



# IFMBE News

## Number 56 September 2002



### *Number 51*

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*International Federation for Medical & Biological Engineering*

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

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### IV International BioSignal Interpretation Workshop - BSI2002

Como, Italy  
June 24-26, 2002

The IV International BioSignal Interpretation Workshop (BSI2002) was held in Villa Olmo, Como, Italy, on June 24-26, 2002. The Workshop was a joint initiative of the International Medical Informatics Association (IMIA) and the International Federation for Medical and Biological Engineering (IFMBE), in cooperation with the IEEE Engineering in Medicine and Biology Society (IEEE-EMBS), the Japan Society of Medical Electronics and Biomedical Engineering (JSMEBE). Co-sponsors for the event were the Associazione Elettrotecnica ed Elettronica Italiana (AEI), the Associazione Italiana di Ingegneria Medica e Biologica (AIIMB) and the Polytechnic University in Milan.

The conference attracted 132 participants from 26 Countries, who actively contributed to conference works and animated the social events. The conference activities were hosted by Villa Olmo, a magnificent neoclassic villa built at the end of the Eighteenth Century with a unique location on the shore of Lake Como. The beautiful three floor hall (Salone delle Feste), enriched with stuccoes and wonderful balconies, acted as the main conference room. The scientific programme of BSI2002 was organised into 12 scientific sessions (including two poster sessions) which covered the main topics in the research area of biosignal interpretation. These included: model-based biosignal analysis, design and implementation of algorithms of data and signal processing applied to medical and biological investigations, integration of information and signal/image data fusion, as well as the phases

of interpretation and clinical decision-making on the basis of the obtained information. 136 papers were presented during the workshop, in oral (54 papers) or poster (82 papers) sessions. All the presentations focused on the advanced methods and techniques in the field, and a selection of the presented papers will be included in a Special Issue of the journal *Methods of Information in Medicine* which is due to be published at the end of the year. Particular attention was paid to emerging application fields, such as Data Processing in Genomics and Proteomics and Processing of Electrical Signals in the Brain. Two distinguished keynote speakers delivered lectures on these topics on Monday and Wednesday morning sessions: Prof Alain Arneodo from the *Centre de Recherche Paul Pascal, Pessac, France*, dealt with *Fractal Analysis of DNA Sequences Using Wavelet Techniques* and Prof Josè Principe from the University of Florida, Gainesville, USA dealt with *Signal Processing Techniques in Neuroscience and Brain-Machine Interface*.

The Scientific Committee also focussed on young researcher activities and it awarded prizes for the top three poster presentations (500, 300 and 200 €, respectively). The awards were given in a special ceremony at the end of the Workshop. The winning posters were: “*A Nonlinear Circuit Architecture for Magnetoencephalographic Signals Analysis*”, by M. Bucolo, L. Fortuna, M. Frasca, M. La Rosa, D. Shannahoff-Khalsa, M.C. Virzì; “*Paroxysmal Atrial Fibrillation: Automatic Diagnosis Algorithm Based on Not Fibrillating ECG*”, by E. Ros, S. Mota, F.J. Toro, A.F. Diaz, F.J. Fernández; and “*Prediction of Cardiovascular Risk in Hemodialysis Patients by Data Mining*” by M. Pfaff, K. Weller, D. Woetzel, R. Guthke, K. Schroeder, G. Stein, R. Pohlmeier, J. Vienken.

As the participants could not be fed by science alone, the Social Events were particularly appreciated. On Monday evening there was a duo camera (harp and violin)



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concert followed by a meal in a wonderful open-air atmosphere in the yard just in front of the Villa and the lake.

The main Social Event however, took place on Tuesday evening. After a tour of Lake Como by boat, the participants landed on the Isola Comacina (Comacina Island). The mysterious Isola Comacina is the only island on the lake, a strongbox that still remains virtually unexplored. The island has a history which is extraordinarily eventful dating back to ancient times: you can hear tales of barbarian raids, Longobard Kings and Dukes who hid fabulous treasures here, the schismatic Bishop Agrippino who ruled the island and the ten-year war between Como and Milan. It is actually considered as one of the most important archaeological sites of Lombardy. Whilst on the Island, the conference participants sampled traditional Como cuisine accompanied by ancient tales about the Island's history and inhabitants.

You can see pictures taken during the Conference activities and the social events by visiting the site (<http://www.centrovolta.it/Foto/Web%20Foto%20congresso/BSI2002.htm>).

Several external sponsors such as the Common of the City of Como (Italy), Fresenius Medical Care, Bad Homburg (Germany), Cardioline-Remco Italia, Milan (Italy), as well as the Institute of Biomedical Engineering of Italian CNR (Research National Council), Milan, have also been good enough to support some of the activities connected to the Workshop.

For further information, please refer to Prof Sergio Cerutti, Department of Bioengineering, Polytechnic University, Milano, Italy ([cerutti@biomed.polimi.it](mailto:cerutti@biomed.polimi.it)) or to Dr Luca Mainardi ([mainardi@biomed.polimi.it](mailto:mainardi@biomed.polimi.it)).

## MAIDE BUCOLO

### Winner of the Award at Como Workshop on Biosignal Interpretation

This year, the organisers of the IV International Workshop on Biosignal Interpretation 2002 awarded three students for their achievements at the workshop. These are **Maide Bucolo**, Italy, **Eduardo Ros**, Spain and **Michael Pfaff**, Germany.

In this issue, we are very happy to introduce to the readers of the newsletter **Maide Bucolo**, a young scientist who was awarded 1<sup>st</sup> prize for her scientific achievements presented at the Workshop. Maide got the *Award for the best poster* for a paper entitled 'A Nonlinear Circuit Architecture for Magnetoencephalographic Signals Analysis'.

Maide studied at the School of Engineering, University of Catania, and got her degree in Computer Engineering in July 1997. She continued with her Ph.D. and took a course in Electronic and Control Engineering at the **University of Catania, Dipartimento Elettrico Elettronico e Sistemistico**. During the Ph.D. course she has studied at the **University of California San Diego, Institute of Nonlinear Science**, conducting research in 'Information Processing in Neural Networks' as a visiting researcher of the 'Agreement of Cooperation between the University of Catania, Italy and the University of California-San Diego'.

She was also awarded a grant to attend the 4<sup>th</sup> International Summer School/Conference 'Let's Face Chaos through Nonlinear Dynamics', at The Centre for Applied Mathematics and Theoretical Physics (CAMPT) University of Maribor, Slovenia and the European School on Intelligent Data Analysis (IDA 2001), Palermo, Italy.



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In January 2001 she completed her Ph.D. thesis entitled '*Arrays of Fuzzy Logic Based Dynamical Systems: the Role of Spatial Diversity*'.

She is currently *Contract Researcher* at University of Catania working on:

·“*Dictam Project*” supported by the European Union.

·“*Application of Advanced Techniques for Financial Data Analysis to Support Medium and Long Term Plan Activities*” in collaboration with and supported by ST-Microelectronics.

Her research project entitled “*Innovative Analysis Technique in Neuro-Engineering*” has been selected to receive funding for the next two years by the Research Commission of the University of Catania. She is a lecturer at the faculty of Engineering of the University of Catania teaching the course “*System Theory*”.

Her research activities extend to more than 30 scientific contributions in international journals and conferences and are mainly to be found in the areas listed below:

### **Analysis and Regularization of Complex Dynamics**

These complex systems pervade our daily life as nature. They are characterized by the connection, often local, of a large quantity of simple systems (with few state variables) each nonlinear [3].

During the last few years, investigation on the identification and control of complex nonlinear dynamics in distributed systems has gained particular attention because of the perspective applications in different fields of science. The study that has been carried out focuses on the following tasks:

·characterization of new strategies to regularize complex systems using spatial dissymmetry [1-2];

·the study of a new class of complex systems generated by using arrays of coupled systems defined by g fuzzy logic dynamical systems [1-2];

·investigation of the self-organizing properties versus different topologies: regular, “small worlds” and random [6].

### **Biomedical Application of the Cellular Nonlinear Networks**

The potentiality of the Cellular Nonlinear Networks (CNN's), an analog nonlinear dynamic processor array, has been developed performing examples in fields ranging from the image processing to the time series analysis. The CNNs have been developed to overcome the massive interconnection problem of the parallel distributed processing; thus their key features are asynchronous parallel processing, continuous time dynamics and local interactions among network elements.

The CNN, as Medical Imaging Systems, is applied for the real-time DNA microarray analysis and for on-line image filtering during the laparoscopic surgical operations [5-7].

Human DNA microarrays have an advantage of allowing an analysis of multiple samples to be performed simultaneously, thereby generating a large amount of gene expression data ready to be analysed. The CNN is a powerful system to process the DNA chip, to enhance the whole procedure, making it fully parallel. Moreover the real-time image processing due to the intrinsic properties of the CNN architecture gives the possibility to optimise on-line camera images during different surgical operations; laparoscopic operations being just one.

As time series technique, CNN is used to implement nonlinear blind sources separation on Magnetoencephalographic (MEG) signals.



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The intrinsic nonlinear and parallel architecture of the CNN has allowed the limit of the Independent Components Analysis (ICA) on MEG signals to be overcome, solving the limits of the blind sources separation [9].

### Time Series Analysis and Modeling

The activity developed concerns the characterization and modeling of data collected in different fields. In physiology the neural activity has been studied through Magnetoencephalographic (MEG) signals performing the blind source separation, using both linear and nonlinear technique [8-9], and spatio-temporal analysis [11].

In economics, much attention has been focussed on the development of reliable dynamic linear and nonlinear models to realize a *Decision Supporting System* for the capacity demand requirements in semiconductor company [12].

In chemical plants the potentiality of the time series modeling has been used to execute the control quality [4].

### Micro-circulation based Instrumentation

The development of two real-time non-invasive optical micro-circulation-based instruments; one for the estimation of the blood flow velocity and the other for oxygen delivery has proved invaluable. As far as the micro-circulation equipment is concerned, we have to consider that the blood accomplishes its main functionalities at microcirculation level, through the oxygen delivery and the collection of bio-products of cellular metabolism. The development of a blood substitute requires the understanding of the blood behaviour and therefore the development of an analytical framework, to assess the consequences of theoretical prediction on altering some physical properties [10].

### Publications

1. M. Bucolo, L. Fortuna, 'Spatial Disorder in Complex Neuro-Fuzzy Dynamics', *Prog. Theor. Phys. Suppl. No.139*, 2000.
2. M. Bucolo, M. C. Cutuli, L. Fortuna, A. Rizzo, 'Spatial Diversity in Reaction Diffusion Fuzzy Cellular Networks', Vol. *School on Soft Computing at Salerno University- Series: Studies in Fuzziness and Soft Computing-School* - Springer-Verlag.
3. M. Bucolo, L. Fortuna, M. Frasca, M.G. Xibilia, 'A Generalized Chua Cell for Realizing any Continuous n-Segment Piecewise-Linear Function', *Journal on Bifurcation and Chaos*, September 2001.
4. M. Bucolo, L. Fortuna, M. Nelke, A. Rizzo, T. Sciacca, 'Prediction Model for the Corrosion Phenomena in Pulp & Paper Plant', *Control Engineering Practice*, 10 (2002), 227-237, Elsevier Science.
5. P. Arena, M. Bucolo, L. Fortuna, L. Occhipinti, 'Cellular Neural Network for Real-Time DNA Microarray Analysis', *IEEE Engineering in Medicine and Biology Magazine*, March/April 2002, Vol. 21, No 2, pp. 17-25.
6. M. Bucolo, L. Fortuna, M. La Rosa, 'Network Self-Organization through "Small-Worlds" Topologies', *Chaos Solitons and Fractals*, Vol. 14, No.7, pp. 1059-1064 - Elsevier Science.
7. P. Arena, A. Basile, M. Bucolo, L. Fortuna, 'Image Processing for Medical Diagnosis using CNN', *Nuclear Instruments and Methods in Physics Research Section A*.
8. M. Bucolo, L. Fortuna, M. Frasca, M. La Rosa, D. Shannahoff-Khalsa, 'Independent Component Analysis of Magnetoencephalography Data', *The 23<sup>rd</sup> Annual International Conference of the IEEE*
9. 'A Nonlinear Circuit Architecture for Magnetoencephalographic Signals Analysis', *IV International Workshop on Biosignal Interpretation (BSI 2002)*, Como, June 2002.



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10. M. Bucolo, F. Camarda, L. Fortuna, 'A System for Blood Flow Velocity Measurement in Microcirculation', *IV International Workshop on Biosignal Interpretation (BSI 2002)*, Como, June 2002.

11. S. Baglio, M. Bucolo, L. Fortuna, M. Frasca, M. La Rosa, D. Shannahoff-Khalsa, 'MEG Signals Spatial Power Distribution and Gamma Band Activity in Yoga Breathing Exercises', (*accepted*) *The 24<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society* (EMBC 2002), Houston, October 2002.

12. M. Bucolo, F. Caizzone, L. Fortuna, G. Tomarchio, 'Nonlinear Models for Semiconductor Market Forecast', (*accepted*) *10<sup>th</sup> International Workshop & School Nonlinear dynamics & Complex Structures*, Minsk, September 2002.

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## Traditional EURASIP's Conference BIOSIGNAL 2002

Already the 16<sup>th</sup> conference in a regular series of biennial BIOSIGNAL conferences was again organised by the Department of Biomedical Engineering, Brno University of Technology, and held in Brno (Czech Republic) on June 25 to 27, 2002, in the Masaryk University Congress Centre. The conference scope was determined by the following scientific sessions:

1. Measurement and interpretation of physiological signals (76 papers, of which 39 were posters)
2. Medical imaging and image analysis (43 papers, of which 30 were posters)
3. Signal-based modelling and simulation in biomedicine (18 papers, of which 10 were posters)
4. Multimedia data in clinical decision-making (11 papers, of which 6 were posters)
5. Education of biomedical engineering including ecological technology (round table discussion)

The 148 papers presented were selected from over 170 submitted on the basis of peer review conducted by the members of the international programme committee for the conference and additional reviewers suggested by the committee. Every paper has been evaluated by at least two reviewers from different countries. All accepted papers were published in the conference proceedings printed as a book of 485 pages - J. Jan, J. Kozumplik, I. Provaznik (Eds.): "Analysis of Biomedical Signals and Images", VUTIU



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Press Brno 2002, ISBN 80-214-2120-7. The book has been distributed to all conference participants and several libraries and private applicants have also requested copies. Remaining compilations can be ordered from the organising institution.

The purpose of the conference was to give a forum for information exchange among theoreticians, engineers, and medical scientists. Original theoretical papers, research results, contributions concerning novel technical solutions, clinical experiences and invited survey lectures were presented in A, B, C, and D sessions. The development in curricula for graduate and postgraduate students of biomedical and clinical engineering (including applications in ecology), has been discussed in session E.

The conference was sponsored by EURASIP (BIOSIGNAL has been one of EURASIP's regular conferences since 1996) and by IEEE – Engineering in Biology and Medicine Society as a co-operating institution. Further collaborating institutions include the Czech Society for Biomedical Engineering and Medical Informatics (a part of the Czech Medical Society of J. E. Purkyně and an IFMBE affiliated organisation) and the Institute of Signal and Image Processing. The organisation of the conference was (as in previous years) a result of the huge effort from the Department of Biomedical Engineering from the Brno University of Technology - Faculty of Electrical Engineering and Communication. The conference was opened by the EURASIP president Prof. Peter Grant together with the BUT representatives. Among the conference participants, a large number of internationally recognised scientists were present; as well as a relatively high influx of more junior scientists. A best-paper contest for junior participants had been organised, and was won by Fabrizio Lamberti from Italy who, besides a monetary award, obtained a free one-year EURASIP membership.

Besides the scientific sessions, two social meetings formed an inadmissible component of the conference. The first evening was devoted to a welcome party consisting of a traditional organ concert in the renovated new-baroque centre of the University of Technology followed by a get-together party. A boat trip on the Brno lake, accompanied by Moravian folk music sung and played by a traditional cymbal band, formed the programme for the second evening.

The level of scientific success should be evaluated by independent participants; although it would appear from the spontaneous e-mail reactions sent to the organisers, that the conference fulfilled all expectations. The idea of continuing with the 17<sup>th</sup> BIOSIGNAL 2004 conference therefore, seems to be generally supported.

The conference was supervised and submissions evaluated by the international programme committee, who are:

I. Bajla	Slovakia
E. R. Carson	United Kingdom
G. Christe	France
J. Cmiral	Czech Republic
J. L. Coatrieux	France
D. Evans	United Kingdom
H.-J. Hein	Germany
U. Heute	Germany
V. Hlavac	Czech Republic
H. Hutten	Austria
J. Jan (chair)	Czech Republic
S. Laxminarayan	United States
D. Levicky	Slovakia
I. Provaznik	Czech Republic



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J. P. Marques de Sa	Portugal
V. V. Shakin	Russia
C. A. Swenne	The Netherlands
J. Simurda	Czech Republic
M. Sonka	United States
N. V. Thakor	United States
R. Vich	Czech Republic
J. Zvarova	Czech Republic



Dr. Jaromir Cmiral, the chairman of the Czech Society for Biomedical Engineering and Medical Informatics, talking to Prof. Jana Zvarova, the head of EuroMISE, Prague

The organisational load has been taken over by the local OrgCom, formed from members of the Department of Biomedical Eng., Brno UT, I. Provaznik (chairman), J. Jan, J. Kozumplik, Z. Szabo and P. Fedra.

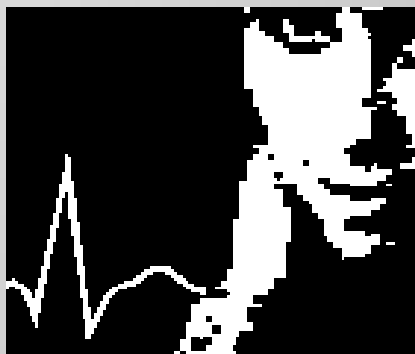
This is to express our sincere thanks to EURASIP for regularly including the BIOSIGNAL conference among a small number of its own conferences. This contributes greatly to the growing awareness and recognition of the conference.

Please note that BIOSIGNAL 2004 has already been announced and its web site <http://www.feec.vutbr.cz/UBMI/bs2004.html> has been launched. The 17th BIOSIGNAL will be held in June 23-25, 2004 in Brno, Czech Republic.

*Jiri Jan*, Conference Chair,  
*Ivo Provaznik*, OrgCom Chairman



Student Paper Competition winner Fabrizio Lamberti (Italy)





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## Report from the 7<sup>th</sup> Annual Conference of the IFESS, Ljubljana 2002

The International Functional Electrical Stimulation Society (IFESS) 2002 conference took place in Ljubljana from June 25<sup>th</sup> to June 29<sup>th</sup> and so continues the successful series of events from Cleveland 1996, Vancouver 1997, Lucerne 1998, Sendai 1999, Aalborg 2000, and Cleveland 2001. The venue was the Faculty of Electrical Engineering at the University of Ljubljana, the place where the late professor L. Vodovnik began his pioneering research in FES in the 1960s.

The IFESS 2002 conference focused on 'the state of the art', the 'assessment of new achievements', and the discussion of 'future goals' in various applications of FES. Predominantly however, for the restoration of motor function and sensory function of individuals with motor disabilities such as hemiplegia, spinal cord injury (SCI), cerebral palsy (CP), multiple sclerosis (MS) and head trauma. A strong emphasis was placed on multidisciplinary approaches, clinical applications, and the functional benefits of assistive devices in terms of quality of life and social participation of the disabled. The conference brought together the leading specialists in the field of FES from both engineering and medical backgrounds which helped promote new and emerging concepts for FES applications, as well as providing a vehicle for the dissemination of the latest results. A visit to the Institute for Rehabilitation was an interesting accompaniment to regular scientific sessions as it provided an overview of practical everyday applications of the FES within the clinical environment.

With the help of renowned members of the international scientific committee we were able to put together an outstanding scientific program with over 140 papers from 484 authors that were presented in either oral or poster sessions. Papers were categorized into 8 topics: lower extremities, upper extremities, gait & posture, muscles & nerves, therapeutic stimulation, control, stimulation technology and bladder & bowel. The most numerous contributions were in sessions of muscles & nerves, therapeutic stimulation and stimulation technology.

Three invited speakers presented their own view of special topics of interest. Prof. J.T. Mortimer gave a brief overview of the latest achievements and presented a very encouraging and fascinating list of potential new applications of the FES in the long term. Prof. M.R. Dimitrijevic, explained how FES can be used in the restoration of the locomotion from the neurophysiological point of view. Finally, prof. T Sinkjaer, the president of the IFESS society, gave the closing lecture, with an interesting summary of the role of the IFESS society with particular reference to future FES developments.

Vodovnik's prize was awarded to the best student papers. This year 24 papers were submitted, all being reviewed by several scientific committee members. Based on subsequent evaluations, the first award was given to Valorie Vince ("Biocompatibility Testing of Platinum Metallized Silicone Rubber", Universite Catholique de Louvain, Belgium). Second to Lisa Malone ("Using the Odstock Dropped Foot Stimulator: Users and Partner's Perspectives", Salisbury District Hospital, UK) and the third to Yoichiro Aoyagi ("Recording Capabilities of a Penetrating Microelectrode array in Dorsal Root Ganglia and its Usefulness for Coding of Limb Position", University of Alberta, Canada).



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All regular and student papers are of course compiled in electronic and hard-copy format. These compilations are edited by prof. R Jaeger, prof. P Veltink and assist. prof. T Karcnik and are still available from the conference organisers.

The conference attracted over 240 attendees. One of the reasons for such interest was due to the financial support from the European Commission (grant No. QLG5-CT-2002-30206) and the support of the Republic of Slovenia Ministry of Education, Science and Sport. The attendees enjoyed the renowned Slovene hospitality and a truly great social program that offered ample opportunity for informal information exchange and discussion.

The conference web page with a complete scientific program is still available at:

<http://robo.fe.uni-lj.si/ifess2002>

Tomaž Karcnik  
Assist.Prof.

## 1<sup>st</sup> International Summer School: Applications of ICT in Biomedicine

### Dubrovnik, August 5th-10th 2002

**Brief report by Marc Nyssen**

Combining work with pleasure, learning and leisure would best summarise the one-week summer school, held in Dubrovnik on the Croatian Dalmatian Riviera.

Imagine a small, interested group, five days of lectures and discussions, a selection of excursions and group dinners, all providing a forum for informal chat and meeting with colleagues, students and teachers in the appropriate environment of the Dubrovnik International School, a stones throw from the Adriatic Sea. But although relaxing and sightseeing were an integral part of the event, there were more serious matters at hand: lectures, discussions and even on-line tests formed the base of the weeks activities.

Organisers Ratko Magjarevic and Ron Summers had set up a well-balanced program consisting of technical, managerial and vision topics in the field of ICT in Biomedicine:

*Digital Libraries by Ron Summers*

*XML by Marc Nyssen*

*E-Health Records by Ratko Magjarevic*

*Health Cards by Vedran Batos*

*Semantic Web by Ron Summers*

*Informatics System Management by Paolo Inchingolo*

*m-Health by Vedran Bilas*

*Decision Support by Hartmud Dickhaus*



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These half-day lectures, given by teachers who are among the leaders in the field were well documented and illustrated with real life ICT examples in biomedicine. Students were presented with printed copies of all the lectures and at the end of the course, a CD-ROM compilation, comprising all lectures and supplementary documentation was given to each of the participants.

During the final “fellow” sessions, the participating students gave a brief presentation of their own work in progress, their background and current PhD work.

The lectures were planned on Monday, Tuesday, Thursday and Friday, leaving Wednesday for a superb boat excursion to the nearby Elafite Islands and Saturday morning for the fellow presentations.

Evening meals on Monday and Thursday were in fact small excursions to exquisite places along the Dubrovnik Riviera: we visited Cavtat and Mali Ston, in the early evenings, before sampling delicious seafood for dinner.

Both students and teachers from all over the world, took advantage of this unique opportunity to learn from each other and to establish this indescribable atmosphere of international friendship.

Thanks to the great personal involvement of organisers Magjarevic and Summers and thanks to the sponsors who are:

The Croatian Ministry of Science and Technology, the Faculty of Electrical Engineering and Computing, University of Zagreb, British Council Croatia, S&T Group, Hypo Alpe-Adria Bank, IBM - Croatia, Jamnica, Croatia Airlines and the IEEE EMB Society.



Lecturers and students of the ICTSS '02 in front of the International Centre of Croatian Universities, Dubrovnik



During the Welcome Reception



During the Welcome Reception



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### 4<sup>th</sup> Annual IEEE EMBS Special Topic Conference on Information Technology Applications in Biomedicine (ITAB 2003) 24-26 April 2003 Birmingham, England

Program topics (regular and invited sessions and posters) are invited which accord with the following ITAB 2003 themes:

- **Bioinformatics, genomics and neuroinformatics**
- **Mobile Healthcare technologies**
- **E-Health internetworking and home healthcare**
- **Clinical knowledge management**
- **Ethical, legal and security aspects**
- **Education and training methodologies**
- **Advances in digital hospitals and EHR/EPR issues**
- **Computational biology and high performance computing**
- **Multimedia, virtual reality, visualization and advanced imaging**
- **Integrated-care pathways**
- **Intelligent systems in diagnosis, prognosis and patient management**
- **Clinical terminology and ontologies**

For registration and paper submission please visit the conference website at:

<http://www.mis.coventry.ac.uk/biocore/itab2003>

### 1st Annual IEEE EMBS Special Topic Conference on Neural Engineering (NER2003) 20-22 March 2003 Capri Island, Italy

Neural engineering is an emerging discipline that attempts to understand the organisational principles and underlying mechanisms of the biology of neural systems and to study the behavior dynamics and complexity of neural systems in nature. It coalesces various engineering aspects such as; electronic and photonic technologies, computer science, physics, chemistry and mathematics, with the molecular, cellular, cognitive and behavioral neurosciences.

- **Brain & Neurons**
- **Artificial Implants/Neural Prostheses**
- **Biological Neural Networks**
- **Control of Neurological Systems**
- **Neural Signal Processing**
- **Neural Informatics**
- **Brain Imaging**
- **Brain-Computer Interface**
- **Virtual and Augmented Reality in Brain Surgery, Diagnosis and Treatment**

For registration and paper submission please see the conference website at:

<http://www.dartmouth.edu/~ne2003/>



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**International Congress on  
Biological and Medical  
Engineering  
The Bio-Era: New  
Frontiers, New Challenges  
4<sup>th</sup> – 7<sup>th</sup> December 2002  
Mandarin Singapore  
[www.icbme.org](http://www.icbme.org)**

The organisers of the International Congress on Biological and Medical Engineering to be held in December 2002 in Singapore invited Prof Louis Lim, Executive Director, Biomedical Research Council, Singapore to give the Congress Opening Address.

The updated information is now available on our website at: [www.icbme.org](http://www.icbme.org)



**First International  
Conference on Clinical  
Document Architecture  
Berlin, Germany,  
October 7-9<sup>th</sup> 2002**

HL7 Germany organises (in co-operation with HL7 US Inc. and HL7 Finland), the first international conference on Clinical Document Architecture (CDA). This will take place in Berlin from Oct. 7-9th.

CDA is likely to hold the same importance in clinical documents as HL7 has in messaging. We are therefore proud to have the first conference on this topic in our country. Participants from more than 10 countries have already registered.

You are kindly invited to join this conference. You will find more information at the Website [www.hl7.de](http://www.hl7.de).





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## Universiadi Friuli, Italy, January 16-20, 2003

### Call for Papers

From January 16th 2003, the “winter Universiadi” will be held in Friuli for four days. It is the intention of CISM to collect a series of contributions/papers on the topic of bioengineering and related areas.

Papers in the fields of sport activities or locomotion, or reports on the research of movement control are invited.

The organisers would also like to receive reports on state of the art research on biomechanics or, more generally, on bioengineering from scientific institutions.

The aim is to utilize the material received as a basis for a collection of proceedings. All the information received before November 2002 will be used to try and organise a meeting or a conference to be held during the Universiadi. It is more than likely that there will be athletes representing many countries in the games and it would be good if scientific institutions could be represented in this initiative.

The organizers are looking forward to receiving your papers, for the benefit of biomechanics and bioengineering science.

For more information, contact:

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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>

## 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](http://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 and 2001. 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 56 September 2002



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### Open consultation on tissue engineering - to 30.9.2002

*Enterprise Europe* (Brussels, 4 July 2002). The Enterprise DG invites comments on the need for, and ideas for the possible content of, a Community legal framework on human tissue engineered products.

Tissue engineering is new, fast-developing and largely unregulated. It aims to restore, maintain or improve the function of human tissues and organs. It differs from standard therapies in that tissue engineered products become integrated within the patient, affording a potentially permanent and specific cure for disease, injury or impairment.

Typical applications are orthopaedic prostheses (bones), cardio-vascular prostheses (heart valves, blood vessels, arteries), neurological tissue repair, skin repair, muscle repair, liver or pancreas regeneration or prosthesis, and prosthesis for the urinary tract.

At present, neither the development of knowledge and technology nor the potential risks are fully foreseeable. Potential benefits for patients however, are thought to be huge. The challenge for the regulators is to

enable patients to gain rapid access to new and highly promising types of products, under optimal safety and quality conditions.

The Commission's Scientific Committee on Medicinal Products and Medical Devices<sup>(1)</sup>, feels that while tissue engineered products bear some similarities to both medical devices and pharmaceuticals (e.g. cell therapy products), they differ sufficiently from both to justify a specific regulatory system.

Lacking an EU-wide legal framework, Member States are beginning to take national measures. However, disparities among states could prevent patients from having equal access to tissue-engineered products across the Union, and undermine confidence in these products.

Tissue engineering companies must also have a clear legal framework to provide certainties with regard to the laws protecting their investments and activities.

The potential worldwide market for tissue engineered products is estimated at almost Euro 100 billion per annum (source: Pittsburgh Tissue Engineering Initiative).

[Enterprise DG on-line consultations](#)

[Tissue engineering consultation document](#)

[Medical device pages](#)

[Pharmaceutical pages](#)

<sup>10</sup> Opinion of the State of the Art concerning tissue engineering, October 1, 2001.



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### Medical & Biological Engineering & Computing

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