

*Excellentia ante omnia*

# **Twenty-Sixth Annual Meeting Technical Program & Registration**

Omni Shoreham Hotel  
Washington, D.C.  
June 20 - 24, 2004

**THE BIOELECTROMAGNETICS SOCIETY**

**2003 - 2004**

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## **FROM THE CHAIR OF THE TECHNICAL PROGRAM COMMITTEE**

The Bioelectromagnetics Society (BEMS) embarks on its second quarter century with this, the 26<sup>th</sup> annual meeting at the Omni Shoreham Hotel in Washington, D.C. just at the time the world is four years along its time path into a new century. These words were chosen with a purpose; BEMS has truly become an international society as evidenced by its membership being over fifty percent international and by the fact that more than half of the abstracts came from authors and laboratories outside of the United States. The viewpoint of BEMS, the voice of its membership and the impact of the papers presented at its annual meeting elicit worldwide responses. The technical program committee and I are pleased to welcome authors, family members, members of government and private agencies, members of the press and attendees to this scientific event. We hope every person that attends this meeting comes with the expectation of participating in a truly outstanding meeting and we are confident that such expectations will be met.

It is with great pleasure that I report over 270 abstracts were submitted for the meeting and, of these, about 70 abstracts were submitted by students. The number of student submissions indicates a very healthy increase from the number of student submissions at the last meeting. This new data point fits nicely on a growth curve showing student involvement in the meeting that was established as a goal by the Awards Committee nearly five years ago. BEMS is committed to enhancing student participation in the annual meeting and it is apparent that it is meeting that commitment.

There is no doubt that bioelectromagnetic research is being actively conducted worldwide and the results of this research have the potential of touching lives everywhere. BEMS was established to be one of the premier scientific societies that would provide, at its annual meeting and through the journal, Bioelectromagnetics, a forum for researchers in such diverse areas as medicine, engineering, biology and physics to interact and to advance the science. The 26<sup>th</sup> annual meeting has been designed to showcase exciting new research at very high (THz) frequencies, to encourage dialog in areas such as epidemiology and health effects and to provide attendees a look at some developing medical applications that make use of electromagnetic fields. I hope the meeting has been properly designed such that it will encourage dialog, allow new ideas to propagate and allow controversy, when it arises, to be addressed in scholarly scientific discussions.

I want to thank the technical program committee for their dedicated work in putting this meeting together. Committee members have reviewed papers, volunteered to organize focus sessions, developed contacts with invited speakers and volunteered to be chairs of sessions. A number of other BEMS members have graciously agreed to chair sessions as well. It is truly the work of the Technical Program Committee, the session chairs and the dedicated staff in the BEMS office that allow me to welcome everyone to what will be, once again, "the best meeting yet."

Bruce R. McLeod  
Chair, Technical Program Committee  
2004 Annual Meeting

## REGISTRATION INFORMATION

*The meeting registration form for the Twenty-Sixth Annual Technical Meeting of BEMS is located in the center of this Program. Advanced registration is strongly recommended to take advantage of the reduced rates and to save time at the conference.*

### **POSTMARK DEADLINE FOR ADVANCED REGISTRATION WITH PAYMENT IS JUNE 1, 2004**

Registrations will be accepted after that date but at the late registration fee. The registration fee includes participation in all scientific sessions, the welcoming reception Sunday evening, June 20, continental breakfast and refreshment breaks daily and the Social Event.

Participants wishing to include spouses or guests at any of the following meal functions must purchase additional tickets in advance for: the Spouse Breakfast on Monday and the Social Event on Tuesday.

One day registration includes participation in the scientific sessions only for the specific day of registration. ***Meal tickets must be purchased separately.***

### **ANNUAL MEETING REGISTRATION FEES**

	<u>Before June 1, 2004</u>	<u>After June 1, 2004</u>
Member	US \$400	US \$465
Non-Member	\$470	\$535
Student/Emeritus	\$225	\$290
One Day	\$225	\$290

### **BEMS REGISTRATION DESK**

The BEMS registration desk at the Omni Shoreham will be open during the following hours:

Sunday, June 20	12:00pm – 8:00pm
Monday, June 21	7:00am – 5:00pm
Tuesday, June 22	7:30am – 5:00pm
Wednesday, June 23	7:30am – 5:00pm
Thursday, June 24	7:30am – 12:00pm

### **REGISTRATION CANCELLATION POLICY**

Refunds are offered only for medical emergencies. No refunds will be given after **June 01, 2004**. There are no refunds for no shows.

### **THE US IRS**

*Dues, subscriptions and other payments to The Bioelectromagnetics Society are not deductible as charitable contributions for federal income tax purposes. The foregoing may be deductible as professional or business expenses. Discuss with your accountant or tax advisor.*

## GENERAL INFORMATION

### MEETING LOCATION

The 26th Annual Meeting will be held at the Omni Shoreham Hotel, 2500 Calvert Street NW, (at Connecticut Ave.) Washington, District of Columbia 20008 Phone: 1-202-234-0700 Reservations direct: 1-202-756-5125, 1-800-843-6664, Fax: (202) 265-7972.

Check-in: 3:00 pm Check-out: 12:00 pm. Our group rate (2004 government per diem rate for DC) is \$150.00 US single or \$170.00 US double *exclusive of 14.5% tax.*

Nestled on 11 acres of lush green landscaping in Rock Creek Park, this historic landmark offers a resort atmosphere in dynamic Washington, D.C. The renowned AAA Four-Diamond/Mobil Four-Star hotel has played host to presidents, world leaders and celebrities since 1930. The Omni Shoreham is located:

- Half a block from the metro;
- One block from the shopping and restaurants of Adams Morgan;
- Two blocks from the National Zoo (free admission);
- Walking distance to the National Cathedral;
- 5 minutes away from boating on the Potomac River;
- 10 minutes from the National Mall, the Lincoln Memorial, Vietnam Veterans Memorial, the White House, the Capitol and Smithsonian Institute;
- 10 minutes from Dupont Circle, the Kennedy Center for the Performing Arts, the National Gallery of Art and other national museums;
- 10 minutes from the Tidal Basin, home of the Franklin D. Roosevelt and Jefferson Memorials;
- 30 minutes from Mount Vernon, the estate of George and Martha Washington.

### INSURANCE

Neither the Society nor Association Services International, Inc. is liable for personal injuries, loss or damage to private property for participants, students, accompanying persons either during or indirectly arising from BEMS 2004. Participants should make their own arrangements with respect to health, accident and travel insurance.

### TRAVEL ARRANGEMENTS

Individuals are responsible for their own travel arrangements. We have no designated official airline carrier or agency for BEMS 2004.

**Shuttle Services:** The Omni Shoreham recommends booking a shuttle from the airport. Super Shuttle is located at all three airports and will cost around \$10 from Reagan (DCA), \$22 from Dulles (IAD), and \$31 from Baltimore (BWI). Reservations can be made at [www.supershuttle.com](http://www.supershuttle.com). The Omni has a private shuttle going TO the airports from the hotel; reservations must be made through the concierge. Prices range from \$10-\$44 plus \$10 for each extra person – if you would like to split this cost with a group you must all make the reservations at the same time with the concierge.

**Metro Rail:** If you are arriving at Reagan (DCA), take the metro (yellow line in the direction of Mount Vernon Square) to Gallery Place/Chinatown. Change to the red line in the direction of Shady Grove. Take the red line to the Woodley Park/Zoo/Adams Morgan stop. Take the escalator exit, and when you reach the street, turn right. Cross the street (towards the Marriott hotel). Turn left, walk to traffic light, and cross the street to the Omni Shoreham (straight ahead).

**Taxi Services:** Taxi prices will be around \$20 from Reagan (DCA), \$50 from Dulles (IAD) and \$65 from Baltimore (BWI).

### REFRESHMENTS

Registrants will receive continental breakfasts and coffee breaks Monday through Thursday in the Blue Prefunction Room and Palladian Ballroom where the posters will be displayed. This will provide attendees the maximum opportunities to view the posters in addition to the three poster sessions; A, B and C.

Meal tickets **must** be purchased in advance for the Box lunch for the Annual Business Meeting on Wednesday, June 23.

## ABSTRACTS

The Twenty-Sixth Annual Meeting Abstract Book will be available on the BEMS website: [www.bioelectromagnetics.org](http://www.bioelectromagnetics.org) June 1, 2004.

***For the first time, the Abstract Book will not be printed and will be distributed ONLY on a CD Rom to the registrants.***

Attendees may wish to download the Abstract Book and print out abstracts prior to attending the meeting.

## PLATFORM (ORAL) SESSIONS

Simultaneous sessions will be held in the Blue Room and the Diplomat Ballroom at the times indicated in the Program schedule.

***The total time for each platform presentation is 10 minutes unless otherwise noted. BEMS requires compliance to stay on schedule.***

Each session will have an overhead projector and a LCD projector for computer presentations using Microsoft PowerPoint. Our meeting procedures require all presentations to be loaded onto the BEMS computer.

***Under no circumstances will presenters be allowed to use their own computers for presentation.***

Speakers who want to use computer projection must provide the BEMS AV technician with their presentation ***the day before*** their session, on either a CD ROM or USB memory stick. It is the BEMS policy to delete speaker's files from the presentation computer at the conclusion of the Annual Meeting.

## STUDENTS

In memory of Charles Polk, BEMS is pleased to announce the Charles Polk Memorial Student Platform Session on Wednesday morning. By grouping these student platform presentations together without a concurrent session, we hope to maximize attendance. All other student presentations throughout the Annual Meeting are identified in the Program as **STUDENT**.

***Student awards will be presented Thursday at 12:15pm in the Blue Room.***

## POSTER SESSIONS

Posterboards will be assembled Sunday and will remain until the conclusion of Poster Session C, Wednesday, June 23 at 7pm. The boards in both rooms will be numbered to correspond with the numbers assigned in the Program and student posters will be clearly identified. Authors are asked to be present at their poster on the day and time scheduled in the Program.

- Authors of P-A posters should be present at their posters on Monday for Poster Session A (from 3:30pm-5:30pm).
- Authors of P-B posters should be present at their posters on Tuesday for Poster Session B (from 1:00pm-3:00pm).
- Authors of P-C posters should be present at their posters on Tuesday for Poster Session C (from 3:30pm-5:30pm).

Authors must remove their posters by Wednesday, June 23 at 5pm. BEMS and Association Services International, Inc. are not responsible for damaged or lost poster materials.

## **ANCILLARY EVENTS & ACTIVITIES**

**WEDNESDAY, JUNE 16**

### **COURSE ON NEW ICES ELF STANDARD CONDUCTED BY ICES SC-3 MEMBERS**

8:00am – 5:00pm

**THURSDAY, JUNE 17**

### **IEEE SCC-34**

8:00am – 12:00pm; Capital Room

### **ICES SC-1**

1:00pm – 5:00pm; Capital Room

### **ICES SC-5**

7:00pm – 10:00pm; Capital Room

**FRIDAY, JUNE 18**

**ICES SC2 MEETING**

8:00am – 12:00pm; Ambassador Ballroom

**ICES SC3 MEETING**

1:00pm – 5:00pm; Ambassador Ballroom

**ICES ExCom MEETING**

7:00pm – 10:00pm; Ambassador Ballroom

**SATURDAY, JUNE 19**

**ICES SC4 MEETING**

8:00am – 5:00pm; Congressional Room

**IEEE COMAR MEETING**

7:00pm – 10:00pm; Congressional Room A

**2005 BIOELECTROMAGNETICS PLANNING COMMITTEE MEETING**

9:00am – 4:00pm; Executive Room

**SUNDAY, JUNE 20**

**ICES/SCC-28 MEETING**

8:00am – 12:00pm; Diplomat Ballroom

**BEMS BOARD OF DIRECTORS MEETING**

8:00am - 5:00pm; Cabinet Room

**U.S. AIR FORCE LABORATORY WORKSHOP:  
MEASURING AND MODELING THERMAL  
RESPONSES TO DIRECTED ENERGY  
EXPOSURE**

1:00pm – 5:00pm; Diplomat Ballroom

**REGISTRATION**

12:00pm – 7:00pm; Diplomat Foyer

**POSTER SETUP**

1:00pm – 7:00pm;  
Blue Room Prefunction and Palladian Ballroom

**WELCOMING RECEPTION**

5:00pm - 7:00pm; Empire Ballroom

**MONDAY, JUNE 21**

**GUEST/SPOUSE BREAKFAST\***

9:00am; Location: Roberts Restaurant  
*\*Breakfast must be purchased by the end of  
Registration on Sunday evening.*

**POSTER SESSION A**

3:30pm – 5:30pm; Palladian Ballroom & Blue  
Room Prefunction

**URSI COMMISSION K BUSINESS  
MEETING**

5:30pm – 6:00pm; Diplomat Ballroom

**EDITORIAL BOARD DINNER**

6:30pm; Meet in lobby

**TUESDAY, JUNE 22**

**POSTER SESSION B**

1:00pm – 3:00pm; Palladian Ballroom & Blue  
Room Prefunction

**POSTER SESSION C\***

3:30pm – 5:30pm; Blue Room Prefunction and  
Palladian Ballroom  
*\*Posters must be dismantled by Wednesday at  
5pm.*

**TUTORIAL SESSION 1: High-Throughput  
Screening Techniques in EMF Research**

3:30pm-5:50pm; Blue Room

**SOCIAL EVENT\***

6:30pm  
*\*Badges for guests to attend the Social Event  
must be purchased before Registration closes on  
Sunday evening.*

**WEDNESDAY, JUNE 23**

**CHARLES POLK MEMORIAL STUDENT  
SESSION**

8:00am – 12:00pm; Blue Room

**BEMS ANNUAL BUSINESS MEETING\***

12:00pm – 1:30pm; Blue Room  
*\*Box lunches for the Annual Business Meeting  
must be purchased by Tuesday, June 22.*

**EMF DOSIMETRY HANDBOOK PROJECT**

5:00pm-7:00pm; Blue Room

**THURSDAY, JUNE 24**

**STUDENT AWARDS CEREMONY**

12:15pm; Blue Room

- **The Curtis Carl Johnson Memorial Awards** will be presented by awards committee chair Marko Markov in recognition of the best student scientific paper presented by platform and by poster.
- **Additional student awards** will be presented in recognition of the 2<sup>nd</sup> and 3<sup>rd</sup> place student platform and poster presentations.

**BEMS BOARD OF DIRECTORS MEETING\*\***

1:00pm – 4:00pm; Cabinet Room

*\*\*Nominees on the BEMS ballot should plan their travel and attend this Board Meeting if elected.*

**TUTORIAL SESSION 2: MURI SYMPOSIUM**

2:00pm-5:00pm; Blue Room

Chairs: Joe Roti-Roti and Martin Meltz

The US Air Force Office of Scientific Research (AFOSR) has awarded two Multiple University Research Initiative (MURI) grants to study unique extremely high peak power ultrawideband EMF pulses; some narrowband signals are also being investigated. The Principal Investigator of one of the grants is Karl Schoenbach of Old Dominion University, Virginia. The Principal Investigator of the second grant is Charles Tseng of Purdue University-Calumet. Other (but not all) investigators and institutions associated with the ODU grant include Stephen Beebe, Eastern Virginia Medical School, James Weaver, Harvard/MIT Division of Health Sciences and Technology, Susan Hagness, University of Wisconsin, Madison, and Joe Roti Roti, Washington University School of Medicine, St. Louis. Other investigators and institutions are associated with the Purdue University-Calumet grant. Additionally, Andre Pakhomov at the Air Force Research Laboratory, Brooks City-Base, is investigating the unique pulses.

The MURI Symposium will include a keynote presentation by Karl Schoenbach, with additional invited presentations by Charles Tseng, Steven Beebe, Jim Weaver, and Andre Pakhomov. Abstracts for the symposium will be available at the meeting.

**TUTORIAL SESSION 3: RESEARCH RELATED TO THE EFFECT OF RADIO-FREQUENCY ENERGY ON MICRONUCLEUS FORMATION**

2:00pm-5:00pm; Diplomat Ballroom

The Food and Drug Administration (FDA) continues to receive inquiries about the safety of wireless phones. In order to insure that needed research is conducted to address the public's concerns, FDA has signed a cooperative research and development agreement (CRADA) with The Cellular Telecommunication & Internet Association (CTIA). Under the terms of the CRADA, the FDA provides research recommendations and research oversight and CTIA will fund research into the health effects of radio frequency (RF) emissions from wireless phones.

Three laboratories were funded to investigate the effects of exposure to radio frequency radiation from wireless communication devices on micronucleus formation.

Discussing their research findings will be:

- Dr. Raymond Tice, Integrated Laboratory Systems, Research Triangle Park, NC.
- Dr. Maria Scarfi, Interuniversity Center on Interaction between Electromagnetic Fields and Biosystems, Naples and Rome, Italy.
- Dr. Clemens Dasenbrock, The Fraunhofer Institute of Toxicology and Aerosol Research, Hannover, Germany.

Invited panel members:

Dr. James McGregor (FDA)

Dr. Greg Lotz (NIOSH)

Dr. Russell Owen (EPA)

Funded through a CRADA between FDA and CTIA.

## **PLENARY SESSIONS**

**MONDAY, JUNE 21**

### **PLENARY SESSION I:**

- **NIH FUNDING UPDATE**
- **PULSED HV FIELDS**

8:30-10:00am; Blue Room

**NIBIB/NIH EXTRAMURAL RESEARCH PROGRAMS UPDATE.** William Heetderks, NIBIB, NIH, Bethesda, MD 20892, USA.

**ULTRASHORT ELECTRICAL PULSES OPEN A NEW GATEWAY INTO CELLS.** Karl Schoenbach, ODU, Norfolk, VA 23510, USA.

The initial focus for the day will be funding and the exciting new research area of ultrashort electrical pulses. We will continue with the results of major studies focusing on the assessment of the biological effects of electromagnetic field exposure from the animal level to humans.

**TUESDAY, JUNE 22**

### **PLENARY SESSION II:**

- **THz RESEARCH**

8:00-9:30am; Blue Room

**THz RESEARCH AN OVERVIEW.** Robert Osiander, Johns Hopkins University/APL, Laurel, MD 20723, USA.

THz research has moved slowly due to a lack of sources and detectors in this frequency range. That has now changed and research into the uses of THz frequencies is increasing at a phenomenal rate. Exciting advances in absorption and theoretical models are also presented by a number of researchers.

**THURSDAY, JUNE 24**

### **PLENARY SESSION III:**

- **THz SCIENCE AND ITS MEDICAL POTENTIAL**
- **BIOFILMS, CLINICAL INFECTIONS AND A ROLE FOR EM FIELD CONTROL**

8:00-9:30am; Blue Room

**APPLICATIONS OF TERAHERTZ FREQUENCY RADIATION IN MEDICINE AND BIOLOGY: A NEW TOOL FOR DIAGNOSIS, THERAPY AND ANALYSIS.** Martyn Chamberlain, University of Durham, Medical Imaging, UK.

**THE USE OF ULTRASOUND FOR BIOFILM STERILIZATION.** William Pitt, Brigham Young University, Chemical Engineering, Provo, UT 84602, USA.

Research with terahertz frequencies is providing new insights about conformational changes in biomolecules. Ultrasound and DC electric fields are providing tools for combating persistent bacterial biofilms. These concluding sessions examine some of the many advances that are being made with using EMF for diagnosis, therapy and analysis of biological systems.