC Member, and Mladen Poluta, IFMBE Treasurer (only face showing). Standing in the background Dov Jaron, IFMBE President.*



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## Progress Report of the Ad-Hoc Committee on Medical and Biological Engineering in Europe

Dear colleagues

As you may remember, a discussion forum took place in connection with the First EMBEC Conference in Vienna, November 1999, on whether we need a European medical and biological engineering organisation. The result was that IFMBE set up an ad-hoc committee to investigate the need of a new European organisation and to propose a solution if a need is identified.

The committee has now been active for little over a year. We met face-to-face in London in March 2000 and in Chicago in July 2000. In Chicago we also arranged a meeting with the European IFMBE affiliates to discuss our findings and to get feedback from you all. Progress reports have also been printed regularly in the IFMBE News. The London meeting produced the work plan of three main activities that we have since been following:

- creating a “one voice “ mechanism for medical and biological engineering in Europe;
- accreditation of MBE educational programs in Europe;
- increasing the membership of the committee in order to cover all European IFMBE affiliates and to bring in younger biomedical engineers.

Our latest meeting took place close to Schiphol airport in late January 2001 with an attendance of nearly 20 committee members. This meeting agreed unanimously that we should go ahead with a European organisation for MBE, which meets two conditions. First, that this new organisation will not be in competition with existing societies in Europe nor with IFMBE. Second, that the aims and functions of such a new organisation add value to what we are already doing in Europe. The intention is to engage the entire European medical and biological engineering community into this

venture. It is estimated that today this community comprises 20,000 experts working in academia, research, industry and supporting the use of health technology in healthcare. For comparison, it is estimated that the size of the community in USA is 30,000 experts.

There are two reasons why a unified medical and biological engineering community is needed. First there are the developments taking place in Europe as exemplified by the EU Framework Programmes in R&D, the European Research Area (ERA) and the Bologna declaration (and lately the European Education Area). All these demonstrate that in addition to the national decision making processes more and more decisions are taken at the European level. Second, affordable and high quality health and healthcare are high on the agenda of citizens and nations in Europe. Medical and biological engineering is one key area in satisfying those concerns. Divided we will not be successful in being heard and having some influence.

Based on these considerations, we formulated the aims and tasks of this new organisation tentatively as follows:

“To improve the health, wealth and well-being of the people of Europe through the coherent and timely application of medical and biological engineering knowledge and skills by

- serving, promoting and influencing science, engineering, and education (policies and programs) at European and national levels;
- establishing liaison with European governmental agencies and other European groups;
- promoting public awareness of medical and biological engineering;
- improving intersociety relations and co-operation in Europe within the field of medical and biological engineering;



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- proposing guidelines for education, training, and accreditation programmes and to contribute to the establishment of appropriate programmes in the field of medical and biological engineering;
- recognising individual and group achievements and contributions to the field of medical and biological engineering”.

Further we agreed that we must consult the European IFMBE affiliate member societies on this decision in order to hear your comments on this. We also agreed to arrange a workshop on this in connection with the next MEDICON conference in Pula, Croatia, 12-15 June 2001, to which you are all invited (see attached announcement). The reason for these two steps is that we must be certain to have the support of the European IFMBE affiliate societies before broadening this initiative to cover the entire European medical and biological engineering community. Similarly we must be assured that this initiative will also in the future have the support of IFMBE and is not seen as being in conflict with IFMBE's interests. To put it simply, we must make sure that our home base is fully aware of this initiative supporting and participating in it before really embarking on it.

Therefore this contact to seek your approval and comments to this initiative. There is of course a little more flesh to the skeleton framework outlined above. First, how will we organise this new organisation? The idea we are pursuing (but note that we have not decided on it) is the model that was set up in USA after lengthy and difficult discussions in the early 90s, the American Institute of Medical and Biological Engineering, AIMBE. If you are not familiar with AIMBE please look at its homepage at [www.aimbe.org](http://www.aimbe.org). As indicated this is the model. What we intend to do is to adapt that to European needs. At our Schiphol meeting we assigned a small task group to draft a set of by-laws for this new organisation and to present these for discussion at the Pula workshop.

Furthermore, if you and IFMBE agree that this is the right way to go then we all need to understand that it will take a few years before this European medical and biological engineering community is created. In addition to the time factor, this will require funds to hold meetings face-to-face and to conduct a dialogue

with all parties. Therefore we have acted in anticipation of a positive answer from you and IFMBE and have submitted a proposal to a European funding agency called COST (Co-Operation on Science and Technology), which covers all European countries, not only the EU members. It funds concertation of research, not direct research. For more information on COST have a look at their homepage at [www.netmaniacs.com/cost](http://www.netmaniacs.com/cost) or <http://www.cfm-resources.com/c/castle>). This proposal was submitted in order to arrange a series of workshops over a three-year period to discuss and prepare this proposal in detail. Attached for your information a copy of the draft proposal that we have submitted to COST. If it would be accepted the earliest start date is the beginning of 2002. This is the reason for our haste in this as the process of acceptance takes roughly a year.

To conclude, this is a very big step and to be successful needs the support of all IFMBE member societies in Europe (and the support of others as well). Therefore, we must first know whether the IFMBE members would support this action.

We would like to receive your comments to this initiative in writing if possible before the workshop in Pula in mid-June. Second, we hope that all European IFMBE affiliates will find this interesting and will designate and send their representatives to this workshop.

Finally, please direct your replies and questions to Professor Helmut Hutten, who has agreed to act as the focal point in this communication between the affiliate societies and the committee. His address is given below.

Niilo Saranummi  
Chairman of Ad-Hoc Committee on Medical and Biological Engineering in Europe

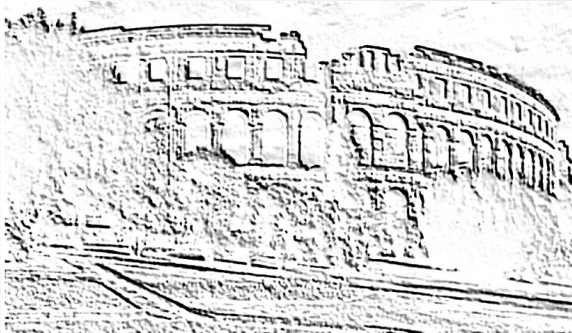
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## MEDICON 2001

Pula, Croatia, June 12-15, 2001

IX Mediterranean Conference on  
Medical and Biological Engineering and  
Computing

### MEDICON 2001

The forthcoming IX Mediterranean Conference is hosted by the Croatian Medical and Biological Engineering Society on behalf of IFMBE. The conference is to be held in Pula, Croatia, from 12-15 June 2001.

In addition to the regular sessions, five special sessions addressing present-day topics of special interest have been announced:

**SS1- HEALTH TELEMATICS AND  
TELEMEDICINE: TECHNOLOGY,  
METHODOLOGY AND  
MANAGEMENT ASPECTS**

**SS2- CLINICAL ENGINEERING  
TOWARD THE THIRD MILLENNIUM:  
WHAT IS CHALLENGING?**

Organised by AAIMB, Italian BME Society affiliated to IFMBE and both co-chaired by **Marcello Bracale** and **Paolo Inchingolo**

**SS3- RESEARCH, DEVELOPMENT  
AND COLLABORATION IN  
BIOMEDICAL ENGINEERING**

Organised by ÖGMBT, Austrian BME Society affiliated to IFMBE and co-chaired by **Hermann Gilly** and **Gerhard Windischbauer**

**SS4- POINT-OF-CARE MEDICAL  
DEVICE COMMUNICATION:  
INTERNATIONAL STANDARDS – THE  
THEORY AND PRACTICE**

Organised by AMS Consulting on behalf of CEN TC251/WGIV and co-chaired by **Melvin Reynolds** and **Michael Krämer**

**SS5- BIOMEDICAL ENGINEERING  
ON THE INTERNATIONAL SCENE**

Organised by IFMBE and chaired by **Jean-Pierre Morucci**

Two workshops on this actual subject will follow SS5:

**Accreditation of BME Programs in  
Europe**

Co-chaired by **Dov Jaron** and **Joachim Nagel**

And

**A New Organisation for Medical and  
Biological Engineering in Europe?**

Co-chaired by **Joe Barbenel**, **Helmut Hutten** and **Niilo Saranummi**

Up-to-date subjects will be elaborated and discussed by keynote lecturers:

- **ADVANCES IN BIOLOGICAL SIGNAL PROCESSING**
- **Metin Akay**, Trayer School of Engineering, Dartmouth College, USA
- **FES and Robot Assisted Standing Exercise**
- **Tadej Bajd**, Faculty of Electrical Engineering, University of Ljubljana, SLOVENIA
- **Safety of Medical Ultrasound**
- **Branko Breyer**, Faculty of Electrical Engineering and Computing, University of Zagreb, CROATIA
- **Cardiovascular variability signal processing: a challenge between noise and chaos**
- **Sergio Cerutti**, Department of Biomedical Engineering, Polytechnic University, Milano, ITALY



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- **MODELLING AND ANALYSIS OF HUMAN MOTION - An Uppsala Perspective**
  - Håkan Lanshammar, Department of Information Technology, Systems and Control, Uppsala University, SWEDEN
  - **HL7 and Its Application in HIS**
  - Joachim Dudeck, Chairman of HL7 Germany, Department of Medical Informatics, University of Giessen, GERMANY
  - **CROSSROADS OF GLOBAL TELE-ISSUES**
  - Swamy Laxminarayan, Editor-in-Chief, IEEE Transactions on Information Technology in Biomedicine, New Jersey Institute of Technology, Newark, USA
  - **Electrical engineering aspects of electroporation drug delivery**
  - Damijan Miklavcic, Laboratory of Biocybernetics, Faculty of Electrical Engineering, University of Ljubljana, Slovenia
  - **Internet and Medicine**
  - Marc Nyssen, Medische Informatica, Faculteit Geneeskunde en Farmacie Vrije, Universiteit Brussel, BELGIUM
  - **ICT FOR PERVASIVE AND PROACTIVE HEALTHCARE**
  - Niilo Saranummi, Mark van Gils, Ilkka Korhonen; VTT Information Technology, Human Interaction Technologies, Tampere, FINLAND
  - **The Treatment of Scientific Misconduct in the Biomedical Literature**
  - Mary D. Scheetz, Division of Education and Integrity, U.S. Office of Public Health and Science/Office of Research Integrity, Rockville, USA
  - **DYNAMIC IMAGING OF THE HUMAN BRAIN**
  - Selma Supek, Department of Physics, Faculty of Science, University of Zagreb, CROATIA
  - **Cardiovascular dynamics - Analysis and modelling of its oscillations and their synchronization**
  - Aneta Stefanovska, Maja Bracic-Lotric; Group of Nonlinear Dynamics and Synergetic, Faculty of Electrical Engineering, University of Ljubljana, SLOVENIA
  - **HOW DO NERVES REGENERATE IN ELECTRIC FIELDS?**
  - Martin Tomšič, Jozef Štefan Institute, Ljubljana, SLOVENIA
  - Fajko Bajrovic, Institute of Pathophysiology, Medical Faculty, University of Ljubljana, SLOVENIA
  - Aneta Stefanovska, Group of Nonlinear Dynamics and Synergetic, Faculty of Electrical Engineering, University of Ljubljana, SLOVENIA
  - **Reliability of skeletal muscle bioimpedance measurements**
  - Stanko Tonkovic, Faculty of Electrical Engineering and Computing, University of Zagreb, CROATIA
- The organisers have succeeded in organising seven pre-conference workshops to be held at the conference venue:
- **W1- Biomedical Signal Processing: Nonstationary and Nonlinear Analysis of Biomedical Signals**, Metin Akay, Trayer School of Engineering, Dartmouth College, USA
  - **W2- Electroporative Assisted Drug Delivery: Electrochemotherapy and Genetherapy**, Damijan Miklavcic, Faculty of Electrical Engineering, University of Ljubljana, Slovenia
  - **W3- Introduction to XML**, Joachim W. Dudeck, Institut for Medical Informatics, Giessen, Germany
  - **W4- Advances in Unbiased Stereological Methodes**, Lucie Kubinova, Institute of Physiology, Prague, Czech Republic
  - **W5- Quantitative Biomedical Image Analysis**, Sven Loncaric, Faculty of Electrical Engineering and Computing, Zagreb, Croatia



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- W6- Motion Analysis: Clinical Topics and New Application Fields, Enrico d'Amico, CEO BTS S.p.A, Milano, Italy
- W7- Advances in Health Informatics, Ron Summers, Loughborough University, United Kingdom

The organisers are looking forward to welcoming colleagues from all over the world at the conference. The webpages of the conference are updated regularly, so for additional information see <http://www.crombes.hr/MEDICON2001>.

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## Conference Announcement EMBEC '02

After the success of the First European Conference in 1999 our Austrian colleagues have decided to organise the Second EMBEC in 2002. A website is being set up for this at <http://www.embec.org>.

## ACEW Panama 2000 Advanced Clinical Engineering Workshop Panama 2000

The Twelfth Advanced Clinical Engineering Workshop (ACEW) was held in the tropical city of Panama, from 13-17 November 2000. The venue was the Continental Riande Hotel in the tourist and international banking district of Panama City. Mr Aldo Maatoo, Ms Mary Luz Santana and Dr Federico Hernández and his secretary Noraida Martinez co-ordinated the local arrangements and the logistics for the event. The staff of the Infrastructure Direction of the Ministry of Health was very active in providing administrative support. Ira Tackel coordinated the ACEW. Bob Morris, Tom Bauld, Kok-Swang Tan, Jonathan Gaev, Adriana Velásquez, Oscar Mislá and Antonio Hernández were the members of the faculty. The core of the activity was the standard five-day workshop program, oriented to build and



*Workshop leader Tackel records the moment*  
strengthen the clinical engineering and health care technology management capacity in the participants.



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Because of the excellence and high quality of the faculty, ACEWs are in high demand throughout the countries of the Pan-American Health Organization (PAHO). The Ministry of Health of Panama requested of the ACEW organisers presentations running in parallel to permit additional attendees. Parallel sessions each afternoon succeeded in enabling additional attendance and in allowing attendees to interact more effectively with the faculty. The parallel presentation topics were technology management, electromagnetic interference, clinical engineering certification, regulation of medical devices, and equipment accident investigations.

The hard work of the faculty, presenting parallel sessions, enabled more than 230 professionals to participate in the ACEW. Each of five parallel three-hour sessions was attended by 30 participants. The workshop included 50 students in addition to 30 observers in the afternoon session.

As is the case for every ACEW, participants hailed from other Latin American Countries. Brazil, Ecuador, Paraguay, Costa Rica and El Salvador were represented as well as Panama.

Bob Morris provided helpful advice to the Ministry of Health and its forensic investigation of an incident in the Santo Tomas Hospital in Panama. At the request of the Ministry of Health authorities, Bob and Ira presented a module on medical equipment accident investigation to the directors and administrators of the public and social security hospitals in Panama.

Faculty had ample opportunity for relaxing and enjoying the local hospitality. A wonderful visit to Old Panama on a beautifully exotic tropical night with a walk through the city's cobblestone streets and a fine meal of the local tasteful cuisine was just one of many highlights. An engineer's trip to Panama would not be complete without a visit to the Canal Zone. The faculty and students enjoyed this engineering diversion, which also gave them the opportunity to visit local handcraft and souvenir markets.



*ACEW delegates listen intently*

The participants evaluated the ACEW as excellent. There could be no doubt that the ACEW left a significant mark and will have a long-term impact on the clinical and hospital engineering programs in Panama.

Special mention is made of Dr José Terán of the Ministry of Health and Dr Lilian Reneau-Vernon, PAHO's Representative in Panama, who provided total support enabling the realisation of the ACEW.

The excellent reputation of the ACEW program has reached the ears of most of the health authorities of the Latin American and Caribbean countries. As a result, Peru, Paraguay, Brazil, Jamaica, and Costa Rica would all like a workshop in the near future.

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## **Bauld Reflects on Panama ACEW**

### **A first-time faculty member opens his diary to the reader**

The Pan-American Health Organization (PAHO), also known in Spanish as the *Organization Panamericana Salud (OPS)*, in conjunction with The World Health Organization sponsored the Advanced Clinical



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Engineering Workshop. They pay for the travel and lodging expenses of the faculty and the students.

Security was very tight as the *Combre Iperioamerica* was taking place the weekend following the conference. At the airport when I arrived on Monday, a day late, there were police and what seemed to be military patrolling with automatic weapons and dogs. The presidents from the Spanish-speaking Latin American countries and Spain had their Tenth Annual Meeting. President Fujimora from Chile did not attend. Fidel Castro, however, did attend and a group of Panamanians were arrested and charged with



*Tackel, Gaev, Tan and Morris (left to right) inspect the canal*

a plot to assassinate him. They were operating out of a hotel in downtown Panama City, not far from where we stayed.

My plane from LaGuardia, New York was late leaving because a few problems cropped up: the right engine needed a part, some cockpit gauges required service, exiting the gate was blocked by other aircraft, and we were thirtieth in line for takeoff. I was not surprised that I missed my connecting flight in Miami by two hours. I stayed over until Monday in the local Embassy Suites, which was very close and nice. Being close, I was able to go to the airport at 7:30 am to get on the standby list first. Then I returned to the hotel, got breakfast and did more work to

prepare for the workshop. Luckily, as I waited on standby, the airline offered a \$400 credit to folks who would take a later flight. Fortunately, although over 20 more people were booked than room allowed, I was the only standby to board. I had got the advice on how best to get on from the gate agents the night before. They had it perfect.

The PAHO-OPS staff was extremely helpful, friendly and competent. Many demands were made on them for last minute document production and large copying orders and they got it all accomplished in great spirits. We owe them a huge debt of gratitude.

Panama has two independence days, November 3 from Spain and November 28 from Columbia. Now they also have Canal Independence Day to celebrate. On the plane from Panama to Miami, I met a businessman who imports parts to Panama and who lived there 18 years. He said the business has declined since so many Americans left after the base closing.

There is a Smithsonian Aquarium and Research Laboratory near the Three Islands Causeway, a new cruise ship resort being built to accommodate the big ships and allow them a place to really stop instead of cruising right on through Panama.

A varied buffet lunch with a fine assortment of salads and cold foods as well as a line of hot items was served every day in the hotel dining room. Everyone had a meal ticket to turn in. Morning and afternoon coffee breaks included snacks.

Monday night, some of the faculty, Antonio, Bob, Ira, Tom, and Kok-Swang, ate at a very plain local restaurant, *Costa Azul*. It was simple and tasty and included a hair in one of the beer glasses. A TV interview was occurring outside on the patio as we ate.

On Tuesday night the faculty ate at the *Italiannis* restaurant based on Ira's enthusiastic and well-researched recommendation. He had run by it earlier in the day on his way to the waterfront fish market. It was very, very nice.

The bar at the hotel had an old Wurlitzer organ, but no one ever played it. The hotel had a casino off the main lobby. Lots of folks



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*Antonio Hernández and Tom Bauld (left to right)*

played at the 21 tables and the slots. Knowing my tendency to give money to the casino, I refrained.

Wednesday evening, the Organizing Committee took us to the old colonial part of Panama where the presidential residence and the National Theatre are located. It was a great treat. Our group of 15, in three cars, stopped first at the very old, circa 1615, Church of



*Church of San Jose*

San Jose. It featured a gorgeous, huge gold altar. Then we toured the old areas and saw the Lindblade house named for a very popular singer in Latin America who recently ran for president but lost badly. We couldn't get too close to the President's place because of all the security. As you drive in the area, you must keep your headlights off so as not to blind the police.

Thursday evening, a small group had a great meal at *Mi Ranchito*. Friday after lunch, we boarded a tourist bus for a special tour. Our guide was one of the Panamanian participants. We passed by the site of the invasion and the apprehension of Noriega. Some damage was still visible but not obvious.

We went to the *Mias Flores* Locks, but couldn't get close because Fidel Castro was there that day. Apparently, Fidel had been pushing for turnover of the Canal to Panama for a long time. This was his first visit to Panama since the transition. Close to the road a group of Cuban-Panamanians had set up a picnic and a welcoming celebration for Fidel. Where we did stop, we could see a good stretch of the canal with large freighters arriving regularly. We saw two arrive with the assistance of brand-new tugboats. We saw how the large boats were moved through the lock area with tugboats guiding them and 'donkey' engines pulling them through the lock.

As we toured the jungle portion of *Los Publitos*, a unique national park celebrating the three cultures that form Panama, a giant palm branch fell from a tree, narrowly missing some of our group by a few metres.

Friday night Norris, one of the delegates from Puerto Rico, became ill with asthma. She had run out of medication, so from the dinner at *Mi Publitos*, colleagues went to a drug store and were able to convince the pharmacist to provide a version of albuteral without a prescription. Unfortunately, it must not have been effective since as we returned around 1:30 from *La Marina*, Oscar was leaving in a cab taking Norris to a hospital. I called the next morning but got no response. We heard later that she recovered and returned home.

All in all, it was a fine experience and I am very grateful that I had the opportunity.



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# International Symposium on Telemedicine (Including Telecare, Telehealth, E-Health and Distance Learning)

Gothenburg, Sweden, 27 June – 1 July 2000

### Background

Telemedicine (including telecare, telehealth, e-health and distance learning), which has developed significantly during the 1990s, from routine projects to those run by enthusiasts, is set to change the nature of healthcare. For various reasons, there is a great deal of variation from country to country concerning the development and use of telemedicine.

To exploit the possibilities offered by telemedicine, a multidisciplinary approach is necessary, involving, for example, the medical, public health, economical, organisational, technological, and industrial fields. This is equally true if we are to increase the quality of healthcare in its broadest sense, i.e. improvement of health, cost efficiency, education and research.

### Aim of the symposium

The aim of the symposium was to focus on the development in the various fields of telemedicine, by bringing together a multidisciplinary team of international participants and a substantial number of invited speakers, to gain a deeper understanding of the needs and the factors determining the acceptance and diffusion of telemedicine.

An important part of the symposium involved targeting young researchers (up to the age of 35) from the European Union member states and associated countries. The symposium was supported by the European Union, under the Human Potential Programme, allowing travel and accommodation grants to be awarded to 21 young researchers. The aim was to enhance the skills of the young researchers in telemedicine, establish a basis for personal professional networking, and promote cross-border co-operation and research.

### Arrangements

The symposium was organised by Telia Research, the R&D Company of Telia, the national tele-operator in Sweden, and was supported by European Union, under the Human Potential Programme. The symposium was run in a summer-school atmosphere, and boarding-school accommodation was offered. The host institution, the Nordic School of Public Health, enjoying a riverside location by the harbour port of Gothenburg, offered excellent conditions for lectures, studies, work and relaxation.

The symposium was attended by about 125 participants from 30 countries. The 21 young researchers came from Austria, Bulgaria, the Czech Republic, Estonia, France, Hungary, Ireland, Latvia, Lithuania, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and the UK.

Contributions from 20 invited lecturers and discussion leaders from Belgium/EU, Estonia, Japan, Norway, South Africa, Sweden, Switzerland/ITU/WHO, UK and USA formed the basis of the scientific part of the symposium.

In addition to presentations from invited speakers and senior and young researchers, a scientific poster session was given including industrial information about products, services and systems. To stimulate as much interaction as possible between the lecturers and participants, not least for the benefit of the young researchers, "Meet-with-Professor" sessions were arranged in small groups that offered informality as well as personnel networking opportunities

So that the participants could also learn about applications and systems in practice, four study visits were arranged:

- Air and maritime rescue co-ordination centre, MRCC, Gothenburg.



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- Telemedicine at sea, “tele-ECG”, at Stena Germanica (a ferry cruising between Kiel, Germany, and Gothenburg, Sweden).
- Telemedicine experience in head and neck cancer by using video-conferences for distant multidisciplinary treatment sessions, Sahlgrenska University Hospital.
- Picture Archiving and Communication System, PACS, Sahlgrenska University Hospital.

### Lectures and poster sessions

The main conference themes, presentations and discussions are reported below:

The introductory part of the programme focused on global and national developments in telemedicine, including e-health, etc., covering industrial as well as developing countries. Presentations pointed clearly to an increased interest in telemedicine in industrialised countries, although a significant number of challenges remain before telemedicine can be implemented and used to its full potential. In developing countries, there is an urgent need to involve worldwide partners in public and private ventures to support the development of policies and render technical assistance. However, some developing countries have already launched national telemedicine programmes as well as application projects.

There is no doubt that telemedicine will reform healthcare organisation, structure and work processes. The aim is to realise higher quality, open up new diagnostic and treatment possibilities, contain costs, and meet patient requirements.

There is a growing and significant interest in telemedicine in the field of home care, care of the elderly, and the support of chronically ill persons. The need for support in these areas is backed up by statistics from many countries demonstrating that the age distribution will in future change from being a pyramid shape, to resembling a dome and finally a tower with even distribution between all ages. In some countries, 20% of the population is already above the age of 65. The increased need for care will be age related, with the prevalence of dementia, diabetes, hip fracture, stroke, cancer and heart failure likely to increase by 40-60% over the

next 30 years. However, the need for care is context dependent and sensitive to supplier-induced demand.

Distance learning, web-based or on-line sessions with different degrees of interactivity, is rapidly developing and a new pedagogic approach is emerging. However, much has to be done in pedagogic development and the amount of work needed to develop efficient distance-learning courses and programmes should not be underestimated. But the need is evident, at different levels: at medical student level, specialisation (resident level), sub-specialisation level and in continuing education. The possibility of accessing and sharing expert knowledge regardless of distance is of course very attractive.

The use of the Internet and “Doctor on the Net” was also a part of the programme. Two main types of user can be identified: (a) doctors and other professionals, who need to be kept updated in their field; and (b) patients (and relatives), who need to be kept more informed about their illness, which will influence the way patients relate to healthcare.

Internet and web interactivity is also being developed to support medical-decision-making processes (between professionals) and support chronically ill persons (e.g. diabetics). One example reported was developing work on a web-based service for the interpretation of myocardial perfusion images.

Internationally there has been a growing interest in health technology assessment in general. Telemedicine methods and applications should be assessed as well as other new medical methods and technologies. As demonstrated during the symposium, telemedicine often uses a multidisciplinary range of technologies and often several outcomes should be measured. Assessment is still a methodological challenge for telemedicine.

The legal and ethical aspects of telemedicine were discussed. There is an increasing international interest in this subject. It seems that the legal aspects of telemedicine practised within a country are often mainly covered by existing rules and laws (e.g. in Sweden). However, as soon as telemedicine is practised in a cross-country-border setting, many questions arise, such as licensure, authorisation,



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malpractice liability defence, insurance, and use of paper versus electronic media and signatures. At present there is no legal basis, professional support or real justification for the creation of a supranational medical authority that would set harmonised standards that facilitated cross-border telemedicine practice throughout Europe. However, voluntary schemes have been set up by professional associations in Europe. A need for a more global approach to this subject is evident.

In the scientific and industrial information session, about 25 posters showed progress and results in fields such as the need for and experience of telemedicine in specific countries, cross-border telemedicine projects, telemedicine applications for sportsmen, applications in immunopathology, applications for disabilities, technical standards, and broadband telecommunication applications. The industry showed telemedicine products and systems regarding e.g. home care, care of the elderly, pre-hospital care, mobile care, and in professional consultations.

The symposium concluded that telemedicine will significantly change and enhance the way healthcare is to be delivered. Many aspects and applications of telemedicine have to be further explored, developed and assessed. Cross-border co-operation and research should be encouraged to accelerate the creation of a systematic knowledge base covering the needs for telemedicine in different contexts, concepts, policies, technologies and the use of telemedicine to ultimately enhance the health of citizens and support patients and their relatives.

### Reference

Proceedings of the International Symposium on Telemedicine (Including Telecare, Telehealth, E-Health and Distance Learning)

Focusing on developments in health care and health.

27 June – 1 July 2000, Gothenburg, Sweden.

### For further information or to request copies of the symposium proceedings, please contact:

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Email: [silas.a.olsson@telia.se](mailto:silas.a.olsson@telia.se)  
Mobile/Cellular: +46-70-5675505



*Course participants*

## Health Informatics World Wide

The Department of Medical Informatics, University Hospital of Freiburg, Germany, maintains a regularly updated link list of the most relevant links to websites on Health Informatics ([http://www.imbi.uni-freiburg.de/medinf/mi\\_list.htm](http://www.imbi.uni-freiburg.de/medinf/mi_list.htm)).

Which raises the question

Do you know of a similar link site for biomedical engineering resources?



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### WEBSITES FOR BIOMEDICAL ENGINEERS WEBSITES PARA LOS BIOINGENIEROS 8 January 2001

*Below is a list of useful websites for biomedical engineers both in English and Spanish. The list has been collated by Jonathan Gaev. Please note that this work is not endorsed by ECRI. Jonathan did it as a colleague, including websites that other colleagues used in their work, without passing judgement. He checked that all links were working as of the week of 1 January 2001. Jonathan points out that the results may not reflect the universe of websites and asks those interested send him suggestions to improve the list at: Jonathan A. Gaev, M.S.E., Director, International Programs, ECRI, 5200 Butler Pike, Plymouth Meeting, PA 19462-1298, USA. Tel.: +1 610 825 6000 X5368; Fax: +1 610 834 1275; Email: [jgaev@ecri.org](mailto:jgaev@ecri.org).*

#### SAFETY AND RECALL INFORMATION INFORMACION RELACIONADA CON LA SEGURIDAD Y ALERTAS

Europe (English and French)	<a href="http://www.hosmat.fr/acceuil.htm">http://www.hosmat.fr/acceuil.htm</a>
FDA-MAUDE (USA)	<a href="http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/search.cfm">http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfMAUDE/search.cfm</a>
FDA-Safety Notices (USA)	<a href="http://www.fda.gov/cdrh/safety.html">http://www.fda.gov/cdrh/safety.html</a>
FDA-User Error (USA)	<a href="http://www.fda.gov/cdrh/useerror/Index.html">http://www.fda.gov/cdrh/useerror/Index.html</a>
FDA-Warning Letters (USA)	<a href="http://www.fda.gov/foi/warning.htm">http://www.fda.gov/foi/warning.htm</a>
Health Canada (English and French)	<a href="http://www.hc-sc.gc.ca/">http://www.hc-sc.gc.ca/</a>
Medical Device Agency (UK)	<a href="http://www.medical-devices.gov.uk/mdahome.htm">http://www.medical-devices.gov.uk/mdahome.htm</a>
Medical Sevice Safety Reports	<a href="http://www.mdsr.ecri.org">http://www.mdsr.ecri.org</a>
Therapeutic Goods Administration (Australia)	<a href="http://www.health.gov.au/tga/">http://www.health.gov.au/tga/</a>
Understanding Medical Device Errors	<a href="http://www.fda.gov/cdrh/useerror/UseErrorChecklist.pdf">http://www.fda.gov/cdrh/useerror/UseErrorChecklist.pdf</a>

#### MEDICAL INFORMATION-ENGLISH LANGUAGE Información de Medicina en Inglés

Definitions of Medical Terms	<a href="http://www.medterms.com">http://www.medterms.com</a>
Drugs	<a href="http://www.pdr.net/">http://www.pdr.net/</a> <a href="http://www.nursespdr.com">http://www.nursespdr.com</a> <a href="http://www.rxlist.com">http://www.rxlist.com</a>
El Medico-English	<a href="http://www.elmedico.net/english.html">http://www.elmedico.net/english.html</a>
The Free Medical Journals Site	<a href="http://www.freemedicaljournals.com/html/spec.htm">http://www.freemedicaljournals.com/html/spec.htm</a>
General Medical Information	<a href="http://cbshealthwatch.medscape.com/medscape/p/gcommunity/ghome.asp">http://cbshealthwatch.medscape.com/medscape/p/gcommunity/ghome.asp</a>
Grateful Med	<a href="http://igm.nlm.nih.gov/">http://igm.nlm.nih.gov/</a>
Information About Healthcare Professionals	<a href="http://www.ama-assn.org/iwcf/iwcfmgr206/aps?304227523">http://www.ama-assn.org/iwcf/iwcfmgr206/aps?304227523</a>
International Classification of Diseases Codes (ICD-9 CM)	<a href="http://www.cdc.gov/nchs/about/otheract/icd9/abtcd9.htm">http://www.cdc.gov/nchs/about/otheract/icd9/abtcd9.htm</a>
Links to Biomedical Information (Mel's Place)	<a href="http://www.invisionet.com">http://www.invisionet.com</a>
Mechanical Ventilation	<a href="http://www.ventworld.com">http://www.ventworld.com</a>



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Medical Articles (Medscape)	<a href="http://www.medscape.com/">http://www.medscape.com/</a>
Medline	<a href="http://medlineplus.adam.com/">http://medlineplus.adam.com/</a>
Merck Manual	<a href="http://www.merck.com/pubs/mmanual">http://www.merck.com/pubs/mmanual</a>
National Guidelines Clearinghouse	<a href="http://www.guideline.gov">http://www.guideline.gov</a>
Search Service-National Library of Medicine	<a href="http://www.ncbi.nlm.nih.gov/PubMed/">http://www.ncbi.nlm.nih.gov/PubMed/</a>

### **INFORMACION DE MEDICINA EN ESPAÑOL** **Medical information in Spanish**

Diario Medico (España)	<a href="http://www.diariomedico.com/">http://www.diariomedico.com/</a>
El Médico	<a href="http://www.elmedico.net/">http://www.elmedico.net/</a>
Health Technology Monitor en Español	<a href="http://www.paho.org">http://www.paho.org</a>
Menú de los Primeros Auxilios	<a href="http://www.ctv.es/USERS/sos/pauxmenu.htm">http://www.ctv.es/USERS/sos/pauxmenu.htm</a>
Planetamedico	<a href="http://www.planetamedico.com">http://www.planetamedico.com</a>
Revistas de Medicina Sin Costo	<a href="http://www.freemedicaljournals.com/htm/esp.htm">http://www.freemedicaljournals.com/htm/esp.htm</a>

### **TECHNICAL INFORMATION IN ENGLISH** **Información Técnica en Inglés**

Biomedical Page	<a href="http://hometown.aol.com/MKauff2556/index1.html">http://hometown.aol.com/MKauff2556/index1.html</a>
Biophotonics International	<a href="http://www.photonics.com">http://www.photonics.com</a>
Conversion Factors	<a href="http://www.megaconverter.com/mega2">http://www.megaconverter.com/mega2</a>
Educational Information and Resources for Electronics Engineers	<a href="http://www.techonline.com/">http://www.techonline.com/</a>
Electronic Design	<a href="http://www.elecdesign.com">http://www.elecdesign.com</a>
Engineering Information	<a href="http://www.efunda.com/home.cfm">http://www.efunda.com/home.cfm</a>
List of Biomedical Engineering Books (through 1995)	<a href="http://kermaosf.medphysics.wisc.edu/~cameron/Books_In_Print/Biomedical.html">http://kermaosf.medphysics.wisc.edu/~cameron/Books_In_Print/Biomedical.html</a>
Medical Design Online Newsletter	<a href="http://www.medicaldesignonline.com">http://www.medicaldesignonline.com</a>
Microsoft	<a href="http://www.microsoft.com/ms.htm">http://www.microsoft.com/ms.htm</a>
Microsoft Technical Support	<a href="http://search.support.microsoft.com/kb/c.asp?fr=0&amp;SD=GN&amp;LN=EN-US">http://search.support.microsoft.com/kb/c.asp?fr=0&amp;SD=GN&amp;LN=EN-US</a>

### **INFORMACION TECNICA EN ESPAÑOL** **Technical Information in Spanish**

Listado de los Fabricantes no Españoles List of Manufacturers outside of Spain	<a href="http://www.medical-devices-net.com/fabriext.htm">http://www.medical-devices-net.com/fabriext.htm</a>
McGraw Hill de España	<a href="http://www.mcgraw-hill.es">http://www.mcgraw-hill.es</a>
Revista de Aula Bioingeniería	<a href="http://www.es.datex-ohmeda.com/aula-bioingenieria/Numero1/Numero1-index.htm">http://www.es.datex-ohmeda.com/aula-bioingenieria/Numero1/Numero1-index.htm</a>
Arquitetura e Engenharia em Saúde (Português)	<a href="http://www.anvisa.gov.br/correlatos/serv/manuais/index.htm">http://www.anvisa.gov.br/correlatos/serv/manuais/index.htm</a>



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### PROFESSIONAL ASSOCIATIONS ORGANISMOS PROFESIONALES

Advanced Medical Technology Association (formerly HIMA)	<a href="http://www.himanet.com">http://www.himanet.com</a>
American College of Clinical Engineering (ACCE)	<a href="http://accenet.org">http://accenet.org</a>
American Hospital Association	<a href="http://www.aha.org">http://www.aha.org</a>
American Institute of Architects	<a href="http://www.e-architects.com">http://www.e-architects.com</a>
American Institute for Medical and Biomedical Engineering	<a href="http://www.aimbe.org/">http://www.aimbe.org/</a>
American Medical Association	<a href="http://www.ama-assn.org">http://www.ama-assn.org</a>
American Society for Healthcare Risk Management	<a href="http://www.ashrm.org/asp/home/home.asp">http://www.ashrm.org/asp/home/home.asp</a>
American Society for Testing and Materials	<a href="http://www.astm.org">http://www.astm.org</a>
Association for the Advancement of Medical Instrumentation	<a href="http://www.aami.org/">http://www.aami.org/</a>
Asociación Española para la Calidad (AEC)	<a href="http://www.aec.es/">http://www.aec.es/</a>
Asociación Española de Normalización y Certificación	<a href="http://www.aenor.es/">http://www.aenor.es/</a>
Association Française des Ingénieurs Biomédicaux/French Biomedical Engineering Association (English and French)	<a href="http://www.afib.asso.fr/">http://www.afib.asso.fr/</a>
Biomaterials Network	<a href="http://www.biomat.net/">http://www.biomat.net/</a>
Biomechanics World Wide	<a href="http://www.per.ualberta.ca/biomechanics">http://www.per.ualberta.ca/biomechanics</a>
The Biomedical Engineering Network	<a href="http://www.bmenet.org/BMEnet/">http://www.bmenet.org/BMEnet/</a>
Boletín Oficial del Estado	<a href="http://www.boe.es/">http://www.boe.es/</a>
Center for Disease Control	<a href="http://www.cdc.gov">http://www.cdc.gov</a>
Center for Devices and Radiological Health (FDA-USA)	<a href="http://www.fda.gov/cdrh/index.html">http://www.fda.gov/cdrh/index.html</a>
Center for Telemedicine Law (CTL)	<a href="http://wwwctl.org">http://wwwctl.org</a>
Centro de Comunicaciones CSIC-RedIRIS Interconnection of Computer Resources	<a href="http://www.rediris.es">http://www.rediris.es</a>
Spanish National Research Network (Spanish and English)	
The Danish Healthcare Network (English and Danish)	<a href="http://www.medcom.dk/english/index.htm">http://www.medcom.dk/english/index.htm</a>
ECRI (English/Español en febrero)	<a href="http://www.ecri.org">http://www.ecri.org</a>
Engineering in Medicine and Biology Society of the IEEE	<a href="http://www.ewh.ieee.org/soc/embs/">http://www.ewh.ieee.org/soc/embs/</a>
European Diagnostic Manufacturers	<a href="http://www.edma-ivd.be">http://www.edma-ivd.be</a>
IEEE Websites	<a href="http://www.ieee.org/web/search/">http://www.ieee.org/web/search/</a>
International Federation for Medical and Biological Engineering	<a href="http://www.ifmbe.org/">http://www.ifmbe.org/</a>
IFMBE News	<a href="http://ifmbe-news.iee.org">http://ifmbe-news.iee.org</a>
Instituto de la Ingeniería de España	<a href="http://www.iies.es/">http://www.iies.es/</a>
International Organization for Standardization	<a href="http://www.iso.ch">http://www.iso.ch</a>
International Society for Technology Assessment in Healthcare	<a href="http://www.istahc.org/">http://www.istahc.org/</a>



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Joint Commission on the Accreditation of  
Healthcare Organizations  
Librerías Españoles Accesibles a través de  
Internet

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

Medical Device Network en Español  
Miliarium Aureum, Ingeniería Civil y Medio  
Ambiente

<http://www.bne.es/esp/libes.htm>

<http://www.medical-devices-net.com/>  
<http://www.miliarium.com/>

Ministerio de Administraciones  
Públicas-España

<http://www.map.es>

National Fire Prevention Agency  
National Institute of Health

<http://www.nfpa.org>

Pan American Health Organization  
Organización Panamericana de Salud  
(English and Spanish)

<http://www.nih.gov>

<http://www.paho.org>

Sociedad Española de Informática de la Salud  
Sociedad Española de Ingeniería Biomédica  
(Spanish and English)

<http://www.seis.es/>

<http://seib.uv.es>

Sociedad Española de Medicina Familiar y  
Comunitaria

<http://www.semfyec.es/>

Sociedad Española de Patología Digestiva  
Sociedad Mexicana de Ingenieros Biomedicos  
Underwriters Laboratories

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

<http://www.somib.org.mx>

Veteran's Administration Virtual Learning  
Center

<http://www.ul.com/welcome.html>

<http://www.va.gov/med/osp/default.asp>

World Health Organization  
Links from Medical Devices Net  
(Títulos en Español)

<http://www.who.org>

[http://www.medical-devices-net.com/  
web.htm](http://www.medical-devices-net.com/web.htm)

### SEARCH ENGINES-ENGLISH

#### Buscadoras en Inglés

AltaVista

<http://www.altavista.com/>

Ask

<http://www.ask.com/>

Dogpile

<http://www.dogpile.com>

Excite

<http://www.excite.com>

FTP Search

<http://ftpsearch.lycos.com/?form=medium>

GOOGLE

<http://www.google.com>

Northernlight

<http://www.northernlight.com>

Searchengines

<http://www.searchenginewatch.com>

Yahoo!

[www.yahoo.com](http://www.yahoo.com)

### BUSCADORAS EN ESPAÑOL

#### Search engines in Spanish

Agencia Española del ISBN Títulos

<http://www.mcu.es/bases/spa/isbn/ISBN.html>

Buscador En Internet de Webs Españoles

<http://www.biwe.es/>

El Mundo Búsquedas en Salud

<http://www.el-mundo.es/salud/buscador>

Netscape

<http://home.es.netscape.com/es>

Portal de España

<http://www.terra.es/>

Yahoo! España

<http://es.yahoo.com/>



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### OTHER USEFUL WEBSITES OTROS WEBSITES DE INTERES

Code of Federal Regulations  
[index.html](http://www.access.gpo.gov/nara/cfr/index.html)

Currency Conversion  
Dictionary-English  
[www.dictionary.com/](http://www.dictionary.com/)

Technical and Medical Terms in 9 European Languages

Página de la Lengua Española Diccionarios  
Spanish language dictionaries,  
multilingual dictionaries and on-line  
translations (titles are mostly in Spanish)

Infotrieve

ISI Document Solution

TDI Library Services, Inc.

UnCover Company

European Newspapers

Flight Schedule Information

Free Fax and e-mail

Free 100 MB of Storage via Internet

Free e-mail

International Calling Codes

Job Search for Multilingual Speakers  
(English/Portuguese/Spanish)

Location of Videoconferencing Centers

Para enviar mensajes a celulares (España)

Reverse Phone Directory

Time Zones

Translation

Travel Warnings

<http://www.access.gpo.gov/nara/cfr/>

<http://www.xe.net/ucc/>  
<http://www.orchy.com/dictionary/> <http://>

[http://allserv.rug.ac.be/~rvdstich/eugloss/  
welcome.html](http://allserv.rug.ac.be/~rvdstich/eugloss/welcome.html)

[http://www.dat.etsit.upm.es/~mmonjas/  
dicc.html](http://www.dat.etsit.upm.es/~mmonjas/dicc.html)

<http://www.infotrieve.com>  
[www.isinet.com/prodserv/ids/idsfm.html](http://www.isinet.com/prodserv/ids/idsfm.html)

<http://www.tdico.com>

<http://uncweb.carl.org>

<http://ajr.newslink.org/nonuse.html>

<http://www.oag.com/>

<http://www.efax.com/>

[http://www.xdrive.com/index\\_express.html](http://www.xdrive.com/index_express.html)

<http://www.hotmail.com> <http://>

[www.yahoo.com](http://www.yahoo.com)

<http://www.the-acr.com/codes/cntrycd.htm>

<http://www.latpro.com>

<http://www.ftf-tokyo.com/index.html> <http://>

[www.kinkos.com/location/storelocator.jsp](http://www.kinkos.com/location/storelocator.jsp)

<http://www.mivnet.com/roomlocator.html>

<http://www.proximity.com/>

[publicroomlocation.htm](http://www.publicroomlocation.htm)

<http://www.navegalia.com/portal/ofweb/sms/>

[index.htm](http://www.index.htm) <http://www.terra.es/sms/>

<http://reversephonedirectory.com/>

<http://www.timezoneconverter.com/>

<http://babel.altavista.com/translate.dyn>

[http://travel.state.gov/travel\\_warnings.html](http://travel.state.gov/travel_warnings.html)



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## The Visible Human Project®



### Background

The Visible Human Project has its roots in a 1986 long-range planning effort of the National Library of Medicine (NLM). It foresaw a coming era where NLM's bibliographic and factual database services would be complemented by libraries of digital images, distributed over high speed computer networks and by high capacity physical media. Not surprisingly, it saw an increasing role for electronically represented images in clinical medicine and biomedical research. It encouraged the NLM to consider building and disseminating medical image libraries much the same way it acquires, indexes, and provides access to the biomedical literature. Early in 1989, under the direction of the Board of Regents, an ad-hoc planning panel was convened and made the following recommendation: "NLM should undertake a first project building a digital image library of volumetric data representing a complete, normal adult male and female. This Visible Human Project will include digitized photographic images for cryosectioning, digital images derived from computerized tomography and digital magnetic resonance images of cadavers."

### Initial aim

The initial aim of the Visible Human Project was to acquire transverse CT, MRI and cryosection images of a representative male and female cadaver at an average of one millimetre intervals. The corresponding transverse sections in each of the three modalities were to be

registered with one another. A contract for acquisition of these pixel-based data was awarded in August 1991 to the University of Colorado at Denver, with Victor M. Spitzer, PhD and David G. Whitlock, MD, PhD as the principal investigators.

The Visible Human Male data set consists of MRI, CT and anatomical images. Axial MRI images of the head and neck and longitudinal sections of the rest of the body were obtained at 4 mm intervals. The MRI images are 256 pixel by 256 pixel resolution. Each pixel has 12 bits of grey tone resolution. The CT data consists of axial CT scans of the entire body taken at 1 mm intervals at a resolution of 512 pixels by 512 pixels where each pixel is made up of 12 bits of gray tone. The axial anatomical images are 2048 pixels by 1216 pixels where each pixel is defined by 24 bits of color, about 7.5 megabytes. The anatomical cross-sections are at 1 mm intervals to coincide with the CT axial images. There are 1871 cross-sections for each mode, CT and anatomy. The complete male data set, 15 gigabytes in size, was made available in November 1994.

The Visible Human Female data set, released in November 1995, has the same characteristics as The Visible Human Male with one exception. The axial anatomical images were obtained at 0.33 mm intervals instead of 1.0 mm intervals. This resulted in 5,189 anatomical images, and a data set of about 40 gigabytes. Spacing in the "Z" direction was reduced to 0.33 mm in order to match the 0.33mm pixel spacing in the "XY" plane, thus enabling developers interested in three-dimensional reconstructions to work with cubic voxels.

In August 2000, higher resolution axial anatomical images from the male data set were made available. Seventy millimeter still pictures taken at the same time as the original digital pictures were digitised at a resolution of 4096 pixels by 2700 pixels. These images, in the range of 32 megabytes each, are available for all 1871 cross-sections.

### Internet access

Sample full scale images from the original male data set are available via NLM's FTP site: ([nlimpubs.nlm.nih.gov](http://nlimpubs.nlm.nih.gov)). Eleven full-color anatomical images and an explanatory



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“color24.txt” file can be found on the FTP site in (visible/bitmaps/color24) as (\*.raw). Please be careful as each of these images is over 7 megabytes in size. Ten CT scan images and an explanatory “ct.txt” file can be found in (visible/bitmaps/ct) as (\*.fre) (5 images captured while the cadaver was fresh) and (\*.fro) (5 images captured after the cadaver was frozen). Six MRI scan images and an explanatory “mri.txt” file can be found in (visible/bitmaps/mri) as (\*.t1). Scaled down versions of all of these image files can be found on NLM’s FTP site in (visible/gifs) as (\*.gif). On the World Wide Web, the sample images can be found by linking to “images and animations” under the topic “Further Information.” These images are in JPEG format (\*.jpg), thereby requiring a web browser enabled to read files of this format. A license agreement for use of the full Visible Human Project data set is required, and application forms can be retrieved from NLM’s website.

### Users’ conferences

In October 1996, the library sponsored its first Users’ Conference of the Visible Human Project. The conference brought together early adopters, potential users and developers, as well as interested parties from a wide range of disciplines to discuss and demonstrate results obtained and problems encountered using the Visible Human image data sets. Over 50 Visible Human Project licensees demonstrated products and discussed models and algorithms based on the data sets. A press briefing and demonstrations were held on the opening day of the conference. Press heard how physicians and scientists are using the Visible Human as a substitute for medical school cadavers, to train surgeons and to rehearse surgical procedures. Similar events, The Second and Third Visible Human Project Conferences, were held in October 1998 and October 2000 respectively.

### Phase II – From data to knowledge

The second phase of the project is well underway. Segmentation, classification and the building of a prototype database (AnatLine) of the thorax region of the Visible Male has been completed, with AnatLine currently in beta testing. A future web-based atlas of the head and

neck region is under development, the intent of which is to be a model for a new wave of educational applications. It is to consist of six functional anatomy teaching modules. The Visible Human Project Imaging Processing Tools, has as its goal to create a self-sustaining development effort to support image analysis research in segmentation, classification and deformable registration of medical images. And, use of the Next Generation Internet (NGI) is being investigated by employing the Visible Human’s large image data sets in real time 2D and 3D visualizations under haptic control.

### Long-term goal

The Visible Human Project data sets are designed to serve as a common reference point for the study of human anatomy, as a set of common public domain data for testing medical imaging algorithms, and as a test bed and model for the construction of image libraries that can be accessed through networks. The data sets are being applied to a wide range of educational, diagnostic, treatment planning, virtual reality, artistic, mathematical and industrial uses by over 1,400 licensees in 41 countries. But key issues remain in the development of methods to link such image data to text-based data. Standards do not currently exist for such linkages. Basic research is needed in the description and representation of image based structures, and to connect image-based structural-anatomical data to text-based functional-physiological data. This is the larger, long-term goal of the Visible Human Project: to transparently link the print library of functional-physiological knowledge with the image library of structural-anatomical knowledge into one unified resource of health information.

For additional information on the Visible Human Project contact:

Visible Human Project  
National Library of Medicine  
8600 Rockville Pike  
Bethesda, MD 20894  
Fax: (301) 402-4080  
Email: [vhp@nlm.nih.gov](mailto:vhp@nlm.nih.gov)  
Website: [www.nlm.nih.gov/research/visible/visible\\_human.html](http://www.nlm.nih.gov/research/visible/visible_human.html)



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### CLAWAR 2001

## Fourth International Conference on Climbing and Walking Robots

24-26 SEPTEMBER 2001

Karlsruhe, Germany

Organised by the EC BRITE-EURAM  
Thematic Network CLAWAR



After the very successful CLAWAR events, Brussels in '98, Portsmouth in '99 and Madrid in '00, we are now organising the next CLAWAR. It will be hosted by the Research Center for Information Technologies (FZI).

Delegates will have the opportunity to listen to world-renowned plenary speakers and high-level original contributions that will provide a full picture of the state of the art in climbing and walking robots. Applications, both industrial and those in new/emerging fields, will also be covered by the scope of the conference. All presentations will be included in the Proceedings Book. Special attention will be devoted to the exhibition, where most of us will be kindly surprised by attending live demonstrations of the most remarkable and advanced developments in this exciting field.

For further information about the conference and paper submission visit the CLAWAR 2001 webpage at <http://www.fzi.de/clawar2001/>.

Dr. Karsten Berns  
Chairman of the International Organising  
Committee  
Email: [berns@fzi.de](mailto:berns@fzi.de)



IOC OLYMPIC  
PRIZE  
ENDOWED BY  


## The IOC Olympic Prize

by Benno M. Nigg

Physical activity and exercise play a central role in maintaining a healthy lifestyle. Advances in movement-related science have demonstrated the numerous benefits that physical activity has on the human body.

The IOC Medical Commission has a number of programs that support the study of human movement, exercise and sport. Pfizer joined with the IOC Medical Commission to form the *Olympic Prize Partnership* in a global effort to spur significant scientific discoveries that benefit humankind. The joint projects in this partnership include the IOC Olympic Prize, the Olympic Academy of Science, the IOC World Congress and the research projects during the Olympic Games.

The *IOC Olympic Prize* endowed by Pfizer is awarded every two years (in conjunction with the Olympic Summer and Winter Games) to a scientist for contributions that advance the science of movement, exercise and sport and that make a great impact on society. Recipients of the IOC Olympic Prize receive

- an Olympic medal
- a diploma of excellence and
- a US\$ 500,000 cash award.

The next IOC Olympic Prize will be awarded during a special presentation ceremony at the Olympic Games in Salt Lake City, USA, in February 2002.

The first prize, the IOC Olympic Prize 1996, was awarded to Dr. Jeremy N. Morris and Dr. Ralph S. Paffenbarger, Jr. for their pioneering studies demonstrating how exercise reduces the risk of heart disease. The research findings of Drs. Morris and Paffenbarger changed the practice of medicine and inspired



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the fitness revolution. The ground-breaking work of these two leading epidemiologists has brought respect to research in the area of health and fitness and inspired additional studies that have contributed enormously to providing the relationship between physical activity and a reduction in the incidence of coronary heart disease.

The second prize, the IOC Olympic Prize 1998, was awarded to Savio L.-Y. Woo, Ph.D. for his pioneering contributions to the understanding of the properties of connective tissues, the effects of exercise on tissue properties and the possibilities for repair of injured tissues. His work had a significant effect on basic research in this area as well as on the medical treatment of ligament injuries, injuries that occur frequently in physical activities. A large number of individuals benefit directly from his research.

In recognition of his contributions to the science behind enhanced athletic performance and disease state management, John O. Holloszy, MD was selected as the recipient of the third prize, the IOC Olympic Prize 2000. Dr. Holloszy was selected for his leadership in uncovering the mystery behind the correlation between muscle adaptation during exercise and its effect on the overall health of the human body. His groundbreaking discoveries led to significant breakthroughs in preventative medicine as it relates to heart disease, diabetes, obesity and the elderly.

### Call for nominations for the IOC Olympic Prize 2002

Nominations for the IOC Olympic Prize 2002 should be submitted for specific findings resulting from outstanding basic and/or applied research *related to human movement, exercise and/or sport*. This research may be in the fields of medical, biological, physical, or psychological science, and must represent a significant innovation, contribute to the betterment of humankind and/or significantly impact science, health, and/or society.

### Required information for nominations:

1. Brief biographical sketch

2. Education and professional development of the nominee
3. Proposed citation for the award
4. List of awards and honours (maximum of 10)
5. Scientific achievement (2 page maximum, one major finding, document primacy)
6. Three most significant publications
7. Relevance of the described finding(s) for movement, exercise and/or sport
8. Three letters of endorsement
9. List of publications
10. Submit one original (single sided and unbound) plus 17 copies (double sided and bound)

### Deadline

Nominations for the 2002 IOC-Olympic Prize must be received no later than **1 April 2001** at the following address:

IOC Olympic Prize  
International Olympic Committee, Medical Commission,  
Château de Vidy, CH-1007 Lausanne, Switzerland  
Tel: 41-21-621-6517 Fax: 41-21-621-6357  
Email: [susan.greinig@olympic.org](mailto:susan.greinig@olympic.org)

### Information

The chair of the Selection Committee is available for answering questions regarding the IOC-Olympic Prize and for providing further details regarding the preparation of nomination packages, as follows:

B.M. Nigg, Dr.sc.nat., Professor  
Chair: Selection Committee IOC-Olympic Prize  
Human Performance Laboratory  
The University of Calgary  
Calgary, Alberta, Canada, T2N 1N4  
Tel: 403-220-3436 Fax: 403-284-3553  
Email: [nigg@ucalgary.ca](mailto:nigg@ucalgary.ca)



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### Research related to movement, exercise and sport

Benno M. Nigg

Chair, Selection Committee, IOC  
Olympic Prize

*Mobility is a precious gift of life.* The longer we can maintain our mobility, the greater our independence and the better our quality of life. It goes without saying, too, that the longer we can maintain our mobility, the less impact we will have on the health care system.

We are on the threshold of a new era in human mobility. Aided by growing public awareness and support of organizations and corporations, like the IOC and Pfizer, research scientists are making dramatic progress in increasing our knowledge and understanding of mobility.

This is certainly the case in the field of movement, exercise and sport. Questions dealing with movement, exercise and sport have increasingly been studied in the attempt to help humankind improve quality of life. Movement is a precious gift and everything that *improves mobility* has high value for each and every one of us. Thus, the study of factors relevant for movement and mobility is of utmost importance for the well-being of humankind.

Research studies addressing issues of movement and mobility include at least three major topics:

- basic questions of human and animal movement,
- prevention of deterioration of the ability to move, and

- rehabilitation of functions of the human body after injury.

These aspects of scientific research have grown dramatically in the last 50 years. Today, a large group of scientists with varied professional backgrounds from different faculties in many different countries are involved in attempting to answer such questions. Consequently, the understanding of the importance of exercise for the proper functioning of the human and animal body is growing rapidly.

The importance of the findings of such studies is illustrated by:

- changes in medical treatment and prevention of cardiac problems,
- new approaches in treatment and rehabilitation of joint and ligament injuries,
- increasing understanding of the functioning of muscles,
- attempts to counterbalance negative effects of sedentary life styles on obesity with exercise,
- use of appropriate nutrition for optimal body functioning and
- use of strength training in centers for seniors

These are just a few obvious applications. Each has substantial importance for the well being of individuals. Furthermore, the application of these findings has importance for the general health of entire nations and, consequently, an effect on the health care budgets of these countries. Just imagine the possible savings for health care if the patrons of seniors' homes can move using their own muscle strength. And imagine the effect this has on the life quality of each individual senior.

These are the considerations that generated the establishment of the IOC Olympic Prize by the IOC Medical Commission under the chair of Prince Alexandre de Merode and the sponsorship of Pfizer. The vision and leadership of these two groups resulted in a joint program between



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the IOC Medical Commission and Pfizer to support research and development related to movement, exercise and sport.

The goals of the program include improved quality of life for the general population. These studies often deal with questions that are relevant to our lives on a daily basis. Research on movement, exercise and sport will ultimately have wide-ranging effects: children, adults and seniors, rich and poor, women and men, persons with disabilities, and high performance athletes, in short, absolutely everybody will benefit.

The joint program of the IOC Medical Commission and Pfizer has four components dealing with movement, exercise and sport:

- IOC Olympic Prize,
- IOC World Congress,
- IOC Olympic Academy of Science,
- IOC Research Projects.

**Pfizer endows the IOC Olympic Prize, the centerpiece of this program. It is awarded in conjunction with the Olympic Summer and Winter Games every two years to a scientist for contributions that**

**advance the science related to movement, exercise and sport and that make a great impact on society. Recipients of the IOC Olympic Prize receive an Olympic medal, a diploma of excellence and an US\$ 500,000 cash award.** The next IOC Olympic Prize will be awarded during a special presentation ceremony at the Olympic Games in Salt Lake City in 2002.

The IOC Medical Commission and Pfizer expect that the joint program will have a positive effect internationally on the development of science related to movement, exercise and sport. With this type of incentive, both well established researchers and bright young researchers will be attracted to this field of study. It is clear that significant progress will be made in the next decades, much of it due, no doubt, to this partnership between Pfizer and the IOC Medical Commission.

For further information on the IOC Olympic Prize, please contact Dr Benno M. Nigg, Human Performance Laboratory, University of Calgary, Calgary, Alberta, Canada, Tel: 403-220-3436 or [nigg@ucalgary.ca](mailto:nigg@ucalgary.ca) or visit [http://www.parke-davis.com/ioc/ioc\\_prize\\_home.html](http://www.parke-davis.com/ioc/ioc_prize_home.html).



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