

8-12 October 2000

**3RD INTERNATIONAL CONFERENCE
ON BIOELECTROMAGNETISM**

and

1st Slovenian-Croatian Meeting on Biomedical Engineering

in connection with

**COST 244bis 11th Workshop
on Biomedical Applications of Electromagnetic Fields
and Management Committee Meeting
7-8 October 2000**

PROCEEDINGS
including PROGRAM

Bled - SLOVENIA

Published by

Faculty of Electrical Engineering, University of Ljubljana
Ljubljana, Slovenia, 2000

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CIP - Kataložni zapis o publikaciji
Narodna in univerzitetna knjižnica, Ljubljana

537.8:577(063)(082)

INTERNATIONAL Conference on Bioelectromagnetism (3 ; 2000 ; Bled)
Proceedings including Program / 3rd International Conference on
Bioelectromagnetism and 1st Slovenian-Croatian Meeting on
Biomedical Engineering, 8-12 October 2000 in connection with COST
244bis 11th Workshop on Biomedical Applications of Electromagnetic
Fields and Management Committee Meeting, 7-8 October 2000 ;
[editors Tomaž Jarm, Tadej Kotnik and Damijan Miklavčič]. -
Ljubljana : Faculty of Electrical Engineering, 2000

ISBN 961-6210-95-5

1. Jarm, Tomaž 2. Slovenian-Croatian Meeting on Biomedical
Engineering (1 ; 2000 ; Bled)
109217792

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prepovedano.

Printed by: Birografika BORI d.o.o., Ljubljana

Number of copies: 200

Organised by

Slovenian Society for Medical and Biological Engineering
Faculty of Electrical Engineering, University of Ljubljana
Institute of the Republic of Slovenia for Rehabilitation
Croatian Medical and Biological Engineering Society

Under the auspices of

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Sponsored by

Ministry of Science and Technology of the Republic of Slovenia

European Union Commission

Forschungsgemeinschaft Funk e.V., Bonn, Germany

IEEE/EMB - The Institute of Electrical and Electronics Engineers,
Engineering in Medicine and Biology Society

Institute of the Republic of Slovenia for Rehabilitation, Ljubljana, Slovenia

Faculty of Electrical Engineering, University of Ljubljana, Ljubljana, Slovenia

OrthoLogic, Phoenix (AZ), USA

Consorzio Elletra 2000, Bologna, Italy

EBEA - European Bioelectromagnetics Association

EMF Therapeutics, Inc., Chattanooga (TN), USA

IGEA, s.r.l., Carpi (MO), Italy

Biocore Technologies, Loma Linda (CA), USA

Ministry of Health of the Republic of Slovenia

URSI Commission K - International Union of Radio Science, Commission K -
Electromagnetics in Biology and Medicine

BEMS - Bioelectromagnetics Society

Avtotehna Biro, d.o.o. Ljubljana, Slovenia

Institute of Oncology, Ljubljana, Slovenia

SIIC - Sociedad Iberoamericana de Informacion Cientifica

Foreword

Dear Friends and Colleagues,

We hope You had a pleasant trip and would like to extend to You a very warm welcome to Bled and Slovenia. We would like to wish all of You a scientifically successful and socially enjoyable 3rd International Conference on Bioelectromagnetism and 1st Slovenian-Croatian Meeting on Biomedical Engineering. Our welcome and wishes also go to the attendees of the COST 244bis Workshop and Management Committee Meeting.

The area of bioelectromagnetism is not necessarily a well defined and recognised area of research. However, Your interest in this area clearly demonstrates its viability and importance. The conference covers different aspects of bioelectromagnetism including beneficial and harmful effects of electromagnetic fields on biological systems. We hope that we have managed to organise your scientific contributions in relevant scientific sessions: Electroporation, Theory and Models, Technology and Devices, Bioelectromagnetic Measurements, Fundamental Mechanisms of EMF Interactions, Soft Tissue and Bone Healing, Electric and Magnetic Stimulation, and EMF Health Risk Effects and Dosimetry. For each of the sessions listed, we can proudly announce that high quality papers have been submitted and prominent experts in respective fields are present at the Conference.

This Conference is supported on several levels. We would like to thank all the sponsoring and participating societies, companies, associations, agencies and institutions. Special thanks go to the members of the international Scientific Committee who helped us in preparing a program, which is, we hope, both scientifically rich and of high quality. We all need to thank those sponsors who were kind enough to financially support these events so that we can enjoy the company of each other not only in the conference room but also over good food and other social events.

Of course we cannot guaranty that the weather will be kind to us during the Conference, but we can assure You that we shall try to provide a warm atmosphere.

On behalf of the Organising Committee,

Yours sincerely,

A handwritten signature in black ink, appearing to read 'D. Miklavčič', with a stylized flourish at the end.

Damijan Miklavčič

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GENERAL INFORMATION

Venue

Bled is a small town in the north-west part of Slovenia located at the foothills of Julian Alps and Karavanke Mountains. It is one of the leading tourist resorts in Slovenia with a long-time tourist tradition. Bled offers a healthy sub-alpine climate, magnificent scenery, and numerous possibilities for recreation and special interest excursions. For more information contact representatives of *Albatros Bled Agency* at the Conference.

3rd ICBEM and 1st SLO-CRO MBE will take place at the *Festival Hall Convention Centre* in Bled. The building is located on the bank of an alpine lake, a remnant of the last ice age. There is a small island with its idyllic Baroque church on the lake and a mighty medieval castle overlooks the town from a steep rock-cliff 100 metres above the lake. Festival Hall is at a ten minutes walking distance from all hotels and most other accommodation facilities in Bled.

Registration

The Registration and Information Desk is organised in lobby of the Festival Hall Convention Centre. The Registration Desk will be open on Sunday 17-20h, on Monday from 7h, and on Tuesday, and Thursday from 8h in the morning to the end of the last scientific session of the day. If you need any information, please do not hesitate to contact the Registration and Information Desk or members of the Organising Committee.

For regular participants of 3rd ICBEM (including students), the registration fee includes admittance to all scientific sessions, conference materials, the Proceedings book, coffee breaks, lunches, the Get-together Party, Cocktail and Conference Banquet, excursion to the Institute for Rehabilitation in Ljubljana and visit to Postojna Caves. For accompanying persons, the registration fee includes the Get-together Party, Cocktail and Conference Banquet, daily trips and lunches (see the Accompanying Persons' Program).

Instructions for Authors

Scientific Sessions

All abstracts are assigned to one of the following *Scientific Sessions*:

- EP:** Electroporation
- TM:** Theory and Models
- TD:** Technology and Devices (parts I and II)
- BM:** Bioelectromagnetic Measurements (parts I and II)
- FM:** Fundamental Mechanisms of EMF Interactions
- ST:** Soft Tissue and Bone Healing
- EM:** Electric and Magnetic Stimulation
- HR:** EMF Health Risk Effects and Dosimetry

Within each scientific session the abstracts are further divided between platform and poster presentations. Each abstract is associated with a unique *identifying code* consisting of two letters identifying the corresponding scientific session (see the list above) followed by a consecutive number within the scientific session and an "L" or a "P" for platform (lecture) or poster presentation respectively. E.g., **TM-3L** identifies the **third** abstract within the **Theory and Models** scientific session which is to be presented as a **lecture**. These ID codes can be found next to each abstract's title further on in the *Scientific Program* and at the top of each abstract in the *Abstracts* section.

Platform Sessions

Authors of platform presentations (lectures) should report to chairs of their Scientific Session prior to the start of the session. Authors should limit their lectures to approximately 12 minutes thus leaving the last 3 minutes of the 15 minutes block for discussion. The presentation time for individual lectures can be found in the *Scientific Program*.

Poster Viewing Sessions

Posters (dimensions maximum 95 cm wide by 160 cm high) should be mounted in the Sunday afternoon between 17:00 and 20:00 hours. Each poster must be mounted on the board equipped with the corresponding ID code. There are three official *Poster Viewing Sessions* allocated during the conference (see below). The authors are expected to be present at their posters during the poster viewing period to which their *Scientific Session* is assigned. Posters should be removed on Tuesday in the afternoon after the last platform scientific session of the day.

Poster Viewing	When	For posters belonging to Scientific Sessions:
Part I	Monday (16:00-17:00)	EP: Electroporation TM: Theory and Models TD: Technology and Devices
Part II	Tuesday (10:00-11:00)	BM: Bioelectromagnetic Measurements FM: Fundamental Mechanisms of EMF Interactions ST: Soft Tissue and Bone Healing
Part III	Tuesday (15:30-16:30)	EM: Electric and Magnetic Stimulation HR: EMF Health Risk Effects and Dosimetry

Student Award Competition

The best platform and poster presentation of students will be selected by a special Committee. Only students without a Ph.D. degree and younger than 35 years are eligible for this competition and are required to present their work in person. The awards will be presented during the last official event of 3rd ICBEM on Thursday in the afternoon.

Parallel Events

COST 244bis Meeting

The final in the series of meetings of *COST 244bis Action on Biomedical Effects of Electromagnetic Fields* will take place on 7-8 October 2000 in Bled. This meeting includes the 11th Workshop on Biomedical Applications and COST 244bis Management Committee Meeting. It is noteworthy that the first meeting of COST 244 Action group was also organised in Bled in 1993.

COST stands for European Co-operation in the field of Scientific and Technical research. This open and flexible framework was set up in 1971 and now involves 25 countries from the European Union, the Central and Eastern European countries, and Turkey. COST Actions involve pre-competitive or basic research and activities of public utility. COST Actions exist in over 15 research domains, the largest being COST Telecommunications which also includes the *COST 244bis* Action. COST 244 was started in 1992. Commencing in 1996, the COST 244bis Action is an extension of the original COST 244 Action. As its predecessor, COST 244bis focuses on co-ordination of European research in the area of biomedical effects of electromagnetic fields, on co-ordination and promotion of national research activities in this area at European level, and on stimulation of multidisciplinary collaboration between experts in medicine, biology, electrical engineering, physics etc. More information about specific activities of COST 244 and COST 244bis Actions can be found at:

<http://www.radio.fer.hr/cost244/>

The first official day of 3rd ICBEM and 1st SLO-CRO MBE overlaps with the final meeting of COST 244bis Action Group. The topics covered by COST meeting are related to those covered by 3rd ICBEM and 1st SLO-CRO MBE. *All participants to 3rd ICBEM have free admittance to the COST 244bis scientific sessions.*

1st SLO-CRO Meeting on Biomedical Engineering

Co-operation between Croatian and Slovenian research groups which are involved in biomedical engineering has a long-lasting tradition. 3rd ICBEM is an excellent opportunity to formalise the relationships between researchers from the two neighbouring countries and to initiate a series of regular SLO-CRO meetings on biomedical engineering. The 2nd SLO-CRO Meeting on Biomedical Engineering will be held in Pula, Croatia, in the year 2001.

Within the framework of 1st SLO-CRO MBE, the one-day *Workshop on Clinical Engineering* will be organised by the Commission for Clinical Engineering of the *Slovenian Society for Medical and Biological Engineering* on Tuesday, 10 October. The topic of this workshop is the assurance of impeccability and safety of medical appliances. The program of the workshop includes presentation of education and internet tools for clinical engineering, presentation of recent changes in Slovenian legislation in the area of clinical engineering, presentation of current status of clinical engineering in Croatia, and presentation and practical demonstration of new methods for medical equipment testing.

EBEA Council Meeting

Council Meeting of the *European Bioelectromagnetics Association* will take place on Sunday, 8 October, at 17:00-20:00 in the *White Lounge* in Grand Hotel Toplice (for members only).

ISBEM Council and General Meeting

General Assembly Meeting of the *International Society for Bioelectromagnetism* will take place on Monday, 9 October, at 18:00 in *Festival Hall*. It will be followed by ISBEM Council Meeting at about 19:00 in the *White Lounge* in Grand Hotel Toplice (for members only).

Social Events

Social events of 3rd ICBEM are also listed in the *Scientific Program* on the following pages. They are summarised here.

Sunday, 8 October, 20.00: **Get-together Party** (in the lobby of the Festival Hall)

Monday, 9 October, 9:15: **Official photography session** (in front of the Festival Hall) **and Toast**

Tuesday, 10 October, 19:30 **Cocktail and Conference Banquet** (Grand Hotel Toplice)

Wednesday, 11 October **Excursion** (estimated time schedule is given)

9:00 Buses leave from in front of Grand Hotel Toplice (for all participants including accompanying persons).

10:30-... Visit to the *Institute of the Republic of Slovenia for Rehabilitation*, a well known and established institution located in Slovenia's capital Ljubljana.

14:00 Lunch.

16:00-... Visit to the world famous *Caves of Postojna*. This large system of Karst caves features magical underworld of stalactites and stalagmites, that has been visited by more than eight million people.

19:30 Buses return to Bled.

Accompanying Persons' Program

All accompanying persons are invited to meet with the organiser of their special program over a coffee on Monday, 9 October, at 8:30 in the morning at **Grand Hotel Toplice** to get the detailed information about the program, which will include (for the minimum of 5 persons):

- Monday: A ride by a horse-driven buggy around **Lake Bled** and trip to the beautiful and peaceful alpine valley of **Lake Bohinj**. The drive will take you through the typical Alpine villages down to the Gothic St. John the Baptist church at the end of the Lake Bohinj and then along the lake's shore to the waterfall Savica, that can be reached by foot in about 20 minutes. (lunch included)
- Tuesday: Trip to the old mining town of **Idrija** where mercury was produced until recently. Idrija is famous for its technical museum with a fantastic display of the history of production of "quick silver" and for the craft of bobby lace making. (lunch included)
- Wednesday: Excursion to the **Institute for Rehabilitation** in Ljubljana and visit to **Postojna Caves** together with participants of 3rd ICBEM (see Social Events).
- Thursday: Trip to **Kropa** and **Radovljica**. Kropa is an old iron-forging place. The little towns keeps its original appearance and you will be able to visit a small blacksmith museum showing the way of craftsmen's life of the past. In the mediaeval town of Radovljica, most of the houses in the old town are decorated with frescoes. The rococo-style manor in Radovljica is housing an interesting museum of apiculture with its unique collection of the painted front panels of the bee-hives. (lunch included)