



IFMBE News

Number 49 July 2001



Number 49

July 2001

Contents	1
Report on the Activities of the International Academy for Medical and Biological Engineering at the Medicon 2001 Meeting in Pula, Croatia, June 2001	2
First announcement and call for papers: Fourth International Workshop on Biosignal Interpretation	3
News from the Life-Like Perception Systems Initiative	4
IFMBE Seeks Editor of IFMBE News	4
Announcement: Second Seminar on Appropriate Technology for Developing Countries	5
Conference Announcement: Biomedical Engineering Breaks Through!	6
A Model Program for Medical Devices: An International Guide	7
MBEC News	7
Book Review: Bioimpedance and Bioelectricity Basics	7
Conference Announcement: EMBEC '02	8
The IOC Olympic Program	9

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*



IFMBE News

Number 49 July 2001



Report on the Activities of the International Academy for Medical and Biological Engineering at the Medicon 2001 Meeting in Pula, Croatia, June 2001

The International Academy for Medical and Biological Engineering (IAMBE) was established with the induction of the initial group of founding fellow at the Nice World Congress in 1997. Over the past four years IAMBE has slowly been evolving as an organisation. At the Chicago World Conference in 2000 the Academy organised its first significant activity in the form of an international workshop on biomedical engineering education, which was a great success.

A new board was elected in Chicago:

Chair	P.Åke Öberg
Chair Elect	Günter Rau
Secretary	Niilo Saranummi
Members-at-Large	Fumihiko Kajiya
	Hiroshi Kanai
	Robert Nerem
	Max Valentinuzzi
	Peter Wells

A membership committee was elected and is chaired by Robert Nerem.

The year 2000-2001

The secretariat was moved to Tampere, Finland. A new bank account was set up in a Finnish bank. The Secretary also serves as the Treasurer of the Academy.

A newsletter (idea: Richard Cobbold) was sent out by e-mail and regular mail for the first time in January 2001. A second newsletter is planned for September – October 2001.

The newsletter was well received by the Fellows and many positive remarks were noticed.

The membership committee has been active during the year and new nominations for Fellows will be discussed in Pula. The membership goal is to recruit 4-5 new Fellows/year to reach 50+ by the Sydney meeting in 2003.

The treasurer has collected the membership dues. A discussion came up about the amount, especially as regards Retired Fellows and Fellows from developing countries. A discussion of the matter will take place in Pula.

Initial discussions have been started with a company, willing to donate a major grant, the dividend of which should be used as an annual prize for excellent young researcher/travelling grants for younger researchers. The tentative prize should bear the name of both the Academy and the donor company. Discussions with the tentative donor will continue in August.

A program in Sydney has been discussed briefly. A workshop in a “hot” topic is planned and so is a reception for young faculty with the aim to bring young faculty from all parts of the world together.

A web page in connection with the IFMBE one is also discussed. We are looking for a person willing to take on this task.

A short presentation of the Fellows will take place in IFMBE News. In a longer perspective a booklet on carriers in biomedical engineering will be produced by the Academy.

Linköping, 1 June 2001

P.Åke Öberg
Chair, IAMBE
Email: akeob@imt.liu.se



IFMBE News

Number 49 July 2001



FIRST ANNOUNCEMENT AND CALL FOR PAPERS

Fourth International Workshop on Biosignal Interpretation 24-26 June 2002 Villa Olmo, Como, Italy

The International Federation for Medical and Biological Engineering (IFMBE) and the International Medical Informatics Association (IMIA), in collaboration with the IEEE Engineering in Medicine and Biology Society (EMBS), the Japan Society of Medical Electronics and Biomedical Engineering (JSMEBE), the Associazione Elettrotecnica ed Elettronica Italiana (AEI), the Associazione Italiana di Ingegneria Medica e Biologica (AIIMB) and the Polytechnic University of Milan will organise the Fourth International Workshop on Biosignal Interpretation, which will be held in Villa Olmo, Como, Italy from 24-26 June 2002.

The aim of the workshop is to explore the new fields of biosignal interpretation, including model-based signal analysis, data interpretation and integration, medical-decision-making, and extending existing signal-processing methods and technologies to realise effective utilisation of biosignals in a practical environment and obtain a deeper understanding of biological functions of entire organisms and systems, down to cellular and gene scales. The Third International Workshop on Biosignal Interpretation, was held in Chicago, Illinois, USA in 1999.

Distinguished speakers will be invited to deliver lectures on important topics in the field. Original contributions pertinent with the scope of the workshop are welcome. Prospective authors are encouraged to provide original contributions in any of the following categories (but not limited to the following):

- Biosignal processing, pattern analysis and data fusion (linear and nonlinear, chaotic and fractal analysis techniques, time-frequency and time scale analysis, cluster analysis, genetic algorithms, data mining and prediction,

integration of signals and images, applications to ECG, heart rate variability, EEG, EMG signals analysis, evoked potentials, multimodality approach and other related topics).

- Mathematical modelling of experimental and clinical data (linear and nonlinear phenomena, neural modelling and neural dynamics, modelling and control of cardiovascular and pulmonary systems, modelling of brain functions, perception and learning or other related topics).
- On-line interactive signal acquisition and processing (on-line patient monitoring, intelligent monitoring, ambulatory systems and other related topics).
- On-line interactive signal acquisition and processing (on-line patient monitoring, intelligent monitoring, ambulatory systems and other related topics).
- Medical decision support methods (parameter estimation, decision making, rule based/expert systems, automatic diagnosis, data reasoning and other related topics).
- Medical informatics (biosignal interpretation in virtual reality applications, in telemedicine and internet-based solutions for transmission, exchange and analysis of biomedical data and other related topics).
- Cellular signal and genomics (analysis of DNA sequences, genetic and evolutionary computing, genetic data mining and other related topics).

All submitted papers will be reviewed on the basis of scientific quality, relevance, originality, medical and biological significance, and clarity. Accepted papers will appear in the conference proceedings. A group of selected contributions will be published as full papers in a Special Issue of *Methods of Information in Medicine*.

Deadlines

Paper submission (4 pp max): **15 Jan 2002**
Paper acceptance: **15 March 2002**
Return of revised papers: **15 April 2002**

Contact

Email: BSI2002@biomed.polimi.it
Website: <http://www.BSI2002.polimi.it>



IFMBE News

Number 49 July 2001



News from the EU Life-Like Perception Systems Initiative

Here is the latest news from the Life-Like Perception Systems (LPS) initiative, the objective of which is to promote research into integrated perception-response systems that take their inspiration from the solutions adopted by living systems. For full details on the initiative, see www.cordis.lu/ist/fetbi.htm.

Preproposal service – deadlines 6 July and 31 August (NEW!)

The pre-proposal service for the LPS initiative is open. The purpose of this service is provide additional guidance to potential proposers on the scope and eligibility of their project idea. The first deadline for pre-proposals is 6 July 2001 with replies provided by 20 July. We will also open an additional window for pre-proposal submission. The second pre-proposal deadline is 31 August with replies by 7 September. For more information, see <http://www.cordis.lu/ist/fetbi-pr.htm#preproposal>.

Deadline for proposals still 17 October 2001

The call for proposals for the ‘Life-Like Perception Systems’ initiative has been delayed until mid-July. In spite of the delay the deadline of the proposals will remain 17 October 2001.

Partner search

More than 40 researchers are looking for research partners through the LPS partners’ pages. Have a look at <http://www.cordis.lu/ist/fetbi-pp.htm>.

LPS Information Day held on 18 June 2001

The information day of the initiative was organised on 18 June 2001 in Brussels. There were 58 participants from 15 European countries and the USA. Most of the presentations and the list of participants are available at <http://www.cordis.lu/ist/fetbi-if.htm>.

Pekka Karp

Co-ordinator of the LPS initiative
Future and Emerging Technologies
European Commission DG INFSO

Tel: +32 2 296 02 88

Fax: +32 2 296 83 97

Email: pekka.karp@cec.eu.int

Website: www.cordis.lu/ist/fethome.htm

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.

Professor W. Bonfield
Dept of Materials Science and Metallurgy
University of Cambridge
Pembroke Street
Cambridge CB2 3QZ
UK

wb210@hermes.cam.ac.uk



IFMBE News

Number 49 July 2001



Announcement

Second Seminar on Appropriate Medical Technology for Developing Countries

Wednesday 6 February 2002

**The Institution of Electrical Engineers
Savoy Place, London WC2R 0BL, UK**

In developing countries, the provision of healthcare may face problems including a severe shortage of funding, expertise and infrastructure. Following the first successful IEE seminar on 15 February 2000, the IEE Healthcare Technologies Professional Network is organising a second seminar on 6 February 2002.

This seminar will attempt to identify the key needs and problems; identify current and future possible developments in appropriate medical devices, laboratory equipment and supporting systems; identify sources of funding and support; and provide opportunities for sharing experiences and networking.

Apart from papers on medical devices and laboratory equipment, papers will be welcome on all related issues such as procurement, installation, maintenance, equipment management systems, training, safety, equipment standardisation, essential equipment lists, donated equipment, waste disposal, etc.

Prospective authors interested in contributing to this seminar are invited to submit an abstract of 200-300 words describing the work (and including their postal address, telephone number, fax number and email address) by **Friday 5 October 2001**.

N.B.: The final version of accepted papers will be a maximum of four sides of A4 and will be required about one week before the seminar. The requirements will be confirmed to successful authors. There will be a **DIGEST** of the papers presented at the seminar.

There will be an **EXHIBITION** of appropriate medical technology products and services and related literature at the seminar.

Contact

Mr Len Cornish
GLOBAL HEALTHCARE PROJECTS
58 Oakfield
Goldsworth Park, Woking
Surrey GU21 3QS, UK
Tel/Fax: +44 (0)1483 480420
Email: len-cornish@the-owl.freemove.co.uk

IEE Launches Healthcare Technologies Professional Network

The IEE professional networks are people-to-people networks that allow engineers to interact with each other in their specialist field. The professional networks can be virtual and/or physical, which differentiates them from other online communities.

The Healthcare Technologies network, which was one of the first to be launched, promises to be a valuable resource for biomedical engineers. Details can be found by visiting http://pn.iee.org/preview/pn_healthtech/



IFMBE News

Number 49 July 2001



Conference Announcement
Biomedical Engineering
breaks through!
Days of Biophysics and
Biomedical Engineering
31 Oct – 2 Nov 2001
Biomedical Engineering
Education in Europe
31 Oct – 1 Nov 2001
In vivo Imaging
2 Nov 2001
Eindhoven University of
Technology
Eindhoven, The
Netherlands

On the occasion of the ninth luster of the Eindhoven University of Technology (TU/e) the Days of Biophysics and Biomedical Engineering will be held on October 31, and November 1-2, 2001. A one-and-a-half-day symposium will take place entitled Biomedical Engineering Education in Europe, followed by a one-day symposium devoted to in vivo imaging.

The symposium entitled Biomedical Engineering Education in Europe has been organised with a number of goals in mind:

- to create awareness of the importance of a good definition of the educational field of biomedical engineering and the abilities of a biomedical engineer. With the new Bachelor/Master programs in development, it is important to obtain an accreditation for biomedical engineering that guarantees good quality education, while preserving and stimulating diversity of programs.
- to discuss the importance of internationalisation of education. It should be possible to complete a Master [or part thereof] at another university to the one where the Bachelor degree was taken.

- to discuss various educational methods for biomedical engineering; to bring together books and other teaching materials. Internationalisation demands communication through the internet; to assess the importance of a co-operation in the development of [internet-based] learning materials.
- to provide the opportunity for directors of biomedical engineering programs [already existing or in development] to meet each other.
- to work towards the development of a european platform for (under) graduate curricula in biomedical engineering. It is important that biomedical engineering in Europe has one voice.

The Biomedical Engineering Educational Summit, organised by The Whitaker Foundation, which was held in Lansdowne, VA, USA, from 7-10 December 2000, inspired the program of the meeting. This meeting used the following Biomedical Engineering Curriculum Philosophy:

- A thorough understanding of the life sciences, with the life sciences as a critical component of the curriculum.
- Mastery of advanced engineering tools and approaches.
- Familiarity with the unique problems of making and interpreting quantitative measurements in living systems.
- The ability to use modelling techniques as a tool for integrating knowledge.
- The ability to formulate and solve problems with medical relevance, including the design of devices, systems, and processes to improve human health.

It should be recognised that different needs call for different methods.

Contact

Prof. Dr. Dick Slaaf

Email: DW.Slaaf@BF.UNIMAAS.NL

Website: www.bmt.tue.nl



IFMBE News

Number 49 July 2001



A Model Program for Medical Devices: An International Guide

PAHO in co-operation with US-FDA has published the document "A Model Program for Medical Devices: An International Guide". Copies have been sent to PAHO Country Offices for distribution. The document is also available from the PAHO website in PDF format at http://www.paho.org/English/HSP/HSE/medical_devices.pdf

The document provides information on the organisation of medical devices regulatory programs to assure the safety, efficacy, and quality of medical devices and to highlight aspects of the global harmonisation of regulatory requirements for medical devices. It is intended to provide basic tools for this task.

Contact

Eng. Antonio Hernandez
Regional Advisor
Health Services Engineering and Maintenance
PAHO/WHO
Email: lhernana@paho.org

MBEC News

The online version of *Medical & Biological Engineering & Computing*, the official journal of the International Federation for Medical & Biological Engineering, can be found by simply following the [Federation Journal](#) link from the IFMBE homepage, which can be found at www.ifmbe.org. In addition to a guide to authors, the site now features a browsable index of all papers published in *Medical & Biological Engineering & Computing* in 2000. Visit the site now to discover the range of papers published in the course of the last year as well as details of recently published papers. Details about how to submit and subscribe to the journal can be found on the back page of this issue.

Book Review Bioimpedance and Bioelectricity Basics by S. Grimnes and Ø.G. Martinsen, Academic Press 2000

After more than 20 years in this area of scientific endeavour, I have come to realise the need for a common ground in the field. Indeed, much of the required knowledge has been around for many years, but not as comprehensively and certainly not in one place. The seminal work by Höber, Cole, Debye, Fricke and Schwan has often been neglected in more recent publications, where authors have tried to invent the wheel again – often misusing fundamental laws and models due to a lack of understanding of the prerequisites and limitations in certain applications.

Excellent reviews have occasionally appeared in the literature, but these have not been easily accessible to new workers without a solid background in physics, engineering and mathematics. This textbook is a successful attempt to bridge the gap between the solid fundamental sciences and the applications in the biomedical field. I believe this missing link is the reason why, so far, relatively few applications have been established in the medical field. In my own experience, with a few exceptions, I have found that it takes years to overcome the linguistic barrier between end users – i.e. medical doctors, dentists, biologists – and the device and signal processing community. Sophisticated instrumentation, imaginary parts of complex numbers and modelling without simple one-to-one correspondence with anatomic structures or physiological and pathological entities tends to scare away end users. But once this communication barrier has been broken down, end users truly appreciate the relatively cheap, objective, fast, safe and mostly non-invasive way to obtain useful diagnostic information. No one would dispute the usefulness of e.g. ECG and pacemakers these days, and as I see



IFMBE News

Number 49 July 2001



it a number of diagnostic uses of bioimpedance will soon become just as accepted once we succeed in communicating the advantages and provide a reasonable degree of sensitivity and specificity to the end users in various fields. As Einstein said: "Everything should be made as simple as possible, but not simpler." This is what it takes!

Thus, this new textbook is intended to facilitate a highway route into the field of bioelectricity and in particular bioimpedance. The book starts with the fundamentals of dielectrics, electrolytics and electrochemistry, followed by a review of the human body from single cells through specific properties of various tissue types to the whole body from the electric perspective. Advantages and limitations of various electrode types and configurations, as well as basic instrumentation, is included. One chapter is devoted to a discussion of a number of classical lumped parameter models, and how they would appear in commonly used graphical representations. A number of more or less established applications are discussed in some detail, with ample references; the list of references comprises around 300 well-selected papers and books.

The book also provides a broad historical perspective by including a separate chapter on the history of bioimpedance and bioelectricity. Fundamentals of complex numbers and equivalent circuits are found in an appendix. The book is focused on applications of bioimpedance and bioelectricity, but at the same time gives a scientific base for any such attempt in this highly interdisciplinary field.

Is there anything missing? As the title of the book indicates, the scope is bioimpedance and bioelectricity BASICS, and from that perspective I would say nothing is really missing. Even advanced model signal processing methods such as wavelets and neural networks are mentioned in the book, but not advanced statistical methods such as PCA and PLS, but probably all of these are beyond the scope of a basic textbook in this field.

Is it correct? Yes, there are very few lapses and misprints, and the authors have taken a novel approach to correcting any such shortcomings by providing a dedicated website where corrections are continuously published as they are found and reported. The book should serve as a comprehensive course, as it is written in a tutorial style, although experienced researchers will also benefit from selected chapters because all the necessary aspects of this truly interdisciplinary field has been included.

Stig Ollmar
Associate Professor
Division of Medical Engineering
Karolinska Institutet
Sweden
Email: Stig.Ollmar@cob.ki.se

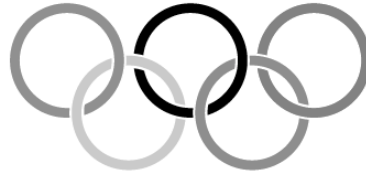
Conference Announcement EMBEK '02

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>.



IFMBE News

Number 49 July 2001



IOC OLYMPIC
PRIZE

ENDOWED BY



The IOC Olympic Program

by Benno M. Nigg

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

This article focuses on the World Congress.

Issues related to movement, exercise and sport are typically interdisciplinary in nature; a single-discipline approach is rarely productive. To come up with answers and to make progress, teams of experts from many different backgrounds must work together. Yet most scientific congresses related to movement, exercise and sport are discipline-oriented. The goal of the **IOC World Congress** (www.iocworldcongress.org) is to provide an interdisciplinary, topic-related forum for scientists from many fields to meet and to exchange ideas. The IOC World Congress unites scientists from the biological, physical, behavioral and medical disciplines for the purpose of sharing their knowledge with an international audience of physicians, therapists, scientists, and coaches. Past Congresses have proved to be valuable launching pads for advances in the science related to movement, exercise and sport.

As a rule, the IOC World Congress takes place in the host city for the Olympic Games a few months before the Games. The next one, the sixth since its initiation, will take place in Salt Lake City September 16-21, 2001. Its theme is **Science and Medicine of Human Movement**. The various sessions will deal with questions related to movement, exercise and sport, general physical activity, healthy lifestyles and the prevention, treatment, and rehabilitation of injuries. There will also be a special session (Wednesday) highlighting technology related to the study of movement, exercise and sport and the application of the internet in relation to these issues.

The Fifth IOC World Congress in Sydney in 1999 was very successful and attracted about 1200 participants. It is expected that the Sixth Congress in Salt Lake City will attract even more participants.

The Congress Program includes over 25 keynote and invited speakers. The keynote lectures of the IOC Congress include several highlights such as:

- Dr John O. Holloszy, University of Washington, St. Louis, USA

Recipient of 2000 IOC Olympic Prize:

Establishing the Relationship between Mitochondria, Exercise and Health.



IFMBE News

Number 49 July 2001



- Dr Jim Sallis, San Diego State University, San Diego, USA

Keynote for the Behavioral Section:

Motivating Youth to Exercise: A Public Health Perspective.

- Dr Ben Levine, Institute for Exercise and Env. Medicine, Dallas, USA and Dr Jim Stray-Gundersen, Norges Idrettschøleskole, Oslo, Norway

Keynote for the Biological Section:

Living High, Training Low: Development of the Paradigm.

- Dr Erich Müller, University of Salzburg, Austria

Keynote for the Physical Section:

Biomechanics and Training of Elite Skiers.

- Dr Andrew Pipe, University of Ottawa, Canada

Keynote for the Medical Section:

Responsible Medicine in Amateur Sports

- Dr Jos de Koning, University of Amsterdam, Netherlands

Keynote for the Technology Section:

Ideas to Practice Using New Technology and Science to Derive Practical Applications to Help Coaches/Athletes Improve Performance.

Further invited speakers and symposia organisers include:

Ackland, Tim, PhD, Australia; Baumann, Adrian, PhD, Australia; Burke, Louise, PhD, Australia; Carron, Albert, PhD, Canada; Foster, Carl, PhD, USA; Hahn, Allan, PhD, Australia; Hartfield, Brad, PhD, USA; Hay, James G. PhD, New Zealand; Heil, John, MD, USA; Johnson, Robert, J., MD, USA; Johnson, Steven C. PhD, USA; Kram, Roger, PhD, USA; McNitt-Gray, Jill, PhD, USA; Mester, Joachim, PhD, Germany; Mohr, Tom, PT, PhD, USA; Mutrie, Nanette, PhD, Scotland; Nigg, Claudio, PhD, USA; Paulos, Lonnie, MD, USA; Richardson, Bill, PhD, Canada; Rollins, Douglas E., MD, PhD, USA; Rosenberg, Thomas, MD, USA; Rundell, Ken, PhD, USA; Rusko, Heikki, PhD, Finland; Saltin, Bengt, PhD, Denmark; Steadmann, Richard, MD, USA; Stone, Mike, PhD, Scotland; Van den Bogert, Antonie, PhD, USA; Yeadon, Fred M.R. PhD, UK

Special Highlight of the Congress

The Opening Ceremony of the IOC World Congress has a very special highlight. The winner of the prestigious IOC Olympic Prize, valued at \$500,000 will be announced. The prize is awarded every two years to one or more scientists for specific findings resulting from outstanding basic and/or applied research in the fields of medical, biological, physical, or psychological science ***related to human movement, exercise and/or sport***. The Selection Committee for the IOC Olympic Prize will meet immediately before the Congress to determine the winner. This will be the fourth time the prize has been awarded.

Research Awards

Four research awards of \$US2500 will be given to the best conference papers in each of the four Sections of the Congress: behavioral, biological, medical, and physical.



IFMBE News

Number 49 July 2001



Closing Dinner Ceremony

The closing dinner for the IOC World Congress will be ice-side in the Utah Olympic Oval, site of the 2002 Games long track speed skating events. Musical entertainment and speed skating will make this a memorable event.

Olympic Venue Tour

Participants will tour some of the 2002 Games venues, including the Rice-Eccles Stadium, site of the opening and closing ceremonies, the Utah Olympic Park, site of the bobsleigh, luge, ski jumping and Nordic combined events and Park City (ski and snowboarding venues).

All lunches, the Olympic Venue Tour, the Opening Ceremony, and the closing ceremony are included in the registration fee making this event an excellent value.

For more information visit www.iocworldcongress.org; Telephone: (801) 212-3472; Fax: (801) 212-2440

The Sixth IOC World Congress is under the auspices of the IOC's Medical Commission and is endowed by Pfizer Inc. The Congress is endorsed by the American College of Sports Medicine (ACSM) and the Federation Internationale de Medicine du Sport (FIMS). The local organiser of the Congress is Todd Allinger, PhD.



IFMBE News

Number 49 July 2001



IFMBE News

IFMBE News is the newsletter of the International Federation for Medical & Biological Engineering. The newsletter can be accessed at <http://ifmbe-news.iee.org/> or by following the links from the IFMBE homepage at <http://www.ifmbe.org>

IFMBE News Editor: Niilo Saranummi, Health Care Technology, VTT Information Technology, Hermiankatu 12 B, PO Box 1206, FIN-33101, Finland. Tel.: +358 3 316 3300; mobile: +358 40 501 7300; fax: +358 317 4102; email: Niilo.Saranummi@vtt.fi

Publishing and Advertisement Office: Peter Peregrinus Ltd, Michael Faraday House, Six Hills Way, Stevenage, Herts., SG1 2AY, United Kingdom. Tel.: +44 1438 767266; fax: +44 1438 742849; email: mbec@iee.org.uk

IFMBE Administrative Council

IFMBE President: Prof. Dov Jaron, Calhoun Distinguished Professor of Engineering in Medicine, School of Biomedical Engineering, Science and Health Systems, Drexel University, 32nd and Chesnut Streets, Philadelphia, PA 19104, USA. Tel.: +1-215-895 2216; fax: +1-215-895 4983; email: dov.jaron@coe.drexel.edu

IFMBE Past-President: Prof. Jean Pierre Morucci, INSERM unit 455, Biomedical Technology Research and Industrial Transfer, Pavillon Riser, C. H. U Purpan, F-31059 Toulouse Cedex, France. Tel.: +33-5-61-77 95 17; fax: +33 5-61-49 95 24; email: morucci@cict.fr or Jean-Pierre.Morucci@purpan.inserm.fr

IFMBE Vice-President: Prof. Joachim Nagel, Institut für Biomedizinische Technik, Universität Stuttgart, Seidenstrasse 36, D-70174 Stuttgart, Germany. Tel.: +49-711 121 2370; fax: +49-711 121 2371; email: jn@bmt.uni-stuttgart.de

IFMBE Secretary-General: Dr Heikki Terio, Department of Biomedical Engineering, Huddinge University Hospital, SE-14186 Huddinge, Sweden. Tel.: +46 85 85 808 52; fax: +46 85 85 862 90; email: heikki.terio@mta.hs.sll.se

IFMBE Treasurer: Mr Mladen Poluta, University of Capetown, UCT Medical School, Dept of Biomedical Engineering, Observatory 7925, Cape Town, South Africa. Tel.: +27-21-406 6545; fax: +27-21-448 3291; email: poluta@anat.uct.ac.za

Medical & Biological Engineering & Computing

The official journal of IFMBE is the peer-reviewed *Medical & Biological Engineering & Computing*, published bimonthly by Peter Peregrinus Ltd. Full details, including guide to authors, list of subject-indexed papers and contents of recent issues, can be found on the world wide web by following the [Federation Journal](#) link from the IFMBE homepage.

Journal Subscription Office: *Medical & Biological Engineering & Computing*, Peter Peregrinus Ltd, PO Box 96, Stevenage, Herts. SG1 2SD, United Kingdom. Tel.: +44 1438 7673281; fax: +44 1438 742792; email: sales@iee.org.uk

MBEC Editor in Chief: Prof. Alan Murray, Regional Medical Physics Department, Freeman Hospital, Freeman Road, Newcastle upon Tyne, NE7 7DN, United Kingdom. Tel.: +44 191 223 1270; fax: +44 191 213 0290; email: mbec@nuth.northy.nhs.uk