



IFMBE News

Number 57 November 2002



Number 57

November 2002

Contents	1
From the Editor	2
Report from the International Council for Science (ICSU) General Assembly	3
UNESCO Announcement.....	5
Call for Nominations: Election of New IFMBE Officers and Administrative Council Members.....	6
1st European MBES Forum: Role of MBES in Europe.....	9
Biomedical Engineering Education Moving Towards European Harmonization: Initiatives and Experiences	11
IFMBE Proceedings Series	13
Book Agreement Signed Between IFMBE and IoPP	14
Finnish Society's First Medical Physics and Medical Engineering Day Best Students Awarded	16
WC2009	19
WC2003	20
6th International Conference on Cellular Engineering	21

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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IFMBE News

Number 57 November 2002



From the Editor

The latest issue of IFMBE News, published after the summer holidays in September, may have left the impression that there is not much happening in the IFMBE community. I am happy to inform you that this was a false alarm and that in fact a lot has been done this autumn. Furthermore, there are a lot of important events in the forthcoming months.

Let me first mention the General Assembly of the International Council of Science Union (ICSU) held in Rio de Janeiro, Brazil, 20-28th September, 2002. Our President, Prof. Dov Jaron was attending the meeting and representing IUPESM (and through the Union, the IFMBE, too). Following the discussions of the GA in Paris 2001, where Keith Boddy proposed **health and well being** to become an ICSU theme, Dov Jaron made a formal recommendation to the participants, to adopt this theme for an initiative in which all of the Bio-related Unions will collaborate. This suggestion was accepted with great enthusiasm. Read more on this subject in Dov's report in this issue.

The year 2003 is not only the year of the World Congress on Medical Physics and Biomedical Engineering, to be held in Sydney, Australia (www.wc2003.org) but the year of elections for new officers and Administrative Council members. Find more on open positions, nomination and the election procedure in this issue.

Two major IFMBE regional conferences will be held at the beginning of December this year: the **2nd European Medical and Biological Engineering Conference** in Vienna, and the International Congress on Biological and Medical Engineering incorporating **5th Asia-Pacific Conference on Medical and Biological Engineering** organised under the auspices of the Asia-Pacific Working Group of the IFMBE in Singapore. Do not forget to visit the www.embec.org and www.icbme.org for detailed information. In addition, the web site of the World Congress and the **6th International Conference on Cellular**

Engineering (an IFMBE co-sponsored conference to be held in Sydney as a WC satellite event) should be viewed in order to plan your trip to Australia in good time. www.celleng2003.org.au.

The EMBEC '02 in Vienna is of special importance for the European IFMBE affiliated societies. In the framework of the Conference, the **1st European MBES Forum "Role of MBES in Europe"** is organised with scope to discuss the role of MBES within the current European-wide initiatives such as the European Research Area and to present the results of the IFMBE Protem group that was assigned to build a European Alliance in Medical and Biological Engineering and Science, EAMBES.

The Special Session **Biomedical Engineering Education Moving Towards European Harmonization: Initiatives and Experiences** will present the challenges European BME Societies are facing due to the new developments in higher education and research.

The IFMBE makes systematic efforts to increase the visibility of Medical and Biological Engineering through its publications. The most important publication is the Federation's journal, **Medical and Biological Engineering and Computing**, whose impact factor has risen steadily over the last three years. I believe that most of you have taken the opportunity to access the Journal on-line during the free subscription period. If not, do so before the end of this year when this offer is due to close. If you found MBEC interesting, please do not forget to ask your library to subscribe to the journal.

IFMBE and IoPP have signed an agreement that establishes the **Series in Medical Physics and Biomedical Engineering** of IoPP as the **official IFMBE book series**. IoPP is inviting potential authors to send in proposals for possible books in this series.

The Proceedings of the **2nd European Medical and Biological Engineering Conference** in Vienna are the third volume in the IFMBE Proceedings Series, started in



IFMBE News

Number 57 November 2002



2001. The first volume was very well accepted by the bibliographic databases and most of the published papers are cited in INSPEC and in ISI Proceedings databases.

With each new issue of the News, we learn more about our young colleagues who received awards at various scientific events and on their research programs. In this issue, we introduce **Soile Nymark, Tommi Noponen** and **Marko Tirri**, the winners of the awards at the First Medical Physics and Medical Engineering Day organised by the Finnish BME Society and **Eduardo Ros Vidal**, one of the award winners at the Como Workshop on Biosignal Interpretation.

The Swedish BME Society has decided to hold the next Nordic Baltic BME Conference (2005) in Umea, a city approximately 600 km to the North of Stockholm. Many of us will have the opportunity to see the midnight sun again. Looking forward to it!

I have been following the number of 'hits' to the News in this year and am pleased to say that it is continuously increasing. I invite you to read the reports in this issue, explore the news from the world of BME science and to send your comments and contributions for the next issues of the news.

Ratko Magjarevic
ratko.magjarevic@fer.hr

The **EMBS History Booklet** entitled **"Charting the Milestones of Biomedical Engineering"** is now available. It is based on articles appearing in the May EMB Magazine. Printed as a special edition, "Charting the Milestones of Biomedical Engineering" is an ideal source of information for an introductory class in biomedical engineering, as an accompaniment to seminars or as a recruiting tool with High School students. The booklet is available for \$6.00 per single copy for orders fewer than 100, and \$220.00 for 100 booklet orders. Booklets can be ordered through the EMBS website at: <http://www.embs.org>

Report from the International Council for Science (ICSU) General Assembly



The ICSU General Assembly meeting and a number of other ICSU related meetings were held in Rio de Janeiro, Brazil from the 20th to the 28th of September. The related meetings included a forum on Science in Brazil and, for the first time in ICSU's history, separate business meetings of the ICSU Unions and of the ICSU National members. These meetings were held prior to the General Assembly itself. Dov Jaron represented IUPESM at the Assembly.

The ICSU Unions already held a separate meeting in Paris last year. At that time it was decided that the ICSU unions would meet prior to each General Assembly as well as midway between General Assemblies. These meetings provide an opportunity for detailed discussion of strategic issues and a forum to reach a consensus on major items that are included on the agenda.

The agenda for the General Assembly and all related documents can be found on the ICSU web site at www.icsu.org. The minutes of the Assembly will be posted by the end of October. What follows is a summary of the elections and the major issues that are most relevant to IUPESM and its member organizations.

Results of the elections

Officers

President Elect:

Dr. Goverdahn Mehta (India), Discipline:
Organic Chemistry

Vice President for Scientific Planning and Review:

David A.D. Parry (New Zealand), Discipline:
Biophysics

Vice President for External Relations:

Peter D. Tyson (South Africa), Discipline:
Climatology



IFMBE News

Number 57 November 2002



General Secretary:

Ana Maria Cetto (Mexico), Discipline: Physics and Quantum Mechanics

Treasurer:

Roger Elliott (U.K.), Discipline: Theoretical Physics

Representatives to the Executive Board

Representing National Academies

H. Chaimovich (Brazil)

M.L. Chanin (France)

Gudyanga (Zimbabwe)

Lapointe (Canada)

Representing Scientific Unions

G. Berlucchi, International Brain Research Organization (IBRO)

R. Brett, International Union for Geological Sciences (IUGS)

M. Denis, International Union for Psychological Sciences (IUPsyS)

B. Richter, International Union for Pure and Applied Physics (IUPAP)

Summary of major items

The Committee on Scientific Planning and Review proposed the dissolution of the Committee of Science and Technology in Developing Countries/International Biosciences Networks (COSTED/IBN) and instead, the establishment of regional ICSU offices in Africa, Asia, Arab regions, Latin America and the Caribbean. This should allow ICSU to interact more closely with the community in these areas and to be more effective than it has been previously. The proposal was approved by the General Assembly.

In response to a recommendation by the ICSU Assessment Report, a resolution to consider admitting ICSU Unions representing engineering, medical and agricultural sciences was presented. The General Assembly discussed this resolution and decided to return the resolution to the committee in order to make the wording consistent with the recommendations of the report. Final wording will be posted on the web with the minutes of the General Assembly.

A very controversial resolution on Traditional Knowledge was presented by the Resolution Committee to the General Assembly.

The resolution called on ICSU to undertake concrete initiatives in this area. This resolution elicited the most heated arguments of the session and was the only one that was forced to a secret ballot. The participants who objected to the wording of the resolution were concerned that the scientific community may mistakenly view activities in Traditional Knowledge as being equivalent to the endorsement by ICSU of pseudo-science. Dov Jaron presented a motion to revise the wording of the resolution. The proposed change would have prevented potential harm to ICSU that could result from misperception by the scientific community, the public and government legislators. The proposed motion to reword the resolution was defeated with a very narrow margin. While this was a secret ballot, it was apparent that most of the scientific unions voted to revise the resolution and that the representatives from the developing countries voted against the motion to revise. The initial resolution was then approved. The resolution will be posted on the ICSU web site together with the minutes of the General Assembly.

Last year, each Union received a \$5,000 grant to help support its activities in Capacity Building. IUPESM used these funds to publish a brochure whose purpose is to educate the public, government entities and legislators in the importance of medical physics and biomedical engineering in the delivery of health care and in improving quality of life. The Executive Committee of ICSU decided to terminate this program and use the funds to augment the general grant program.

Science for Health and Well Being

During the meeting of the Scientific Unions that was held in Paris last year, this topic was suggested by Keith Boddy (past president of IUPESM) as an important area for ICSU. During that meeting the Unions adopted this topic as one of three future strategic focus areas for ICSU. Nevertheless, the Executive Committee neglected the recommendation and did not include it in any of the reports or deliberations for the General Assembly in Rio. Dov Jaron brought the omission to the attention of the participants a number of times during the General Assembly's reports and discussions. In addition,



IFMBE News

Number 57 November 2002



this topic was raised during a meeting of the Bio-related Unions that was held on Friday, 27th of September. The purpose of this meeting was to facilitate interdisciplinary collaboration by forming effective partnerships between the Unions. At that meeting Dov Jaron made a formal recommendation to the participants to adopt this theme for an initiative in which all of the Bio-related Unions will collaborate. The suggestion was accepted with great enthusiasm. The Unions are planning to prepare a draft document with input from the various unions, followed by a meeting in Paris - probably during February of 2003 to discuss implementation of this initiative and to develop proposals for the ICSU grants deadline of March 1st, 2003. Dov Jaron discussed this item with Thomas Rosswall (Executive Director of ICSU) and Carthage Smith (Deputy Executive Director) who were both very supportive of the idea. IUPESM should play a leading role in this effort.

Dov Jaron met with Dr. Metha, President Elect of ICSU and discussed with him increased participation by the Indian community in the affairs of IUPESM, IOMP and IFMBE. India, for example, is not currently a member of IFMBE. Dr. Metha was very surprised and promised to act through the national Academy of India in order to have their community join IFMBE and play an increasing role in IUPESM.

An important contact was made with a representative of UNESCO who is interested in supporting activities of IUPESM in developing countries and possibly providing modest support to bring scientists from these countries to the 2003 World Congress. Dov Jaron will pursue this opportunity.

To conclude, IUPESM was very visible during the General Assembly and, if we maintain and strengthen our activity, we could have major influence on ICSU's actions in the future.



Respectfully submitted,
Dov Jaron
President, IFMBE

ANNOUNCEMENT

A position in UNESCO's Directorate for Basic Science and Engineering, Paris, France is available for a young scientist with a background in biomedical engineering. This position would enable the successful applicant to obtain experience in administrative and political areas and he/she would have a chance to enhance the importance of biomedical engineering within UNESCO and worldwide.

The application to UNESCO should be sent through appropriate national agencies.

For more information contact Dr. Maciej Nalecz, Jr. at

Mr Maciej NALE CZ

Secretary International Interim Council of
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Director

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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* from 2000 to 2002. 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.



IFMBE News

Number 57 November 2002



Call for Nominations: Election of New IFMBE Officers and Administrative Council Members

The next elections will take place in August 2003 in Sydney at the General Assembly of the World Congress. The terms of Officers and some Administrative Council members expire at that time (see below) and will have to be filled by new colleagues. We look forward to appropriate nominees to promote IFMBE activities worldwide.

Further information regarding nominations and elections is presented in this Call. For details please contact the office of the Secretary General, Dr Heikki Terio at heikki.terio@mta.hs.sll.se

Jean-Pierre Morucci
Chairman of the Nominating Committee
Past-President IFMBE
Vacancies for IFMBE Administrative Council posts are indicated as 'open'.

Position

Vice-President
Joachim Nagel
(President-Elect) Open

Treasurer
Mladen Poluta Open

Secretary-General
Heikki Terio Open

AC Members

Walter Chang	Open
Jos Spaan	Open
Janie Foue	Open
Joe Barbenel	Open
Antonio Infantosi	Continues
Didier Geiger	Continues
Marc Nyssen	Continues
Myoungho Lee	Continues

Procedure of the Elections

The Structure of the Federation

The direction of Federation business is the responsibility of the Administrative Council which comprises of eight elected members plus the president, vice-president, past president, treasurer and secretary-general.

Major decisions of the Administrative Council must be ratified by the General Assembly which is the ultimate authority of the IFMBE. The General Assembly comprises representatives of all affiliated organizations on a scale proportional to their respective enrollments.

The General Assembly

The control and direction of the policy and affairs of the Federation shall be vested in the General Assembly.

The General Assembly shall consist of the Delegates of the Member Organizations or their named alternates accredited as prescribed in the Bye-laws, together with the voting members of the Administrative Council and such Chairmen of committees as the Administrative Council shall decide. No individual member of the General Assembly shall have more than one vote. The function of the General Assembly shall be:

a) to establish the policy of the Federation,

b) to elect the officers of the Federation,

c) to elect members of the Administrative Council,

d) to receive, and to approve or reject, reports and recommendations of the Administrative Council,

e) to make recommendations to the Administrative Council as required,

f) to add or to amend the Constitution and Bye-laws as required, and

g) to initiate action to further the aims and objectives of the Federation as set out in Article 3 of this Constitution by means consistent with the Constitution and Bye-laws.



IFMBE News

Number 57 November 2002



A General Assembly shall be convened by the Administrative Council at such times and places as are prescribed in the Bye-laws. A meeting of the General Assembly will be convened by the Administrative Council on petition of at least twenty per cent of the Member organizations.

The business of the General Assembly may be carried out by mail as specified in the Bye-laws.

Nominating Committee

The Nominating Committee shall be responsible for preparing and presenting to the next Ordinary Session of the General Assembly a list of candidates eligible for election as Officers and Elected Members of the Administrative Council. Such a list shall be prepared at such times and in such a manner as prescribed in Bye-law 18:

Election of Officers and Members of the Administrative Council

The Vice-President shall be the President-Elect of the Federation.

a) The Vice-President, Secretary-General, Treasurer, and elected members of the Administrative Council shall be elected by the General Assembly from a list of nominated members of the Member Organizations put forward by the Nominating Committee of the General Assembly.

b) At least 120 days before each Ordinary General Assembly Session, the Secretary-General shall notify the secretary of each Member Organization of listed Delegates and shall request notification of any amendments. He shall also request from them the names of any of their individual members which they would wish to have considered for nomination for Office or Council membership.

c) The Secretary-General shall forward to the Chairman and each member of the Nominating Committee a list of the Delegates and of the suggested names.

d) In preparing a list of nominated candidates for presentation to the General Assembly, the Nominating Committee shall

first consider the list transmitted by the Secretary-General. It is then open to the Nominating Committee to add further names to the list from the individual membership of the Member Organizations if the Committee considers that it would be in the interest of the Federation to do so.

e) From that list the Nominating Committee shall prepare a final list of individuals for presentation to the General Assembly as nominated candidates. If it is feasible, this final list should provide, if possible, at least two candidates for election to each Office, together with at least two more nominations than the number of Council vacancies, and should have as wide a national representation as is consistent with the requirements of the positions. The consent of each candidate to be nominated shall be obtained in writing by the Chairman of the Nominating Committee before the list is presented to the General Assembly.

f) The final list shall be presented to the General Assembly at its Ordinary Session, and voting shall proceed in the following sequence: Vice-President, Secretary-General, Treasurer, and Council members. Unsuccessful candidates for the Offices of Vice-President, Secretary-General, and Treasurer, may if they so desire and are eligible, be added to the list of candidates for membership of the Council, but not for other Office. Voting shall be by a simple majority, any tied vote being determined on the vote of the presiding officer.

g) The voting for elected members of the Administrative Council shall be done simultaneously. Each member of the General Assembly may vote for the same number of candidates as the number of vacancies, normally four.

h) On occasion, due to a resignation, death or other circumstances, it may be necessary to hold an election between two sessions of the General Assembly. This shall be carried out by mail and the procedure shall be the same as for a normal election; however the timing of the stages of the nominating programme shall relate to the date on which it



IFMBE News

Number 57 November 2002



is proposed to send out the ballot papers and not to an Ordinary Session of the General Assembly.

i) To ensure continuity the Administrative Council may decide to hold the election for the post of Secretary-General or Treasurer of the Federation in advance of the next Ordinary Session of the General Assembly. An officer so elected will be known as the Secretary-General Elect or Treasurer Elect, and will not formally take the office until the next Ordinary Session; the term of office will therefore commence at that Session. The procedure of election shall be the same as for a normal election; the timing of the stages of the nominating programme shall relate to the dates on which it is proposed to send out the ballot papers and not to an Ordinary Session of the General Assembly.

Officers

The officers of the Federation shall be:

- a) the President,
- b) the Vice-President,
- c) the Secretary-General, and
- d) the Treasurer

Administrative Council

The affairs of the Federation shall be administered by an Administrative Council, whose voting members are:

- a) the officers,
- b) the immediate Past-President, and
- c) eight members, elected by the General Assembly from the membership of the Member Organizations.

The Editor, the Deputy Editor, and all Committee Chairmen may attend Administrative Council Meetings if they so wish.

The President and the Administrative Council may both invite individuals to attend meetings of the Administrative Council.

The Administrative Council shall have full power to act on behalf of the Federation and to take such action in all matters of

administration and policy, including conference policy, not expressly reserved by these Articles for the General Assembly, but in all its actions shall be responsible to the General Assembly.

A meeting of the Administrative Council shall be convened by the President or by a petition of at least thirty per cent of the voting members of the Administrative Council.

The business of the Administrative Council may be carried out by mail, as specified in the Bye-laws.

Term of Office of Officers and Members of the Administrative Council

a) Each elected officer of the Federation shall hold office from the end of the Ordinary Session of the General Assembly at which he was elected, or took up office, until his successor takes office.

b) An elected Council member shall hold office from the end of the Ordinary General Assembly which elected him until the end of the second succeeding Ordinary Session of the Ordinary General Assembly. Normally four members shall be elected at each session of the Ordinary General Assembly and no member may be re-elected as a Council member immediately upon the completion of his term.

c) The President and the Vice-President shall be eligible for election for a single term of office, after which one full term must elapse before they are again eligible for that office.

d) The Secretary-General, Treasurer, and Editor shall normally be eligible to hold office for two successive terms only but exceptionally may hold office for a maximum of three successive terms. After demitting office, one term must elapse before they are again eligible for the same office.

e) If no General Assembly has been held within a period of three and one half years, the President shall proceed with an election by mail if necessary, using the existing list of delegates and names, if any, and following the procedure in Bye-law 18(h).



IFMBE News

Number 57 November 2002



Secretary-General

The Secretary-General shall be the executive officer of the Federation. He or she shall be responsible for the general conduct of the affairs of the Federation, and the maintenance of liaison between Member Organizations at all times. The Secretary-General shall maintain the following books and registers, and shall make them available to the Council and the General Assembly as required.

- a) a minute book of the meetings of the General Assembly,
- b) a minute book of the meetings of the Administrative Council,
- c) a register of Member Organizations, including for each, the names and addresses of their current executive officers and Delegates to the General Assembly, and their current number of members,
- d) a register containing the current Constitution and Bye-laws of each Member Organization,
- e) a register of Observer Groups and the relevant officers,
- f) a register of Honourary Life Members with their current addresses,
- g) a register of the Chairmen and members of each Committee, Working Group, Division, and Board within the Federation,
- h) a register of past officers, with their current addresses if these can be ascertained.

Treasurer

The Treasurer shall be responsible to the Administrative Council for the financial management of the Federation. He or she shall maintain the monies of the Federation in such bank accounts and other deposits as shall be directed by the Administrative Council, shall be responsible for the collection of dues and other monies as directed in the Constitution and Bye-laws, and shall maintain such books and accounts as the Council shall require. The working currency of the Federation shall be decided by the Administrative Council on the recommendation of the Treasurer. The Auditors of the accounts shall be appointed by the Administrative Council.



**1st European MBES
Forum
Role of MBES in Europe
5 December 2002
In conjunction with the
2nd EMBEC, Vienna, Austria**
www.embec.org

Forum background & objectives

Prof. Niilo Saranummi is currently chairing a working group that the European biomedical engineering societies (30+) have assigned to build a European Alliance in Medical and Biological Engineering and Science, EAMBES. A web site for it was launched in the early summer (www.eambes.org). The main objective of the group in creating this new alliance, is to bring the community (societies, industry and academic programs) together as a united single entity, capable of representing the biomedical engineering interests towards the EU Parliament and Commission e.g. in the process leading to the definition of the 7th FP. For the 6th we were too late and our interests are now



IFMBE News

Number 57 November 2002



“all over” the 6th FP. The group received a small project grant from the Commission to do a survey of biomedical engineering related resources in Europe. That project starts in November. Our definition of “Medical and Biological Engineering and Science” is the widest possible.

In the 2nd European Medical and Biological Engineering Conference, Vienna, December 4-8, 2002 (www.embec.org) we will organise the 1st European Medical and Biological Engineering and Science Forum. This takes place on Thursday, December 5th, 2002. The objective of the forum is to present and discuss the current European wide initiatives, namely the creation of the European Research Area, the 6th Framework Program and its new instruments, especially Networks of Excellence, and the creation of the European Higher Education Area in relation to the field represented by EAMBES.

Niilo Saranummi

1st European MBES Forum **Role of MBES in Europe** **Draft Program**

Thursday, 5 December 2002
10.30 – 17.30
Room K

MBES and the European Research Area and the European Higher Education Area

Chairmen: Professors Joe Barbenel, Strathclyde University, UK and Christian Roux, École Nationale Supérieure des Télécommunications de Bretagne, France

10.30 Welcome & Opening statements by chairmen

10.40 Implementation of the European Research Area
Professor Jane Grimson, Trinity College, Ireland

11.00 Implementation of the European Research Area through the instruments of the 6th Framework Program
Mr. Octavi Quintana-Trias, European Commission

11.20 Implementation of the European Research Area through the COST

instruments

Professor Mihail Pascu, COST (to be confirmed)

11.40 Implementation of the European Higher Education Area
Prof. Joachim Nagel, University of Stuttgart, Germany

12.00 Lunch break

Industry – Academia collaboration in MBES *Chairmen: Professors Marcello Bracale, University of Naples, Italy and Ratko Magjarevic, University of Zagreb, Croatia*

13.30 Futures EU25+
Ms. Paola Dipietrogiacomo, JRC / IPTS, Sevilla, Spain

13.55 National MBES related funding and focus activities
Prof. Jean-Louis Coatrieux, University of Rennes, France

14.15 Healthcare technology – Industry viewpoint
Mr. Hannu Ahjopalo, Instrumentarium

14.40 ERCIM model as a model for collaboration
Prof. Stelios Orphanoudakis, FORTH Institute of Computer Science, Greece

15.00 Coffee break

European research networks in MBES *Chairmen: Professors Jos van der Sloten, Katholieke Universiteit Leuven, Belgium and Jan Wojcicki, Institute of Biocybernetics and Biomedical Engineering, Poland*

15.30 Biomechanics
Professor Marco Viceconti, Italy

15.45 Tissue engineering
Professor Alicia el Haj, Keele University, UK

16.00 eHeart
Professor Isabelle Magnin, France

16.15 Biosignal interpretation and modelling
Professor Pablo Laguna, Spain

Progress report on the creation of the European Alliance on Medical and Biological Engineering and Sciences

16.30 EAMBES
Niilo Saranummi

17.30 Close



IFMBE News

Number 57 November 2002



Biomedical Engineering Education Moving Towards European Harmonization: Initiatives and Experiences Special Session EMBEC'02

The continuing, dynamic development of Medical and Biological Engineering and Sciences (MBES), the consequential fast expansion of educational programs, and the political changes in Europe which emphasize mobility and employability in a European Higher Education Area, demand that the professional societies in the field of MBES face the challenges to actively participate in shaping the future of this highly successful discipline by leading and guiding the further development of higher MBES education.

Achieving unimpeded employability in the European labour market, mobility in the European higher education area, compatibility and comparability of educational degrees within a common but flexible qualifications

network, quality assurance and competitiveness in Europe and in the world, require the professional societies in Europe to develop strategies, criteria and recommendations for the realization of the European Higher Education Area with regard to MBES. Agreements must be reached concerning harmonized outcome-based accreditation of educational programs throughout Europe, training, continuing education, certification of individuals, and the arising questions about a regulation of the MBES professions.

Importance and spectrum of Biomedical Engineering keep growing, as do the educational programs. This situation forces us to think about issues such as; who will be the guardians and pacesetters of medical and biological engineering education? How do we secure the necessary influence of the professional societies on education, and the standing of the BME professions? Which countries and schools are our role models while moving towards the European Higher Education Area?

Today, more than 150 universities, colleges of applied science, polytechnic schools and academies in Europe offer educational programs in MBES at all academic levels, but with very little international coordination of contents and required outcome qualifications. In order to maintain and further the high quality of European MBES education, the ProTem Group of EAMBES, formerly the IFMBE AdHoc Group for European Activities, is currently charting all MBES educational programs throughout Europe, and preparing recommendations for competitive MBES education and harmonized accreditation of the multitude of diverse programs for the benefit of the MBES professions and thus for society.

The initiative proved to be an overwhelming success. 27 European BME societies have so far contributed articles for the White Book, describing the status of biomedical engineering and the societies in general, as well as BME education and accreditation of BME programs in their countries. While editing these contributions,



IFMBE News

Number 57 November 2002



it became apparent that special efforts are already being made with regard to the foundation or change of educational programs and their accreditation following the requirements of the Bologna Declaration. When we started to organize a special session on accreditation and education for EMBEC'02, we decided to concentrate on these concrete initiatives and experiences rather than asking the individual authors of the White Book to present their contributions which would have resulted in a two-day marathon.

The titles of the presentations reflect these special efforts, experiences and difficulties in the respective countries as far as they are representative for the European situation and offer important information for other countries, and were chosen just for that reason. What we are especially interested in is the experience that was made taking the different steps, the problems that occurred, the successes that were made and any advice that could be given to the countries that are just starting or will soon start the process. Are there special experiences related to the specific circumstances in, or special situations of a country, e.g. strong financial problems, like Romania, establishment of BME only 10 years ago and already trying to make the changes required by the Bologna Declaration like, Estonia, a small labor market in a small country like Croatia, educational systems and structures that have grown over the centuries, like in Italy, Germany, Austria and Spain? Are there, on the other hand, any experiences or problems that can occur independently of special situations in any country and can they be avoided?

The session is planned to start with a short outline of the contents of the White Book on Accreditation of Biomedical Engineering Programs in Europe, followed by presentations that should focus on the special problems and experiences concerning harmonization of biomedical engineering education in Europe.

Joachim Nagel

Special Session at EMBEC'02

Friday, December 06, 2002

15:00 – 18:30

Biomedical Engineering Education Moving towards European Harmonization: Initiatives and Experiences

Organizer:

Prof. Dr. Joachim Nagel
Institute of Biomedical Engineering
University of Stuttgart
Germany

Part 1

Chairmen: Professors Joachim Nagel, University of Stuttgart, Germany and Johannes J. Struijk, Aalborg University, Denmark

15:00 Biomedical Engineering Education and Accreditation in Europe – the White Book, Professor Joe Barbenel, University of Strathclyde, Glasgow, UK

15:15 The Challenge of Establishing New Programs in Medical Informatics and Engineering in Face of the Bologna Declaration, Professor Bernhard Tilg, University for Health Informatics and Technology, Innsbruck, Austria

15:30 Implementing the 2nd Level Degree and ECTS Systems in Italian Biomedical Engineering Education – Status and Experience, Professor Marcello Bracale, University of Naples, Italy

15:45 Biomedical Engineering Education at Master and Postgraduate Level in Belgium, Professor Jos Vander Sloten, Katholieke Universiteit Leuven, Belgium

16:00 Education in Health Science and Technology in Yugoslavia: A New Project Based Approach, Professor Dejan Popovic, University of Belgrade, Yugoslavia

16:15 The New Degree in Spain: Biomedical Engineering, Professor Enrique Gomez, Universidad Politecnica de Madrid, Spain



IFMBE News

Number 57 November 2002



Part 2

Chairmen: Professors Dick Slaaf, Eindhoven University of Technology, The Netherlands and Enrique Gomez, Universidad Politecnica de Madrid, Spain

17:00 A New Structure of Biomedical Engineering Postgraduate Programs, Professor Ratko Magjarevic, University of Zagreb, Croatia

17:15 Preparations for the Application of the Bologna Declaration Requirements in Estonia, Professor Kalju Meigas, Tallinn Technical University, Estonia

17:30 Meeting a Growing Demand for Biomedical Engineers Under Difficult Conditions: Initiatives in Romania, Professor Radu Ciupa, Technical University of Cluj-Napoca, Romania

17:45 Experiences with the IFMBE Criteria for Accreditation of BME Programs in Europe, Professor Hermann Gilly, University of Vienna, Austria

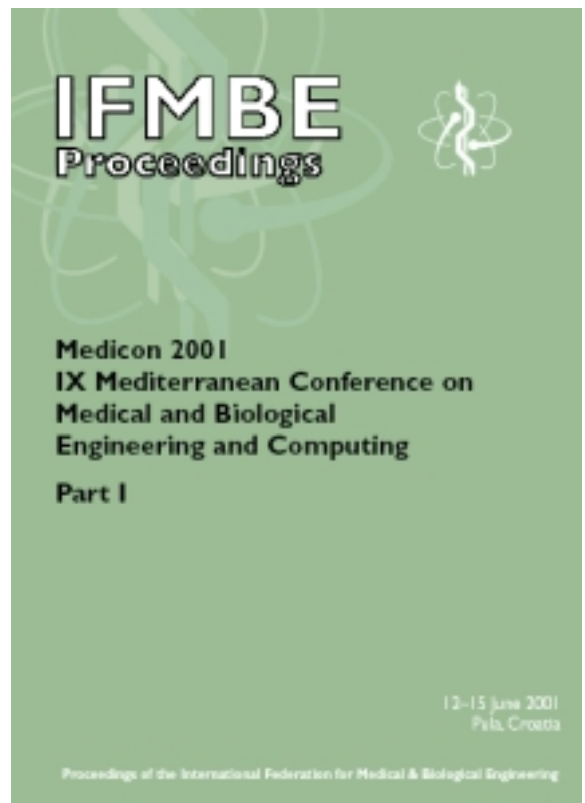
18:00 Education, Training, Contents of Education and Certification in Great Britain, Professor Joe Barbenel, University of Strathclyde, Glasgow, UK

18:15 Concluding Statements on the Diversity of BME Education in Europe, its Challenges and Opportunities, Professor Joachim Nagel, University of Stuttgart, Germany

IFMBE Proceedings Series

In 2001 the Federation started a new IFMBE Proceedings Series with the aim to improve the visibility and accessibility of the papers presented at the IFMBE sponsored conferences. The first volume in this series was the Proceedings of the IX Mediterranean Conference on Medical and Biological Engineering and Computing MEDICON 2001, Pula, June 2001, and the second is the Proceedings of the 12th Nordic Baltic Conference on Biomedical Engineering and Medical Physics, Reykjavik, June 2002. Very soon, at the 2nd European Medical and Biological Engineering Conference, the third volume will be available to the MBE community.

The importance of establishing this series is in the fact that the IFMBE Proceedings get a unique number, the ISSN that makes the series easily recognisable for the libraries and the scientific databases. The ISSN (International Standard Serial Number) is an eight-digit number that identifies periodical publications as such. More than one million ISSN numbers have so far been assigned. It is managed by a worldwide network of 74 National Centres co-ordinated by an International Centre based in Paris, backed by UNESCO. Various partners throughout the



Proceedings of MEDICON 2001 - the first proceedings in the IFMBE Proceedings series



IFMBE News

Number 57 November 2002



information chain use the ISSN: libraries, subscription agents, researchers, information scientists, and newsagents. The ISSN of the IFMBE Proceedings series is *ISSN 1680-0737*.

The Publication and Publicity Committee of the IFMBE, chaired by Prof. J. Nagel, is preparing a detailed 'Guidelines for the organisers' of the IFMBE sponsors conferences in order to help them in their efforts to make the conferences successful and recognisable to the BME scientists.

The conference organisers have to send a complimentary copy of the Proceedings to relevant bibliographic information services, like INSPEC or Institute of Scientific Information (ISI). Both services make a selection of full papers that are entered to the databases. It is important to note that both mentioned databases make the Abstracts available for the users of the service.

INSPEC is the leading English-language bibliographic information service providing access to the world's scientific and technical literature in physics, electrical engineering, electronics, communications, control engineering, computers and computing, and information technology.

ISI is a database publisher of scientific, medical, and technical information. Product offerings include Current Contents, Science Citation Index, Journal Citation Reports and also the ISI Proceedings. The *ISI® Proceedings* are multidisciplinary products that provide Web access to bibliographic information and authors abstracts from papers delivered at prestigious international conferences, symposia, seminars, colloquia, workshops, and conventions.

On behalf of the organisers of MEDICON 2001, I am very glad to inform you that the majority of the contributions published in the first volume of the IFMBE Proceedings were included in INSPEC and ISI Proceedings.

Ratko Magjarevic

Institute of Physics

Institute of Physics Publishing

Institute of Physics Publishing is a not-for-profit publishing subsidiary of the Institute of Physics (<http://www.iop.org/>) and as such our sole purpose is to promote the advancement and dissemination of knowledge about physics.

On October 21, 2002, IoPP and IFMBE signed an agreement concerning the book series entitled the "Series in Medical Physics and Biomedical Engineering" published under the IoPP stating that the Series shall be



Dov Jaron, President IFMBE and John Navas, IoP Senior Commissioning Editor, signing the Agreement on Medical Physics and Biomedical Engineering Book Series in London, October 2002

adopted as the official book series of the IFMBE. The IFMBE shall be active in commissioning new books for the series.

Institute of Physics (IOP) publishes books in physics and related areas such as mathematical and medical physics, biomedical engineering, materials science, computational science and astronomy. Research monographs report on the state of the art in the subdisciplines of physics and are refereed to a high standard of quality. Textbooks at senior undergraduate and



IFMBE News

Number 57 November 2002



graduate level support the teaching of physics. Popular science titles make physics and related sciences more accessible within and beyond the scientific community. These books are complemented by comprehensive and authoritative handbooks and reference works in all subjects.

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When the manuscript is completed it is again assessed by our reviewers for quality of content and coverage. A more detailed assessment of the market is made to ensure that pricing is appropriate, promotion is well planned and no opportunities are missed to

give your book the widest exposure possible. Reviewers may make suggestions for changes, and once these are completed the book is accepted into production. Our desk editors will work with you to turn the manuscript into a high-quality, well-designed printed book.

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IFMBE News

Number 57 November 2002



Finnish Society's First Medical Physics and Medical Engineering Day Best Students Awarded

The Finnish Society arranged the first Medical Physics and Medical Engineering Day in Tampere University of Technology on 11 January 2002. The idea of the MPME Day was to offer students from various parts of Finland a get-together meeting and to promote the Society to them. Furthermore, the occasion provided a way for companies to present their job opportunities and products. The main event was a poster presentation of Master's graduate theses in the field of medical physics and engineering, completed during 2001. The works were evaluated, based on poster presentation and three best received an award (€2001 donated by Datex-Ohmeda). The members of panel were prof. *Pekka Meriläinen*, Chief Scientist from Datex-Ohmeda, *Riina Kinnunen*, president of Pollex (the student club of the Biomedical Engineering), and 5 Finnish Society's council members, prof. *Hannu Eskola*, prof. *Jari Hyttinen*, prof. *Timo Jämsä*, prof. *Erkki Soini*, and ass. prof. *Jari Viik*. The panel decided to give an award to the best presented work and to give two equal awards to the second best presented works. The rewarded were:

Nymark Soile, Helsinki University of Technology (€1001)
Method for measuring free drug concentration in mammalian neural tissue

Noponen Tommi, Helsinki University of Technology (€500)
Instrumentation of diffuse optical imaging in the frequency domain

Tirri Marko, Tampere University of Technology (€500)
Molecule counting with two-photon fluorescence excitation

Thirteen Master's graduates participated in the poster competition. In total there were 135 participants from all over Finland. The abstracts of the best works are on the Finnish Society's web site, http://www.ee.tut.fi/~lfty/lft_paiva/abstracts.html.

Jari Viik, secretary
jari.viik@tut.fi

Method for measuring free drug concentration in mammalian neural tissue

The use of functional polymers offers possibilities to deliver drugs to their targets in a controlled way. Drug molecules can be released from polymeric structures in a certain time scale by an external stimulus, such as temperature. Developing controlled drug delivery systems requires a method for measuring drug concentration in polymer solutions accurately. In addition, it would be especially valuable to be able to measure drug concentration in a living tissue.

The aim of this thesis was to develop a method for measuring free drug concentration in mammalian neural tissue at different temperatures. Furthermore, the purpose was to find out how the biocompatibility of various monomers and polymers could be tested reliably. The method developed is based on the monotonic dependence of the photoresponse kinetics of mammalian photoreceptors on the concentration of the model drug (3-isobutyl-1-methylxanthine, IBMX). The changes in the photoresponse kinetics were followed by the electroretinogram (ERG) technique. Isolated retinas of the albino rat (*Rattus norvegicus*) were used as a preparation.

In this thesis it was observed that the kinetics of linear-range photoresponses of rat rods is proportional to the square root of the concentration of IBMX. The calibration curve (the concentration of IBMX as a function of photoresponse kinetics) was used to determine the amount of IBMX released from polymeric structures in the concentration range 3-300 nM. It was also shown that rat retina can be used for the testing of biocompatibility of various molecules as rod photoresponses are very sensitive to potentially hazardous molecules.

As shown in this thesis the mammalian retina can be used as a very sensitive biosensor. The method developed will be described in a forthcoming international serial publication.



Soile Nymark
Helsinki University of
Technology



Instrumentation of diffuse optical imaging in the frequency domain

Diffuse optical imaging (DOI) is a new functional medical imaging modality, in which near-infrared light is delivered into the tissue and the transmitted light is measured.

A one-channel frequency-domain instrument for physiological measurements had been developed earlier in the DOI-project in the Laboratory of Biomedical Engineering. In the frequency-domain technique, intensity-modulated light is delivered into the tissue and the modulation amplitude and phase are measured from the transmitted light. When the light transport is modeled in tissue, the optical properties of the tissue can be estimated using the measured data.

Methods for expanding the one-channel instrument to an imaging device were developed in this work. First a commercial fiberoptic switch is presented for extending the number of source fibers from 1 to 16. A computer program was developed for controlling the switch.

The receiving optics was expanded using time multiplexing. A chopper shutter was built for this purpose. The shutter is controlled with a stepper motor so that a single measurement bundle out of a possible four can be selected active. The coupling of the active bundle is 85-90% and the leak of the passive bundles is approximately -26 dB. The shutter system can be used for topographical imaging applications.

In the second part of this work, a four-channel digital lock-in amplifier (LIA) was developed. The LIA is used to measure the amplitude and phase of the signal. The design is based on digital signal processor technology. A DSP program for the LIA was programmed and a four-channel analog-to-digital converter board was designed for the extension of the DSP board. The noise level of the A/D converter board was approximately -86 dB. The LIA was connected to a PC and the performance of the four-channel LIA was compared with a commercial digital LIA (Stanford Research Systems, SR810). The

amplitude and phase noise of both devices were approximately the same.

Tommi Noponen
Helsinki University of
Technology



Molecule counting with two-photon fluorescence excitation

The main goal of this thesis was to construct and test the equipment, by which it is possible to detect and count single molecules or molecule clusters in liquid. Technology and knowledge necessary for the construction of the equipment were principally known in advance. The design and realization of the assembly as well as the testing of the measurement system were performed in the experimental part of the thesis. The methods based on single molecule detection are important research tools, eg. in the discovery of new drugs.

The function of the constructed equipment is based on the measurement of fluorescence produced by two-photon excitation. The aim was to clarify the requirements for equipment and laser to realize dual-colour fluorescence correlation spectroscopy (FCS) by two-photon fluorescence excitation. Further aim was to clarify the possibility to realize a bioaffinity assay, in which fluorescent nanoparticles are used as label molecules and nanoparticle complexes produced by bioaffinity reaction are counted.

Two-photon fluorescence excitation was performed by a mode-locked Nd:glass femtosecond laser, which can produce laser pulses that have duration of 120 fs and wavelength of 1060 nm. Two-photon excited dual-colour FCS realized by that kind of laser has not been published earlier in scientific literature. In those experiences the lasers have been titanium-sapphire-lasers functioning in lower wavelength range.

The possibility to count biomolecules and nanoparticles in liquid with the constructed equipment was elucidated by measurements. It is possible to detect and count single photons by the measurement system. When calculating an auto-correlation function for the photon signal, it is possible to define size differences between molecules or molecule clusters. When measuring nanoparticles labeled with different fluorescent dyes cross-correlation can be calculated for these

signals. Binding reactions between different particles can be observed by cross-correlation.

Marko Tirri
Tampere University of
Technology





IFMBE News

Number 57 November 2002



E. Ros Vidal - Winner of the Award at Como Workshop on Biosignal Interpretation



Eduardo Ros Vidal received his BSc Degree in Physics in 1993, Electronic Engineering in 1996, and the Ph.D. degree in 1997, all from the University of Granada, Spain. After receiving his PhD, he spent 4 months at the Department of Electronic Engineering, King's College of London (UK). Currently, he is associate professor at the Departamento de Arquitectura y Tecnología de Computadores. He teaches at the Informatics Engineering School, mainly the subject "Introduction to Computers", and the PhD. courses called "Biomedical Applications" and "Computers and Biomedical Instrumentation".

Eduardo's PhD Thesis is entitled "VLSI implementation of Neural Structures inspired in the biology". It addressed some topics related to the research field known as Neuromorphic Engineering. Biological neurons were studied in order to discriminate the properties that lead to their computational power within the nervous

systems of other properties that seemed not to be significant for computational tasks. After this functional abstraction, the research work was concentrated in evaluating whether bio-inspired circuits, built with standard VLSI technology, can take advantage of similar computational primitives for certain processing tasks [1-8].

Currently he and his group continue this line of research with three projects in which he directly collaborates:

ECOVISION: Artificial Vision System Based on Early Cognitive Cortical Processing

SPIKEFORCE: Real-time Spiking Networks for Robot Control

CORTIVIS: Cortical Visual Neuroprosthesis for the Blind

In ECOVISION [9] the research group attempt to build (Hardware/Software) an artificial vision system inspired in the higher vertebrates visual systems that exhibits processing performance levels still far ahead the ones achieved by artificial machines. CORTIVIS [10] addresses the implementation of a neuroprosthesis for the blind. Using conventional CCDs or more bio-inspired front-ends they try to emulate the whole visual pathway, preserving the information integrity, in order to transfer it directly to the visual cortex through a micro-array of neuro-stimulators. Finally, SPIKEFORCE [11] is focussed on the study of the cerebellum, our role in this project is to evaluate the possibility of using the same computational primitives (based on spiking neurons) observed in the cerebellum to gain efficiency and flexibility in robot control applications. In all these applications they design digital systems (FPGAs) to achieve real-time processing.

More directly related with signal processing for biomedical applications, the group have studied the problem of Paroxysmal Atrial Fibrillation Diagnosis and On-set episode prediction [12, 13] based on ECG traces not explicitly containing fibrillation episodes. This challenging problem was proposed as an international initiative [14] to encourage different research groups to participate in this interesting field. The research group has also addressed this application as a Multi-objective optimisation problem using Genetic Algorithms [15].

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IFMBE News

Number 57 November 2002



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2009 World Congress

Applications to host the 2009 World Congress on Medical Physics and Biomedical Engineering are due no later than February 2003. The World Congress is sponsored by IOMP and IFMBE through the International Union for Physical and Engineering Sciences in Medicine (IUPESM). The 2003 World Congress will be held in Sydney, Australia and the 2006 World Congress, in Seoul, Korea. Countries or consortium of countries interested in having their application reviewed in time for consideration should visit the IUPESM home web page (www.iupesm.org) and download the Application Form and Selection Procedure. Completed applications should be sent to Dov Jaron

Chair of the Congress Coordinating Committee at dov.jaron@drexel.edu



IFMBE News

Number 57 November 2002



World Congress on Medical Physics and Biomedical Engineering DOWNUNDER Sydney, Australia, August 24-29, 2003



**The call for abstracts will be released soon.
Deadline for submission of abstracts will
be 10th March 2003.**

PROGRAM UPDATE

The Radiation Oncology Physics track is shaping up to be a major program of interest to medical physicists, radiation oncologists and radiotherapists.

Dr Rock Mackie (Chair) and Prof Peter Metcalfe (Co-Chair) have set up some 17 topic sessions. Proposed topics include:

- Brachytherapy (endovascular)
- Brachytherapy
- Dose calculation/optimisation
- Dosimetry 1 protocols and QA protocols
- Dosimetry 2 (macro and clinical)
- Dosimetry 3 (micro mini)
- IMRT 1 planning and delivery
- IMRT 2 verification
- Motion compensation
- Oncology imaging
- Photodynamic therapy
- Quality systems
- Radiobiology
- Radionuclide therapy
- Simulation
- Stereotactic & gamma knife
- Treatment verification

Topic Chairs - currently being allocated - will be world leaders in their disciplines.

You'll find the final program structure for the Radiation Oncology Physics track on the WC2003 website (www.wc2003.org) in the near future.

EXHIBITION

Five major players have already confirmed their commitment to the WC2003 Exhibition:

- Siemens Medical
- LAP Laser Applications
- Varian Medical Systems
- PTW Freiburg
- ICN Worldwide Dosimetry

The Exhibition is an excellent opportunity for organisations to demonstrate products, services and technology to an elite field of delegates, all of whom are directly involved in your target business.

There are also many options available for **sponsorship** of the Congress - your organisation's name on anything from satchels to sessions. Everything is for sale!

For more on sponsorship or the Exhibition, visit the website at www.wc2003.org or contact the Congress managers at wc2003@tourhosts.com.au



IFMBE News

Number 57 November 2002



Join the throng! - add your hit to the 13,624 already recorded at the WC2003 website www.wc2003.org

A GLIMPSE DOWNUNDER

The Rocks is one of Sydney's oldest areas. It's the site of Australia's first European settlement in 1788, occupied originally by the Eora Aboriginal people. Between the Harbour Bridge and Sydney's bustling ferry terminal, a tangle of old streets, colonial cottages and elegant converted warehouses tumble down to the Harbour.

Join a walking tour and discover the area's rich heritage. Enjoy tales both tall and true as you visit historic pubs, colonial cottages, archaeological dig sites, a quaint corner store, a Gothic church, cobblestone lane ways and leafy courtyards.

Explore the many restaurants and cafes, specialty stores, galleries and boutiques, offering everything from hand-made puppets to Aboriginal artefacts. See glass engravers, clothing designers, painters and jewellery-makers at work. You'll find antiques and old wares alongside innovative Australian design. More than 70 retailers offer tax-free shopping to bona fide international travellers.

The Rocks' heritage pubs are home to some of Sydney's most talented bands and musicians. And every weekend, The Rocks Market offers something for everyone under a sail-like canopy within a sea breeze of Sydney Harbour, while wandering street entertainers put on a show for young and old.

6th International Conference on Cellular Engineering

The 6th International Conference on Cellular Engineering will be held from

August 20-22, 2003 at the Swiss Grand Hotel Bondi Beach, Sydney, Australia overlooking Sydney's fabulous Bondi Beach. Conference website: <http://www.celleng2003.org.au>.

Invited speakers are from amongst the international leaders in the field and the scientific program promises to be exciting.

Themes and topics include: Development of differentiated cell types from stem cells; Regulation of cellular growth and development; Cell-cell and cell-matrix interactions; Biophysical properties of cells and tissues; Cell-based technologies - Gene delivery and expression, cell selection and expansion, biosensors, tissue-scaffolds; Cellular or tissue based therapies; and regenerative medicine.

Submission of abstracts - and processing of registration and payments - are online. All abstracts will be peer-reviewed and full papers for publication in MBEC Journal will be called for after the conference. The official language of the conference is English.

A number of oral presentations in each session will be selected from submitted abstracts. Poster presentations, panel discussions and educational sessions will focus on introducing specific topics of interest. Several student travel scholarships are available.

The Swiss Grand Hotel is conveniently situated just 20 minutes from Sydney's International Airport and the City centre. Accommodation is in 4-star single and twin-share rooms and student accommodation is also available. The social program includes the Welcome Reception, the Conference Dinner and accompanying persons program. Please check the website: <http://www.celleng2003.org.au>

ICCE 2003 is an official satellite symposium of the *World Congress on Medical Physics and Biomedical Engineering*. It will be held just prior to the World Congress (also convened in Sydney) and is supported by the International Federation of Medical and Biological Engineering, Cellular Engineering Working Group; the Graduate School of Biomedical Engineering, University of New South Wales, and the Institute of Engineers, Australia.

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IFMBE News

Number 57 November 2002



IFMBE News

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Medical & Biological Engineering & Computing

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