

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 26th 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 26th 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. 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/China-town. 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 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; Marriott Wardman Park Hotel,
Nathan Hale Room

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:

PHILLIPS FLAGSHIP RESTAURANT

6:30pm Load Buses; This famous seafood restaurant is located right on the Potomac River.

Their delicious all you can eat buffet includes a wonderful variety of seafood - baked, steamed & fried, along with baked ham, carved beef, chicken, and a bountiful medley of soups, salads, pastas, rice and desserts.

**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 2nd and 3rd 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.

TIME	BEMS 26th Annual Meeting SCHEDULE AT A GLANCE	LOCATION
	<u>WEDNESDAY, JUNE 16</u>	
8:00 am – 5:00 pm	Course on new ICES ELF Standard conducted by ICES SC-3 Members	Marriott Wardman Park Hotel- Nathan Hale Room
	<u>THURSDAY, JUNE 17</u>	
8:00 am – 12:00 pm	IEEE SCC-34	Capital Room
1:00 pm – 5:00 pm	ICES SC-1	Capital Room
7:00 pm – 10:00 pm	ICES SC-5	Capital Room
	<u>FRIDAY, JUNE 18</u>	
8:00 am – 12:00 pm	ICES SC2	Ambassador Ballroom
1:00 pm – 5:00 pm	ICES SC3	Ambassador Ballroom
7:00 pm – 10:00 pm	ICES ExCom Meeting	Ambassador Ballroom
	<u>SATURDAY, JUNE 19</u>	
8:00 am – 5:00 pm	ICES SC4	Congressional Room
9:00 am – 4:00 pm	2005 <i>BIOELECTROMAGNETICS</i> Planning Committee Meeting	Executive Room
7:00 pm – 10:00 pm	IEEE COMAR Meeting	Congressional Room A
	<u>SUNDAY, JUNE 20</u>	
8:00 am - 12:00 pm	ICES Committee Meeting	Diplomat Ballroom
8:00 am - 5:00 pm	BEMS BOARD OF DIRECTORS MEETING	Cabinet Room
12:00 pm - 7:00 pm	Registration	Diplomat Foyer
1:00 pm - 7:00 pm	POSTER SET-UP in two ballrooms: one on the east wing and one on the west wing	Palladian Ballroom & Blue Room Prefunction
1:00 pm - 5:00 pm	U.S. AIR FORCE LABORATORY WORKSHOP: Measuring and Modeling Thermal Responses to Directed Energy Exposure	Diplomat Ballroom
3:00 pm - 7:00 pm	<i>LOADING TIME FOR MONDAY PRESENTATIONS</i>	
5:00 pm - 7:00 pm	Welcoming Reception	Empire Ballroom
	<u>MONDAY, JUNE 21</u>	
9:00 am	Spouse Breakfast	Roberts Restaurant
8:00 am - 10:00 am	Welcome & PLENARY SESSION I: <ul style="list-style-type: none"> • NIH Funding Update • Pulsed HV Fields 	Blue Room
10:30 am - 12:00 pm	SESSION 1: Pulsed HV Research & Applications SESSION 2: Epidemiology	Blue Room Diplomat Ballroom
12:00pm – 1:00pm		Lunch
1:00 pm - 3:00 pm	SESSION 3: EMF Therapies SESSION 4: In Vivo Studies	Blue Room Diplomat Ballroom

<p>3:00 pm - 5:00 pm</p> <p>3:30 pm - 5:30 pm</p> <p>5:30 pm – 6:00 pm</p> <p>6:30pm - 9:30pm</p>	<p style="text-align: center;"><u>MONDAY, JUNE 21</u> <i>(continued)</i></p> <p><i>LOADING TIME FOR TUESDAY PRESENTATIONS</i></p> <p>POSTER SESSION A: two rooms</p> <p>URSI Commission K Business Meeting</p> <p>Editorial Board Dinner</p>	<p>Palladian Ballroom & Blue Room Prefunction</p> <p>Diplomat Ballroom</p> <p>Meet in Lobby</p>
<p>8:00 am - 9:30 am</p> <p>10:00 am - 12:00 pm</p> <p>12:00 pm - 1:00 pm</p> <p>1:00 pm - 3:00 pm</p> <p>3:30 pm – 5:30pm</p> <p>3:00 pm - 5:00 pm</p> <p>3:30 pm - 5:50 pm</p> <p>6:30 pm</p>	<p style="text-align: center;"><u>TUESDAY, JUNE 22</u></p> <p>PLENARY SESSION II: THz Research</p> <p>SESSION 5:Thz Applications in Biology & Medicine SESSION 6: Mechanisms & Modeling</p> <p>POSTER SESSION B: two rooms POSTER SESSION C: two rooms</p> <p><i>LOADING TIME FOR WEDNESDAY PRESENTATIONS</i></p> <p>TUTORIAL SESSION 1: High-Throughput Screening Techniques in EMF Research</p> <p>SOCIAL EVENT</p>	<p>Blue Room</p> <p>Blue Room Diplomat Ballroom</p> <p>Lunch</p> <p>Palladian Ballroom & Blue Room Prefunction</p> <p>Senate Room</p> <p>Blue Room</p>
<p>8:00 am - 12:00 pm</p> <p>12:00 pm - 1:30 pm</p> <p>1:30 pm - 3:00 pm</p> <p>3:00 pm - 5:00 pm</p> <p>3:30 pm - 5:00 pm</p> <p>5:00 pm – 7:00 pm</p>	<p style="text-align: center;"><u>WEDNESDAY, JUNE 23</u></p> <p>CHARLES POLK MEMORIAL STUDENT SESSION</p> <p><i>BEMS ANNUAL BUSINESS MEETING (purchase box lunch tickets)</i></p> <p>SESSION 7: RF studies SESSION 8: Biophysical & Biological Dosimetry I</p> <p><i>LOADING TIME FOR THURSDAY PRESENTATIONS</i></p> <p>SESSION 9: InVitro Studies SESSION 10: Instrumentation & Methodology</p> <p>EMF Dosimetry Handbook Project</p>	<p>Blue Room</p> <p>Blue Room</p> <p>Blue Room Diplomat Ballroom</p> <p>Blue Room Diplomat Ballroom</p> <p>Blue Room</p>
<p>8:00 am - 9:30 am</p> <p>10:00 am - 12:00 pm</p> <p>12:15 pm</p> <p>1:00 pm - 4:00 pm</p> <p>2:00 pm - 5:00 pm</p>	<p style="text-align: center;"><u>THURSDAY, JUNE 24</u></p> <p>PLENARY SESSION III:</p> <ul style="list-style-type: none"> • THz Science and Its Medical Potential • Biofilms, Clinical Infections and a Role for EM Field Control <p>SESSION 11: Biological Effects & Medical Applications SESSION 12: Biophysical & Biological Dosimetry II</p> <p>STUDENT AWARDS CEREMONY</p> <p>BEMS Board of Directors Meeting</p> <p>TUTORIAL SESSION 2: MURI Symposium TUTORIAL SESSION 3: Research Related to the Effect of Radiofrequency Energy on Micronucleus Formation</p>	<p>Blue Room</p> <p>Blue Room Diplomat Ballroom</p> <p>Blue Room</p> <p>Cabinet Room</p> <p>Blue Room Diplomat Ballroom</p>

TECHNICAL PROGRAM
TWENTY-SIXTH ANNUAL MEETING
MONDAY, JUNE 21

OPENING SESSION: 7:15- Breakfast; 8:00-8:30am, Blue Room
Welcome & Introduction: Shoogo Ueno, President
Program Highlights: Bruce McLeod, Technical Program Chair
General Announcements: Gloria Parsley, Executive Director

PLENARY SESSION I:

- **NIH FUNDING UPDATE**
- **PULSED HV FIELDS**
8:30-10:00am, Blue Room
Chair: Bruce McLeod

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.

10:00-10:30am BREAK

SESSION 1: PULSED HV RESEARCH & APPLICATION

Chairs: Joe Roti Roti and Marty Meltz
10:30am-12:00pm, Blue Room

1-1
INTRACELLULAR EFFECTS DUE TO EXTREMELY LARGE, SUBMICROSECOND ELECTRIC FIELD PULSES: THEORY AND MODELING. J.C. Weaver, D. A. Stewart,* Z. Vasilkoski* and T. R. Gowrishankar*. Harvard-MIT Div of Health Sci and Tech, Massachusetts Inst of Tech, Cambridge, MA 02139, USA.

1-2
HUMAN GENE EXPRESSION IN RESPONSE TO NANOSECOND PULSED ELECTRIC FIELDS. C.C. Tseng*¹, Z-M. Wang*¹, D.S. Johnson*¹, S.J. Beebe*², and K.H. Schoenbach*³. ¹Purdue Univ Calumet, Hammond, Indiana 46323, USA; ²Eastern Virginia Med School, Norfolk, VA 23510, USA; ³Old Dominion Univ, Norfolk, VA 23510, USA.

1-3
DYNAMIC EFFECTS OF NANOSECOND PULSED ELECTRIC FIELDS ON HUMAN CELL SIGNAL TRANSDUCTION AND FUNCTION. SJ Beebe*^{1,2,4}, C Tseng³, PF Blackmore*², J White*¹, E Hall*¹, and KH Schoenbach*⁴. ¹Center for Pediatric Res, Eastern VA Med School, Norfolk VA 23510; ²Dept of Physiological Sci, Eastern Virginia Medical School, Norfolk Virginia, 23501; ³Purdue University Calumet, Hammond Indiana 46323; ⁴Center for Bioelectrics Old Dominion Univ and Eastern Virginia Med School, Norfolk Virginia, 23510

SESSION 2: EPIDEMIOLOGY

Chairs: Leeka Kheifets and C.K. Chou
10:30am-12:00pm, Diplomat Ballroom

2-1
COMPARATIVE ANALYSIS OF RF EXPOSURE FROM MOBILE PHONES IN DIFFERENT GEOGRAPHICAL LOCATIONS. J.J. Morrissey, M. Kanda. Motorola Florida Research Labs, 8000 West Sunrise Blvd., Ft. Lauderdale, Florida, USA 33322.

2-2
EFFECT OF GSM CELLULAR PHONES ON HUMAN HEARING: METHODOLOGICAL APPROACH AND PRELIMINARY RESULTS. S. L. Bell*¹, N. Thomas *¹, M. Parazzini*², G. Thuroczy³, M. E. Lutman*¹, P. Ravazzani². ¹Inst of Sound & Vibration Res, Univ of Southampton, Hi SO17 1BJ, Southampton, UK; ²Inst di Ingegneria Biomedica CNR, 20133 Milano, Italy; ³Nat'l Res Inst for Radiobiology and Radiohygiene, Dept. of Non-Ionising Rad, 122 Budapest, Anna u.5, Hungary.

2-3
METHODS FOR ASSESSING OCCUPATIONAL EXPOSURES TO ELECTRIC AND MAGNETIC FIELDS FOR THE INTERPHONE STUDY OF MOBILE PHONES AND CANCERS OF THE HEAD. J.D. Bowman¹, D.L. Conover¹, S. Mann^{2*}, D. McLean*, L. Nadon^{3*}, P. Vecchia^{4*}, I. Deltour*, E. Cardis*. Int'l Agency for Res on Cancer, 150 Cours Albert Thomas, 69008 Lyon, France. ¹Nat'l Inst for Occupational Safety & Hlth, Cincinnati, OH, USA. ²Nat'l Radiological Protection Board, Didcot, Oxon, OX11 0RQ, UK. ³INRS—Inst Armand Frappier, Laval de Rapides, Quebec, Canada. ⁴Nat'l Inst of Hlth, Rome, Italy.

SESSION 1: PULSED HV RESEARCH & APPLICATION (*continued*)

1-4

THE RULES OF CELL SURVIVAL AFTER EXPOSURE TO HIGH-INTENSITY, ULTRASHORT ELECTRICAL PULSES. A. Andrei Pakhomov^{1,3}, Kerfoot Walker III¹, Juergen Kolb³, Karl Schoenbach³, ²Bruce Stuck, and Michael Murphy⁴. ¹McKesson BioServices Corporation, ^{1,2}US Army Med Res Detachment, Brooks City-Base, San Antonio, TX, USA; ³Center for Bioelectrics, Old Dominion Univ., Norfolk, VA, USA; ⁴Directed Energy Bioeffects Division, Human Effectiveness Directorate, Air Force Res Lab, Brooks City-Base, San Antonio, TX, USA.

1-5

ULTRAWIDEBAND ELECTROMAGNETIC RADIATION (UWB EMR) EXPOSURES AND ACTIVATION OF SIGNAL TRANSDUCTION PATHWAY. M. Natarajan¹, B.K. Nayak^{1*}, S.P. Mathur², C. Galindo^{1*}, M.L. Meltz¹. ¹Dept of Radiation Oncology, University of Texas Health Science Center at San Antonio, ²McKesson BioServices, US Army Med Res Detachment, Brooks City-Base, San Antonio, TX 78235 USA.

1-6

POTENTIAL EFFECTS OF SHORT {1-5 SECOND} THERMOEXPOSURES {+ 15OC} FROM 95 GHZ RADIATION ON DNA REPAIR. J.L. Roti Roti, J. Mueller*, M. Xu*, E. Moros. Radiation Oncology Dept, Washington Univ School of Medicine, St. Louis, Missouri 63108 USA.

11:15

11:30

11:45

12:00-1:00pm LUNCH

SESSION 3: EMF THERAPIES

Chairs: Art Pilla and Gabi Nindl

1:00-3:00pm, Blue Room

3-1 **STUDENT**

LOW FIELD MAGNETIC STIMULATION: ANTI-DEPRESSANT EFFECTS WITH MRI STRENGTH FIELDS. M. L. Rohan*, W. A. Carlezon Jr.*, B. M Cohen*, P. F. Renshaw*. Dept of Psychiatry, Harvard Medical School and Mclean Hospital, Belmont, Massachusetts 02478 USA.

3-2

STATIC MAGNETIC FIELDS MODULATE THE EFFECT OF CHEMOTHERAPY IN THE TREATMENT OF HUMAN MALIGNANCY. J. R. Salvatore, J. Harrington, T. Kummet. Division of Hematology/Oncology, Hayden VA Medical Center, Phoenix, AZ 85012 USA.

1:00

1:15

SESSION 2: EPIDEMIOLOGY

(*continued*)

2-4

IMPROVING RADIOFREQUENCY EX- POSURE ASSESSMENT IN EPIDEMIOLOGIC STUDIES OF MOBILE PHONE USERS: AN OVERVIEW OF RESEARCH DESIGN AND PRELIMINARY DATA. M. A. Kelsh¹, A.R. Sheppard², N. Kuster³, M. Shum*¹, J Fröhlich³, M. McNeeley*¹. ¹Exponent, Inc., Menlo Park, CA, USA; ²Asher Sheppard Consulting, Redlands, CA, USA; ³Information Tech in Society (IT'IS) Zurich, Switzerland.

2-5

FEASIBILITY OF FUTURE EPIDEMIO-LOGICAL STUDIES ON POSSIBLE HEALTH EFFECTS OF MOBILE PHONE BASE STATIONS. G. G. Neubauer¹, M. Rössli², M. Feychting³, Y.Hamnerius⁴, L. Kheifets⁵, N. Kuster⁶, J. Schüz⁷, J.Wiart⁸. ¹Seibersdorf research, Austria, ²Univ Bern, Switzerland, ³Karolinska Institutet, Sweden, ⁴Chalmers Univ, Sweden, ⁵UCLA, USA, ⁶IT IS Switzerland, ⁷Univ of Mainz, Germany, ⁸France telecom research center, France.

2-6

NEW CONCEPT FOR RISK ASSESSMENT AND MANAGEMENT OF RADIO FREQUENCY ELECTROMAGNETIC FIELD EXPOSURE HEALTH EFFECTS ON THE BASIS OF NEURO-FUZZY NETWORKS. O.P. Molchanova. Dept of General Hygiene & Basics of Ecology, M.I. Pirogov Vinnitsya Nat'l Med Univ, Vinnitsya, 21018, Ukraine.

SESSION 4: IN VIVO STUDIES

Chairs: Rene De Seze and Larry Anderson

1:00-3:00pm, Diplomat Ballroom

4-1

THERMOPHYSIOLOGICAL RESPONSES OF SEATED HUMAN VOLUNTEERS TO WHOLE-BODY RADIO FREQUENCY (RF) EXPOSURE AT 220 MHZ. E.R. Adair¹, D.W. Blick², S.J. Allen³, K.S. Mylacraine³, J.M. Ziriac⁴, D.M. Scholl⁵. ¹Air Force Senior Scientist Emeritus, Hamden, CT 06517; ²Independent Consultant, San Antonio, TX 78218; ³Advanced Eng Information Sys, a General Dynamics Co., Brooks City-Base, TX 78235; ⁴Naval Hlth Cntr Detachment, Brooks City-Base, TX 78235; ⁵AFRL/HEDR, Brooks City-Base, TX 78235 USA.

4-2

LIFE-LONG EXPOSURE TO 50 HZ MAGNETIC FIELDS DOES NOT INCREASE THE RISK OF LYMPHOMA IN AKR/J MICE. A. Lerchl, A.M. Sommer*. School of Engineering and Science, International Univ Bremen, D-28759 Bremen, Germany.

SESSION 3: EMF THERAPIES*(continued)***3-3 STUDENT**

STATIC MAGNETS REDUCE MYOFASCIAL TRIGGER POINT PAIN. M. Brantley*, D. Cheben*, H. Gay*, L. Wright*, A. Thompson*, D. Lake*. Department of Physical Therapy, Armstrong Atlantic State University, Savannah, Georgia, USA 31415.

P-B-23 MOVED TO SESSION 3-4.

EFFECTS OF PULSED ELECTROMAGNETIC FIELDS (PEMFs) ON EXPERIMENTAL DEGENERATIVE OSTEOARTHRITIS. S.Setti¹, M. Fini², F. Cavani³, R. Cadossi¹. ¹Laboratorio di Biofisica Clinica, IGEA, 41012 Carpi (Mo), Italy; ²Laboratorio di Chirurgia Sperimentale, Istituti Ortopedici Rizzoli, 40126 Bologna, Italy; ³Università degli Studi di Modena e Reggio Emilia, Dipartimento di Anatomia e Istologia, Policlinico di Modena, 41100 Modena, Italy.

3-5

EXPOSURE TO A SPECIFIC PULSED EXTREMELY LOW FREQUENCY MAGNETIC FIELD: A HISTORY OF INDUCED ANALGESIA IN ANIMALS, AND A DOUBLE-BLIND PLACEBO CONTROLLED STUDY IN FIBROMYALGIA PATIENTS. A.W. Thomas, N.M. Shupak, F.S. Prato. Department of Medical Biophysics, University of Western Ontario; Lawson Health Research Institute and Department of Diagnostic Imaging, St. Joseph's Health Care (London), London, Ontario, Canada, N6A 4V2.

3-6

DEBRIDEMENT AND ANTIBACTERIAL EFFECTS OF 25 KHZ ULTRASOUND. L.C. Kloth*, C. H. Schulze*. Marquette Univ and Froedtert Memorial Lutheran Hospital, Milwaukee, Wisconsin, USA and Endotoxin Laboratory for Surgical Research, Christian-Albrechts-Universität, Kiel, Germany.

3-7

BASIC STUDY OF THE EFFECTS OF LOW INTENSITY PULSED ULTRASOUND FOR BONE FORMATION. T.Sorimachi¹, K.Yamamoto¹, T.Masaoka¹, N.Miyagawa¹, K.Morishita¹, D.Kimura¹, S.Asahi¹, E.Fukada². ¹Dept. of Orthop. Surg., Tokyo Medical Univ. 6-7-1 Nishi-Shinjyuku Shinjyukuku Tokyo Japan, 160-0023 ²Kobayashi Inst of Physical Research.

3-8

MECHANISM AND THERAPEUTIC POTENTIAL OF NON-IONIZING ELECTROMAGNETIC. M. T. Johnson¹ and Gabi Nindl². Indiana Univ School of Med, ¹Dept of Microbiology and Immunology and ²Department of Cellular and Integrative Physiology Terre Haute, IN 47809.

SESSION 4: IN VIVO STUDIES*(continued)***1:30****4-3**

ANALYSIS OF LITERATURE (ABSTRACTS) ON BIOLOGICAL EFFECTS OF EMF IN THE FREQUENCY RANGE 2 – 3 GHZ. L. Haberland*¹, M. Simeonova*¹, W. Alsbach*², S. Brandt*³, W. Dubois*². ¹Inst of Cellular Bio and Biosystems Tech, Univ of Rostock, D-18057 Rostock, Germany, ²Forschungsgemeinschaft Funk e.V. (FGF), D-53111 Bonn, Germany, ³rubitec GmbH, D-44801 Bochum, Germany.

1:45**4-4**

TRANSCRANIAL MAGNETIC STIMULATION SUPPRESS THERMAL BUT NOT MECHANICAL HYPERSENSITIVITY IN AN INFLAMMATORY PAIN RAT MODEL. H. Harada. Asahimachi 67, Dept of Anesthesiology, Kurume Univ School of Med, Kurume, Fukuoka, 8300011 Japan.

2:00**4-5**

TWO GENERATION RF EXPERIMENT WITH NON-RESTRAINED RATS OF VARIOUS BODY MASS: DOSIMETRIC ANALYSIS USING HIGH RESOLUTION MODELS. T. Reinhardt*¹, A. Bitz*¹, J. Streckert*¹, V. Hansen¹, J. Buschmann*². ¹Chair of Electromagnetic Theory, Univ of Wuppertal, 42097 Wuppertal, Germany ²Fraunhofer Institute of Toxicology and Experimental Med, 30625 Hannover, Germany.

2:15**4-6**

PROLIFERATION RATES IN MAMMARY GLAND TISSUE AND ADJACENT SKIN OF DIFFERENT RAT STRAINS AFTER 50 – HERTZ, 100 microT MAGNETIC FIELD EXPOSURE. M. Fedrowitz* and W. Löscher. Dept of Pharmacology, Toxicology, and Pharmacy, School of Veterinary Med, Bünteweg 17, 30559 Hannover, Germany.

2:30**4-7**

THE EFFECTS OF RADIOFREQUENCY RADIATION ON BRAIN PHYSIOLOGY AND FUNCTION: A STUDY IN MICE. ¹J.E.H. Tattersall, ^{1*}A.J. Smith, ^{1*}P.K. Harrison, ^{1*}G. Underwood, ^{2*}J.B. Uney, ^{2*}R.J. Hobson, ^{3*}A.L.Bottomley, ^{3*}R.Bartram and ^{3*}Z.J. Sienkiewicz. ¹Biomedical Sci Dept, Dstl Porton Down, Salisbury, Wiltshire, SP4 0JQ, UK ²Henry Wellcome L.I.N.E, Dorothy Hodgkin Bldg, Whitson St, Bristol, BS1 3NY, UK; ³Nat'l Radiological Protection Board, Chilton, Didcot, Oxfordshire, OX110RQ, UK.

2:45**4-8**

INVESTIGATION OF DOSE IN STUDIES OF PROTECTIVE EFFECTS OF ELF MAGNETIC FIELDS ON CHICK EMBRYOS EXPOSED TO UV-IRRADIATION. A. Mannerling*¹, K. H. Mild^{1,2}, Mats-Olof Mattsson¹. Dept of Natural Sciences, Örebro Univ, SE-701 82 Örebro, Sweden. ²Nat'l Inst for Working Life, SE-907 13 Umeå, Sweden.

3:00-3:30pm BREAK

POSTER SESSION A 3:30-5:30pm, Palladian Ballroom and Blue Room Prefunction

TUESDAY, JUNE 22

PLENARY SESSION II: THz RESEARCH

8:00-9:30am, Blue Room

Chair: Bruce McLeod

THz RESEARCH AN OVERVIEW. Robert Osiander. JHU/APL, Johns Hopkins Road 2-255, 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.

9:30am – 10:00am BREAK

SESSION 5: THz APPLICATIONS IN BIOLOGY & MEDICINE

Chairs: Mays Swicord and Joe Spadaro

10:00-12:00pm, Blue Room

5-1 **STUDENT**

TERAHERTZ RADIATION SPECTROSCOPY ON MOLECULAR COMPLEXES, POLYPEPTIDES, AND PROTEINS. Asako Oka¹ Kohji Yamamoto¹, Hideki Kandori², and Keisuke Tominaga¹ ¹Molecular Photoscience Res Center, Kobe Univ, Nada, Kobe, 657-8501 Japan, Dept of Applied Chem, Nagoya Inst of Tech, Gokiso-cho, Showa-ku, Nagoya, 466-8555 Japan, ³CREST/JST Nada, Kobe, 657-8501 Japan. Res Cntr for Superconductor Photonics, Osaka Univ, 2-1 Yamadaoka, Suita, Osaka, 565-0871 Japan.

10:00

5-2

THz-BRIDGE: A EUROPEAN PROJECT FOR THE STUDY OF THE INTERACTION OF TERAHERTZ RADIATION WITH BIOLOGICAL SYSTEMS. G.P. Gallerano¹, E. Grosse², R. Korenstein³, M. Dressel⁴, W. Mantele⁵, M. R. Scarfi⁶, A. C. Cefalas⁷, P. Taday⁸, R. H. Clothier⁹, P. Jepsen¹⁰. ¹ENEA-UTS TechFisiche Avanzate, 00044 Frascati-Italy on behalf of the THz-BRIDGE partners, ²Inst für Kern-und Hadronenphysik-Forschungszentrum Rossendorf, Germany, ³Dept of Phys. & Pharmacol Fac of Med, Tel-Aviv Univ, Israel, ⁴Physikalisches Inst Univ Stuttgart, Germany, ⁵Inst für Biophysik-J. W. Goethe-Univ Frankfurt am Main, Germany, ⁶CNR - IREA, Napoli, Italy, ⁷Nat'l Hellenic Res Found, Athens, Greece, ⁸Teraview Limited, Cambridge, UK, ⁹Sch of Biomedical Sci, Univ of Nottingham, UK, ¹⁰Albert-Ludwigs Univ Freiburg, Germany.

10:15

5-3

DETERMINATION OF P53 PROTEIN STABILIZATION, LOSS OF MITOCHONDRIAL MEMBRANE POTENTIAL, AND THE RELEASE OF CYTOCHROME C INTO THE CYTOSOL IN RESPONSE TO UWB EMR EXPOSURE IN HUMAN LYMPHOBLASTOID CELLS. B.K. Nayak, C. Galindo*, M. Natarajan, S.P. Mathur¹*, M.L. Meltz. Dept of Radiation Oncology, Univ of Texas Health Sci Center at San Antonio, San Antonio, TX 78229, USA. ¹McKesson BioServices, USA Army Medical Res Detachment, Brooks Air Force Base. San Antonio. TX 78235. USA.

10:30

SESSION 6: MECHANISMS & MODELING

Chairs: Frank Barnes and Stefan Engström

10:00-12:00pm, Diplomat Ballroom

6-1

A VOXEL-BASED WHOLE-BODY MODEL INCORPORATING ACTIVE THERMO-REGULATION FOR SIMULATING RF HEATING IN MAN. A.R. Curran^{*1}, E.A. Marttila^{*1}, D.A. Nelson², J.M. Ziriak³, P.A. Mason⁴, W.D. Hurt⁴. ¹ThermoAnalytics, Inc., Calumet, MI 49913, USA; ²Dept of Biomedical Engineering, Michigan Tech Univ, Houghton, MI 49931, USA; ³Naval Hlth Res Center Detachment, Brooks City Base, TX 78235, USA; ⁴Air Force Res Lab, Directed Energy Bioeffects Div, Brooks City Base, TX 78235, USA.

6-2 **STUDENT**

DEVELOPMENT OF A FLAT PHANTOM SETUP FOR THE COMPLIANCE TESTING OF BODY-MOUNTED, WEARABLE AND PORTABLE TRANSMITTERS OPERATING IN THE FREQUENCY RANGE FROM 30MHZ TO 5800MHZ. Loeser M.^{*1}, Christ A.^{*2}, Klingenböck A.^{*2}, Kuster N.², ¹Swiss Federal Inst of Tech (ETH), 8092 Zurich, Switzerland, ²Foundation for Res on Information Tech in Society, 8004 Zurich, Switzerland.

6-3

REAL-TIME MONITORING OF EFFECTS OF ELECTRIC FIELDS ON KINETICS OF MEMBRANE TRANSPORT IN SINGLE LIVING CELLS. X. N. Xu and Q. Wan, Department of Chemistry & Biochemistry; J. Kolb and K. H. Schoenbach, Department of Electrical and Computer Engineering; Old Dominion University, Norfolk, Virginia 23529, USA.

SESSION 5: THz APPLICATIONS IN BIOLOGY & MEDICINE (continued)

5-4 **NANOSECOND UWB EMF PULSES AFFECT CELL RECOVERY AND VIABILITY, AND RESULT IN THE INDUCTION OF C-FOS ONCOGENE EXPRESSION IN HUMAN LYMPHOBLASTOID CELLS.** M.L. Meltz, B.K. Nayak, C. Galindo*, M. Natarajan. Dept of Radiation Oncology, Univ of Texas Health Sci Center at San Antonio, San Antonio, TX 78229, USA. **10:45**

5-5 **NANOELECTROPULSE PERTURBATIONS OF CALCIUM AND PHOSPHOLIPID DISTRIBUTION IN HUMAN LYMPHOCYTES.** P. T. Vernier*^{1,2}, Y. Sun*³, L. Marcu*^{1,4,5}, C. M. Craft*⁶, M. A. Gunderson*¹. ¹Dept of Electrical Engineering-Electrophysics, Univ of Southern CA, Los Angeles, CA, USA; ²MOSIS, Information Sci Inst, Univ of Southern CA, Los Angeles, CA, USA; ³Dept of Materials Sci, Univ of Southern CA, Los Angeles, CA, USA; ⁴Dept of Biomedical Engineering, Univ of Southern CA, Los Angeles, CA, USA; ⁵Biophotonics Res & Tech Development, Cedars-Sinai Medical Center, Los Angeles, CA, USA; ⁶Dept of Cell & Neurobiology, Keck School of Med, Univ of Southern CA, Los Angeles, CA, USA. **11:00**

5-6 **STUDYING THE PROPAGATION OF LIGHT IN STRONGLY SCATTERING MEDIA USING TERAHERTZ PULSES.** J. Pearce, Z. Jian, and D. Mittleman. Rice University, Electrical and Computer Engineering Department, Houston TX 77005 USA. **11:15**

5-7 **THE USE OF TERAHERTZ RADIATION IN THE BIOLOGICAL AND MEDICAL SCIENCES.** D.A. Crawley, University of Cambridge, Cavendish Laboratory, Madingley Road, Cambridge CB3 0HE, England. **11:30**

5-8 **STUDENT** **EFFECTS OF THz RADIATION ON CARBONIC ANHYDRASE LOADED LIPOSOMES.** L. De Gregori¹, M. D'Arienzo², A. Doria², G. P. Gallerano², E. Giovenale², G. Messina,²A. Ramundo-Orlando¹. ¹INEMM-CNR, Via Del Fosso del Cavaliere, 100, 00133 Roma, Italy, ²ENEA C.R. Frascati, Via Enrico Fermi 45, 00044 Frascati, Italy. **11:45**

SESSION 6: MECHANISMS & MODELING (continued)

6-4 **FINITE-DIFFERENCE TIME-DOMAIN (FDTD) ANALYSIS AND DOSIMETRY OF A GIGAHERTZ TEM CELL.** Z. Ji*, S. C. Hagness, J. H. Booske*, S. Mathur*,¹ and M. Meltz,² Dept of Electrical & Computer Engineering, Univ of Wisconsin-Madison, 1415 Engineering Drive, Madison, WI 53706, ¹McKesson BioServices, 8355 Hawks Road, Brooks City-Base, TX 78235, and ² Dept of Radiation Oncology, Univ of Texas Health Sci Center at San Antonio, San Antonio, TX 78229.

6-5 **DEVELOPMENT OF NEW TRANSPARENCY GEL PHANTOM WITH CAPSULATE LIQUID CRYSTAL FOR VISUALIZATION OF THREE- DIMENSIONAL ELECTROMAGNETIC POWER ABSORPTION.** Y. Suzuki*¹, M. Baba*¹, A. Ishii*¹, M. Taki¹, S. Watanabe². ¹Tokyo Metropolitan Univ, Tokyo 192-0397, Japan. ²Communication Res Lab, Tokyo 184-8795, Japan.

6-6 **STUDENT** **DOSIMETRY OF RAT-HEAD SAR CAUSED BY A HIGH-PERFORMANCE G8H-SHAPED LOOP ANTENNA.** H. Watanabe^{1,2*}, K. Wake¹, M. Hanazawa^{1*}, S. Watanabe¹, H. Masuda³, C. Ohkubo³, M. Taki⁴, Y. Yamanaka^{*1}, and T. Uno^{2*}, ¹Nat'l Inst of Information & Communications Tech, Tokyo 184-8795, Japan, ²Tokyo Univ of Agriculture & Tech, Tokyo 184-8588, Japan, ³Nat'l Inst of Pub Hlth, Tokyo 106-8638, Japan, ⁴Tokyo Metropolitan Univ, Tokyo 912-0397, Japan.

6-7 **LIGHT-DEPENDENT MAGNETIC FIELD INFLUENCE ON THE PERIODIC PEROXIDASE-OXIDASE OSCILLATOR.** J.J.L. Carson and J. Walleczek. Bioelectromagnetics Laboratory, Department of Radiation Oncology, Stanford University Medical School, Stanford, California, USA 94305-5304.

6-8 **EXPOSURE OF THE HUMAN HEAD TO 915 MHZ IRRADIATION: A THERMAL MODEL INCORPORATING BLOOD FLOW.** D.A.Nelson¹, A.R. Curran², E.A. Marttila², E.T. Ng¹, J.M. Ziriach³, P.A. Mason⁴, W.D. Hurt⁴. ¹Michigan Technological University, Houghton, Michigan 49931; ²ThermoAnalytics, Inc., Calumet, Michigan 49913, USA; ³Naval Health Research Center Detachment, Brooks Air Force Base, Texas 78235, USA; ⁴Air Force Research Lab, Directed Energy Bioeffects Division, Brooks Air Force Base, Texas 78235, USA.

12:00pm-1:00pm LUNCH

POSTER SESSION B
1:00pm-3:00pm, Palladian Ballroom & Blue Room Prefunction

POSTER SESSION C
3:30pm-5:30pm, Palladian Ballroom &
Blue Room Prefunction

TUTORIAL SESSION 1: HIGH-
THROUGHPUT SCREENING TECHNIQUES
IN EMF RESEARCH
3:30pm-5:50pm, Blue Room
Chairs: Dariusz Leszczynski and Zheng-ping Xu

3:30

TS-1-1
PROTEOMICS AND MASS
SPECTROMETRY: TOOLS FOR
GENOME-ERA BIOLOGY. T. Griffin.
University of Minnesota, Minneapolis, MN,
USA.

4:00

TS-1-2
ANALYSIS OF GENE EXPRESSION IN
EMF RESEARCH. C. Maercker, D.
Remondini, R. Nylund, D. Leszczynski, K.
Schlatterer, R. Fitzner, R. Tauber, S. Ivancsits,
H. Rudiger, F. Bersani. RZPD German
Resource Center For Genome Research.
Heidelberg, Germany.

4:30

TS-1-3
PROTEIN MICROARRAY TECHNOLOGY
– PRINCIPLES AND APPLICATIONS IN
PROTEOMICS. D. Stoll, M.F. Templin, T.O.
Joos. University of Tuebingen, Germany.

5:00

TS-1-4
2-DE/MS PROTEOMICS STUDIES – SOME
PRACTICAL ASPECTS OF ANALYSIS. R.
Nylund. Radiation and Nuclear Safety
Authority, Helsinki, Finland.

5:20

TS-1-5
USE OF HIGH-THROUGHPUT SCREEN-
ING TECHNIQUES IN EMF RESEARCH.
D. Leszczynski. Radiation and Nuclear Safety
Authority, Helsinki, Finland.

SOCIAL EVENT 6:30pm

WEDNESDAY, June 23

CHARLES POLK MEMORIAL STUDENT SESSION

8:00-12:00, Blue Room

Chairs: Reba Goodman, Ruggero Cadossi

8:00 **IN MEMORY OF CHARLES POLK**
Presentation by: Frank Barnes

8:15 **ST-1 STUDY OF THE POTENTIAL LEUKEMOGENIC EFFECTS OF 50HZ MAGNETIC FIELDS AND THEIR HARMONICS IN A RAT LYMPHOBLASTIC LEUKEMIA.** N. Bernard*¹, P. Chretien*², M-L. Tanguy*³, J. Lambrozo⁴, J-J Guillosson*¹, and J. Nafziger*¹. ¹Lab d'Hématologie Cellulaire et Moléculaire CNRS FRE 2444, Faculté de Pharmacie, 75006 Paris, France. ²Lab d'Immunologie – Hématologie, Hôpital Intercommunal, 94000 Créteil, France. ³Lab de Biostatistiques et informatique médicale GH Pitié-Salpêtrière, 750013 Paris France. ⁴Service des Etudes Médicales, EDF-GDF, 75009 Paris, France.

8:30 **ST-2 THE PROTEIN EXPRESSION PROFILING OF MCF-7 CELLS INDUCED BY ELF MF EXPOSURE.** QL Zeng, H Li*, DQ Lu*, H Chiang, ZP Xu*. Bioelectromagnetics Laboratory, Zhejiang University School of Medicine, Hangzhou, Zhejiang, 310031 China.

8:45 **ST-3 EM FIELD DETECTION IN A MYELINATED NERVE FIBER: A STOCHASTIC RESONANT BEHAVIOUR.** M. Gianni*, F. Apollonio*, M. Liberti*, G. D'Inzeo. ICEmB at Department of Electronic Engineering, "La Sapienza" University of Rome, 00184 Rome, Italy.

9:00 **ST-4 EGF RECEPTOR CLUSTERING AND RAS ACTIVATION WAS INDUCED BY 50Hz MF AND INHIBITED BY THE NOISE MF.** W.J. Sun¹, H.Y. Fu², H. Chiang¹, Y.T. Fu¹ and D.Q. Lu¹. ¹Bioelectromagnetics Lab., ²First Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou 310031, China.

9:15 **ST-5 EVALUATION OF MICROWAVE FIELDS EFFECTS ON IONIC CHANNELS: AN EXPERIMENTAL STUDY WITH THE PATCH CLAMP TECHNIQUE.** M. Pellegrino¹*, A. Paffi¹*, M. Liberti¹*, F. Apollonio¹*, G. D'Inzeo¹, M. Mazzanti²*, ¹ ICEMB @ Department of Electronic Engineering, ² Dipartimento di Biologia Cellulare e dello Sviluppo, "La Sapienza", University of Rome, 00184 Rome, Italy.

9:30 **ST-6 THE STUDY ON HYPOTHALAMUS CELLS EXPOSED TO EMP.** X. Cao¹, M. Zhao², D.Wang³. ¹Dept of Pathology, Lanzhou General Hospital, Lanzhou 730050, Gansu province, China; ²NIEHS/NIH, BIDG 101, MD F2-04, Res. Triangle Park, NC 27709, ³Beijing Inst of Radiation Medicine, Beijing 100850, China.²

9:45-10:15 BREAK

Chairs: Om Gandhi, Vijayalaxmi

10:15 **ST-7 AN EXTREMELY LOW FREQUENCY MAGNETIC FIELD ATTENUATES INSULIN SECRETION FROM THE INSULINOMA CELL LINE, RIN-m.** T. Sakurai*, Y. Takashima*, S. Koyama*, & J. Miyakoshi. Department of Radiological Technology, School of Health Sciences, Faculty of Medical, Hirosaki University, Hirosaki, 035-8564, Japan.

10:30 **ST-8 MODULATION-DEPENDENT EFFECT OF MICROWAVES ON PROTEIN EXPRESSION IN HUMAN ENDOTHELIAL CELL LINE EA.hy926.** R. Nylund¹, T. Griffin²*, C. Maercker³, J. Schuderer⁴, J. Reivinen¹*, N. Kuster⁴, R. Aebersold⁵*, D. Leszczynski¹. ¹STUK – Radiation and Nuclear Safety Authority, 00880 Helsinki, Finland, ²Dept. of Biochemistry, Molecular Biology and Biophysics, Univ of Minnesota, Minneapolis, MN, USA, ³RZPD German Resource Center for Genome Research, Heidelberg, Germany, ⁴ETHZ, Zurich, Switzerland, ⁵Institute of Systems Biology, Seattle, WA, USA.

10:45 **ST-9 EFFECT OF PULSING ELECTROMAGNETIC FIELD STIMULATION ON OSTEOBLASTS AND HUMAN BONE MARROW DERIVED OSTEOCLASTS.** C. Button*, B.S. Margulies*, J.A. Spadaro, T.A. Damron*, M.J. Allen*. Dept of Orthopedic Surgery, SUNY Upstate Medical Univ, Syracuse, NY 13210 USA.

11:00 **ST-10 INSTRUMENTATION FOR ACCURATE MEASUREMENT OF NON-HOMOGENEOUS FIELD DISTRIBUTIONS.** Oesch W., Nikoloski N., Kramer A., Kuster N. Foundation for Research on Information Technologies in Society (IT²IS), Swiss Federal Inst of Tech (ETH), Zurich, CH-8092 Zurich, Switzerland.

CHARLES POLK MEMORIAL STUDENT SESSION
(continued)

11:15 ST-11 DEVELOPMENT OF MEASUREMENT PROCEDURE FOR COMPLIANCE TESTING OF WIRELESS DEVICES AT HIGHER FREQUENCIES (5 – 6 GHz). Nikoloski N.¹, Christ A.^{*1}, Pokovic K.², Schmid D.^{*2}, Kuster N.¹

¹Foundation for Research on Information Technologies in Society (IT²IS), Swiss Federal Inst of Tech (ETH), Zurich, CH-8092 Zurich, Switzerland.²SPEAG, Switzerland.

11:30 ST-12 MILLIMETER WAVE INDUCED GENE EXPRESSION CHANGES IN HaCaT HUMAN KERATINOCYTES. Q.Chen, D.Q.Lu*, Z.P.Xu*, H.Chiang, Bioelectromagnetics Lab, Zhejiang Univ School of Med, Hangzhou 310031, China.

11:45 ST-13 LONG-TERM EFFECTS ON MELATONIN SYNTHESIS IN MALE RATS AFTER EXPOSURE TO A 1439 MHz TDMA ELECTROMAGNETIC FIELD. K. Hata ^{*1,2}, S. Ueno ², H Yamaguchi ^{*1}, G. Tsurita ^{*1}, S. Watanabe ³, K. Wake ³, M. Taki ⁴, and H. Nagawa^{*1}. ¹Dept of Surgical Oncology, The Univ of Tokyo, Tokyo, 113-8655, Japan. ²Department of Biomedical Engineering, Graduate School of Med, The Univ of Tokyo, Tokyo, Japan. ³Communications Research Lab, Tokyo, Japan. ⁴Dept of Electrical Engineering, Graduate School of Engineering, Tokyo Metropolitan Univ, Tokyo, Japan.

BEMS ANNUAL BUSINESS MEETING 12:00pm – 1:30pm, Blue Room

SESSION 7: RF STUDIES

Chairs: Jim Lin and Andrei Pakhomov
1:30pm-3:00pm, Blue Room

7-1
AN OVERVIEW OF LOW-INTENSITY RADIO-FREQUENCY/MICROWAVE RADIATION STUDIES RELEVANT TO WIRELESS COMMUNICATIONS AND DATA. C. Sage, Sage Associates, Santa Barbara, California, USA 93108.

7-2
RF ENERGY ABSORPTION OVER BRIEF TIMES AND SMALL DISTANCES FOR MOLECULAR, CELLULAR, AND ANATOMICAL STRUCTURES. AR Sheppard¹, ML Swicord², Q Balzano³. ¹Asher Sheppard Consulting, Redlands, CA 92373; ²Motorola Labs, Ft. Lauderdale, FL 33322; ³Annapolis, MD 21401 USA.

7-3
A REVIEW OF IN VITRO AND ACUTE IN VIVO STUDIES DOES NOT PROVIDE SUPPORT FOR NON-THERMAL RF BIOLOGICAL EFFECTS. M. Swicord, J. Morrissey and J. Elder, Motorola Labs, 8000 W. Sunrise Blvd., Ft. Lauderdale, FL 33322 USA.

SESSION 8: BIOPHYSICAL & BIOLOGICAL DOSIMETRY I

Chairs: Frank Prato and Jim Weaver
1:30pm-3:00pm, Diplomat Ballroom

1:30 8-1
GENOTOXICITY IN MICE EXPOSED TO MILLIMETER WAVES. Vijayalaxmi¹, M. K. Logani², A. Bhanushali², M. C. Ziskin². ¹Department of Radiation Oncology, University of Texas Health Science Center, San Antonio, TX 78229; ²Richard J Fox Center for Biomedical Physics, Temple University School of Medicine, Philadelphia, PA 19140.

1:45 8-2
GEOMAGNETIC FIELD AND LIGHT SENSITIVITY OF THE VISUAL SYSTEM – CHECKING THE MODEL-PREDICTIONS. F. Thoss & B. Bartsch*. Univ of Leipzig, Carl Ludwig Inst of Phys, D-04103 Leipzig, Germany.

2:00 8-3
COMPARISON OF PEAK 1- AND 10-G SARS FOR PLASTIC "PINNA" SAM AND FOR ANATOMIC MODELS FOR EXPOSURE TO CELLULAR TELEPHONES AT 835 AND 1900 MHZ. Om P. Gandhi, Gang Kang, & Qingxiang Li*, Dept of Electrical & Computer Engineering, Univ of Utah, Salt Lake City, UT 84112, USA.

SESSION 7: RF STUDIES*(continued)***7-4 STUDENT**

PERSONAL DOSIMETER FOR RADIO FREQUENCY EXPOSURE ASSESSMENT. J. Wiart¹, F Perrot², Y Toutain², M.F Wong¹ and C Dale¹. ¹ France Telecom R&D, DMR/IIM, 38-40 rue du Général Leclerc, 92794 Issy-les-Moulineaux Cedex 9, France. ² Antennessa Hameau des Entreprises, 65 Place Nicolas Copernic, 29280 PLOUZANE, France.

7-5 STUDENT

PILOT STUDY TO DETERMINE ENVIRONMENTAL FACTORS THAT INFLUENCE RF EXPOSURE FROM MOBILE PHONES. M. Shum*¹, A.R. Sheppard², M. Kelsh¹, N. Kuster³, J. Fröhlich³, M. McNeely*¹, N. Chan*¹. ¹Exponent, Inc., Menlo Park, CA, USA; ² Asher Sheppard Consulting, Redlands, CA, USA; ³ Foundation of Res on Information Tech in Society (IT'IS) Zurich, Switzerland.

7-6

VISUALIZATION OF MILLIMETER WAVE EFFECTS ON MAMMALIAN SKIN. R. Blystone, R. Scholz, F. Catalan-Aguilar, J. Eggers¹, N. Millenbaugh², R. Sypniewska², J. Kalns³, J. Kiel¹, and P. Mason¹. Trinity Univ, Dept of Bio, San Antonio, TX 78212; ¹Directed Energy Bioeffects Div, Air Force Res Lab, Brooks City-Base TX 78235; ²General Dynamics Advanced Information Systems, San Antonio, TX 78235; ³Hyperion Biotechnology, San Antonio, TX 78235, USA.

SESSION 8: BIOPHYSICAL & BIOLOGICAL**DOSIMETRY I***(continued)***8-4**

OVERVIEW OF THE RADIOFREQUENCY DOSIMETRY RESEARCH BEING CONDUCTED BY THE U.S. AIR FORCE. P.A. Mason¹, J.M. Ziriak², M.R. Murphy¹, W.D. Hurt^{1*}, V.M. Swegle^{1*}, & J.D'orea². ¹ Air Force Res Lab, Human Effectiveness Directorate, Directed Energy Bioeffects Div, Brooks City-Base, TX, 78235-5147, USA, ²Naval Hlth Res Center Detachment Directed Energy Bioeffects Lab, Brooks Air Force Base, TX, USA.

8-5

EMF DOSIMETRY REQUIREMENTS FOR PHYSIOLOGICALLY SIGNIFICANT BIOEFFECTS: THIS ISN. A.A. Pilla & D. Muehsam, Dept of Biomedical Engineering, Columbia Univ & Dept of Orthopaedics, Mount Sinai School of Medicine, New York, NY, USA.

8-6 STUDENT

DETERMINATION OF THE CORRECTION FACTOR FOR OCCUPATIONAL ELECTROMAGNETIC EXPOSURE COMPLIANCE EVALUATION USING DIFFERENT HOMOGENEOUS PHANTOMS. W. Joseph & L. Martens. Dept of Information Technology, Ghent Univ, Sint-Pietersnieuwstraat 41, B-9000 Ghent, Belgium.

2:15**2:30****2:45****3:00– 3:30pm BREAK****SESSION 9: IN VITRO STUDIES**

Chair: Abe Liboff and Betty Sisken
3:30pm-5:00pm, Blue Room

9-1

EFFECT OF HYDROGEN PEROXIDE ON JURKAT T CELLS AND ITS REGULATION BY LOW FREQUENCY EMFS. G. Nindl¹, W.X. Balcavage¹, C.J. Moulton*¹, L.R. Waite*², M.T. Johnson¹. ¹Center for Medical Education, Indiana Univ School of Med, Terre Haute, Indiana 47809, USA, ²Applied Biology & Biomedical Engineering, Rose-Hulman Inst of Tech, Terre Haute, IN 47803, USA.

9-2

INFLUENCE OF DAMPS-835 OR EUROPEAN GSM-1800 SIGNALS ON ORNITHINE DECARBOXYLASE ACTIVITY IN L-929 MOUSE FIBROBLASTS AND SH-SY5Y HUMAN NEUROBLASTOMA CELLS. M. Taxile*, B. Billaudel, G. Ruffie*, E. Haro*, J. Schuderer¹, I. Lagroye & B. Veyret. Bioelectromagnetics Laboratory / UMR 5501, EPHE /PIOM-ENSCP, 33607-Pessac, France. I IT'IS Laboratories, Zeughausstrasse 43,8004

SESSION 10: INSTRUMENTATION & METHODOLOGY

Chair: Joe Bowman and Asher Sheppard
3:30pm-5:00pm, Diplomat Ballroom

10-1

DESCRIPTION OF AN EXPOSURE SYSTEM USED IN A PROVOCATION STUDY TO MOBILE PHONE LIKE SIGNALS. J. Wilén, M. Sandström, A. Johansson*, O. Stensson* & K. Hansson Mild. National Inst for Working Life (NIWL), Umeå, Sweden.

3:30**3:45****10-2**

A SEMI-AUTOMATED IMAGE PROCESSING SYSTEM FOR EMF HUMAN MODELS. D.-S. Yoo, M.-H. Seo*¹, J.-H. Yun*, W.-Y. Choi*¹. Dept of Radio Science, Electronics & Telecommunications Res Inst (ETRI), Daejeon 305-350, KOREA, Dept of Electronics Engineering, Myongji Univ, Yongin 449-728, KOREA.

SESSION 9: IN VITRO STUDIES (continued)

9-3

CHANGES IN GENE EXPRESSION PROFILE OF MCF-7 CELL AFTER EXPOSURE TO ELF MFs. Z.P. Xu, G.D. Chen, Q.L. Zeng, D.Q. Lu, H. Chiang. Bioelectromagnetics Laboratory, Zhejiang University School of Medicine, Hangzhou 310031, China.

4:00

9-4

MYOSIN PHOSPHORYLATION IN GRADIENT MAGNETIC FIELDS. S. Engström, M.S. Markov*, M.J. McLean, R.R. Holcomb. Department of Neurology, 2100 Pierce Avenue, Vanderbilt Univ, Nashville, 37212 TN, USA. * Research International, Buffalo, NY, USA.

4:15

9-5

ELECTROMAGNETIC FIELDS IN BIOMEDICINE: CYTOPROTECTION AND GENE THERAPY. R. Goodman¹, H. Lin², M. Blank³, Department of Pathology¹, Anatomy² and Physiology³, Columbia University 630 West 168 St, New York, NY 10032, USA.

4:30

9-6

EVALUATION OF MUTAGENICITY OF COMPLEX MAGNETIC FIELDS WITH STATIC AND TIME-VARYING COMPONENTS. M. Ikehata^{1*}, T. Nagai^{2*}, Y. Suzuki^{2*}, M. Taki² & T. Koana^{3*}. ¹Railway Technical Research Institute, Kokubunji, Tokyo 185-8540, Japan, ²Tokyo Metropolitan University, Hachioji, Tokyo 192-0397, Japan, ³Central Research Institute of Electric Power Industry, Komae, Tokyo 201-8511, Japan.

4:45

9-7

INVITRO EVIDENCE SUPPORTING THE EMF HYPERSENSITIVITY CLAIMS. D. Leszczynski. STUK – Radiation and Nuclear Safety Authority, Helsinki. Finland.

5:00

SESSION 10: INSTRUMENTATION & METHODOLOGY (continued)

10-3

WHOLE BODY AVERAGED SAR: A MALE TO FEMALE NUMERICAL COMPARISON.

L. Sandrini*#, A. Vaccari*, M. Mazzurana*, C. Malacarne*, R. Pontalti* & L. Cristoforetti*. Inst for the Scientific & Technological Res – Physics Chemistry Surface Division, 38050 Povo, Trento, Italy. #InterUniv Center "Interaction between Electromagnetic Fields & Biosystem" (ICeMEmB), Genova, Italy.

10-4 **STUDENT**

A NOVEL INTEGRATION SYSTEM OF PULSED ELECTROMAGNETIC FIELDS STIMULATION WITH BIOREACTORS APPLIED TO BONE TISSUE ENGINEERING. M. T. Tsai, W. H. Chang, D. W. Wu*, & K. T. Chang. Bone Tissue Engineering Res Center, Dept of Biomedical Engineering, Chung-Yuan Christian Univ, Chung-Li, Tao-Yuan 32023 Taiwan.

10-5 **STUDENT**

EFFECTIVE EVALUATION OF HANDSET EXPOSURES IN DIFFERENT NETWORKS UNDER REAL-LIFE CONDITIONS. D. Spät*, J. Fröhlich*, N. Kuster, Foundation for Res on Information Technologies in Society (IT'IS), Swiss Federal Inst of Tech (ETH), CH-8092 Zurich, Switzerland.

10-6

AVERAGING METHODS FOR RELIABLE MEASUREMENTS OF THE ELECTROMAGNETIC FIELD STRENGTH IN THE VICINITY OF MOBILE COMMUNICATIONS BASE STATIONS. Preiner P., Überbacher R., Kaczmarczyk A., Neubauer* G. Seibersdorf Research, Austria.

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

Chair: Bruce McLeod

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, 320 Clyde, 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.

9:30-10:00am BREAK

SESSION 11: BIOLOGICAL EFFECTS & MEDICAL APPLICATIONS

Chair: Martin Blank and Mike McLean

10:00am-12:00pm, Blue Room

11-1

BIOLOGICAL EFFECTS OF EMF, DO THEY EXIST AND WHAT MIGHT BE THEIR BIOPHYSICAL, MECHANISM – A MOLECULAR BIOLOGISTS PERSPECTIVE. D. Leszczynski. STUK – Radiation and Nuclear Safety Authority, Helsinki, Finland.

11-2

VARIABLE EFFICACY OF A STATIC MAGNETIC FIELD AGAINST CHEMICALLY- AND GENETICALLY-INDUCED AUDIOGENIC SEIZURES (AGS) IN MICE. M.J. McLean, S. Engström, R.R. Holcomb, M. Zhang, Department of Neurology, 2100 Pierce Avenue, Vanderbilt University School of Medicine, Nashville, TN 37212, USA.

11-3

INITIAL INTERACTIONS IN EM-STIMULATED BIOSYNTHESIS. M. Blank, Dept Phys & Cellular Biophys, 630 W 168 Street, New York, NY 10032, USA.

SESSION 12: BIOPHYSICAL & BIOLOGICAL DOSIMETRY II

Chair: Junji Miyakoshi and Carl Blackman

10:00am-12:00pm, Diplomat Ballroom

12-1

EFFECTS OF ELECTROMAGNETIC STIMULATION ON PATIENTS RECOVERY AFTER ARTHROSCOPY SURGERY. S.Setti¹, C.Zorzi^{*2}, C.Dall'Oca^{*3}, R. Cadossi¹. ¹Laboratorio di Biofisica Clinica, IGEA, 41012 Carpi (Mo), Italy; ²Ospedale "S. Cuore", 37024 Negrar (Vr), Italy; ³Ospedale "Borgo Roma", 37134 Verona, Italy.

12-2

WHOLE BODY AVERAGE SAR COMPUTED IN A CHILD BODY AT FREQUENCIES FROM 1 GHZ TO 6 GHZ. G. Bit-Babik, A. Faraone, C. K. Chou, M. Swicord. Motorola Florida Research Labs, Fort Lauderdale, FL. 33322. USA.

12-3

DETERMINATION OF LOW FREQUENCY MEASUREMENT CAPABILITY OF AGILENT 85070C DIELECTRIC PROBE KIT. M. Ballen*, M. Kanda*, M. Douglas*, C-K. Chou. Motorola Labs, Corporate EME Research Lab, Fort Lauderdale, FL. 33322. USA.

12-4

LONG-TERM MONITORING OF STATIC ELECTRIC FIELD AND SPACE CHARGE NEAR AC TRANSMISSION LINES. W.H. Bailey¹, T.D. Bracken², R.S. Senior^{2*} ¹ExponentTM, New York, New York, 10170 USA, ²T. Dan Bracken, Inc., Portland, Oregon, 97202 USA.

12-5

FIELD AND TEMPERATURE GRADIENTS IN TISSUES NEAR RESONANT SHORT WIRES. Q Balzano¹, AR Sheppard², KR Foster³, ML Swicord⁴, ¹Annapolis, Maryland 21401; ²Asher Sheppard Consulting, Redlands, CA 92373; ³Dept of Bioengineering, U. PA, Philadelphia, PA 19104; ⁴Motorola Labs, Ft. Lauderdale, FL 33322 USA.

12-6

ACCURATE COMPLIANCE ZONE CALCULATIONS AROUND BASE STATION ANTENNAS USING FULL BODY SAR PROFILING. F.J.C Meyer, M.J van Wyk*, M Bingle*, EM Software & Systems-S.A., EMSS Blding, 32 Techno Ave, Technopark, Stellenbosch, 7599, South Africa.

SESSION 11: BIOLOGICAL EFFECTS & MEDICAL APPLICATIONS (*Continued*)

Discussion

11:30

SESSION 12: BIOPHYSICAL & BIOLOGICAL DOSIMETRY II (*Continued*)

12-7

IMPROVED NUMERICAL MODEL FOR EXPOSURE TO PULSED MAGNETIC FIELD FROM A MOBILE PHONE. A.-P. Sihvonen, K. Jokela. STUK - Finnish Radiation and Nuclear Safety Authority. Helsinki, FIN-00881 Helsinki, Finland.

12-8

ANALYSIS OF THE POSSIBILITY FOR WORKERS TO TOUCH PANEL BASE STATION ANTENNAS FROM BEHIND AT 900 MHZ, 1800 MHZ AND 2100 MHZ. C. Dale, V. Dronne, O. Colas, J. Wiart. France Telecom R&D, DMR/IIM, 38-40 rue du Général Leclerc, 92794 Issy-les-Moulineaux Cedex 9, France.

11:45

12:15 STUDENT AWARDS CEREMONY, Blue Room

TUTORIAL 2: MURI SYMPOSIUM

2:00 - 4:00 pm (Open scientific session); 4:00 - 5:00 pm (Breakout MURI administrative sessions)

Blue Room

Co-Chairs: Karl Schoenbach and Charles Tseng

TUTORIAL 3: RESEARCH RELATED TO THE EFFECT OF RADIOFREQUENCY ENERGY ON MICRONUCLEUS FORMATION

2:00pm – 5:00pm; Diplomat Ballroom

The US Air Force Office of Scientific Research (AFOSR) has awarded two Multidisciplinary University Research Initiative (MURI) grants to study unique extremely high peak power ultrawideband EMF pulses; some narrowband signals are also being investigated.

This project is examining the potential biological effects of extremely high peak power pulsed ultrawideband electromagnetic field exposures on bacterial cells, mammalian cells, and other biological molecules and systems. Engineering, dosimetry and theoretical contributions are actively involved in the projects. The pulses are of 10-nanosecond duration, with peak average field strengths reaching up to 20 million volts/meter. It was hypothesized that the pulses may effect the inner nuclear membrane of the cell, while possibly not effecting the outer cell membrane. It was also hypothesized that the exposures can result in apoptosis, and that after some (to be determined) number of pulses, at some average peak height, the exposure might induce signaling processes, non-hypothesized gene transcription, and/or unspecified protein alterations. A wide variety of molecular biology (genomics, proteomics) and other techniques are being applied to the related investigations at the different institutions. Investigators from all of the institutions involved will be given an opportunity to make short presentations about their current research.

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)

BIOELECTROMAGNETICS: JOURNAL UPDATE. B. Greenebaum, Dept. of Physics, University of Wisconsin-Parkside, Kenosha, Wisconsin 53141-2000, USA.

CLINICAL DEVICES

P-A-1
EFFECTIVE EVALUATION OF HANDSET EXPOSURES IN DIFFERENT NETWORKS UNDER REAL-LIFE CONDITIONS. D. Spät, J. Fröhlich, N. Kuster, Foundation for Research on Information Technologies in Society (IT²IS), Swiss Federal Inst of Tech (ETH), CH-8092 Zurich, Switzerland.

P-B-2
SHIELDING CHARACTERISTICS OF HIGH CONDUCTIVITY OR HIGH PERMEABILITY MATERIALS ON ELF MAGNETIC FIELDS GENERATED FROM SINGLE OR THREE PHASE AC LINE. S.W. Min, K.H. Song, S.H. Myung¹. Division of Information Tech Engineering, Soonchunhyang Univ, Asan, Chungnam, 336-745, Korea, ¹Electrical Power Research Laboratory, Korea Electrotechnology Research Inst, Seongju-dong, Changwon-city, Kyongnam, 641-120, Korea.

P-C-3
EFFECT OF GSM-900 EXPOSURE ON HSP27 EXPRESSION IN EA-HY926 ENDOTHELIAL CELLS. F. Poullietier de Gannes, I. Lagroye, S. Sanchez, B. Billaudel, B. Veyret. PIOM/Bioelectromagnetics lab, ENSCPB/ EPHE, Univ of Bordeaux, Pessac, France.

P-A-4
AN EVALUATION OF POTENTIAL GPRS 900/1800 MHZ AND WCDMA 1900 MHZ INTERFERENCE TO MEDICAL DEVICES. R.J. McKenzie¹, S. Iskra¹, B.W. Thomas¹ and J. Rowley², ¹Telstra Research Laboratories, Clayton, Victoria, 3168, Australia; ²GSM Association, Deausgrange Co., Dublin, Ireland.

DOSIMETRY

P-B-5
THE CORRELATION BETWEEN HEAD SIZE AND SARs FOR HANDSET EXPOSURES AT 835 MHZ. A.K. Lee¹, H.D. Choi¹, J.H. Yun¹, J.I. Choi¹, and J.K. Pack². ¹Radio Technology Group, Electronics and Telecommunications Research Institute, 161 Gajong-Dong, Yusong-Gu, Daejeon, 305-350, KOREA, ²Dept. of Radio Science & Engineering, Chungnam National University, 220, Gung-Dong, Yusong-Gu, Daejeon, 305-764, Korea.

P-C-6
UMTS SIGNAL CHARACTERIZATION FOR SAR COMPLIANCE TESTS OF CELLULAR PHONES. A. Schiavoni, M. Francavilla, D. Forigo, TILAB, via Guglielmo Reiss Romoli 274, 10148, Torino, Italy.

P-A-7
2 GHZ-EXPOSURE OF NON-RESTRAINED AKR/J MICE IN A SLIGHTLY OVER-MODED RADIAL WAVEGUIDE. A. K. Bitz¹, J. Streckert¹, A. M. Sommer², A. Lerchl², and V. W. Hansen¹, ¹Chair of Electromagnetic Theory, University of Wuppertal, D-42097 Wuppertal, Germany, ²School of Engineering and Science, International University Bremen, D-28759 Bremen, Germany.

P-B-8
DETERMINATION OF THE SPATIAL-PEAK SAR IN HUMAN MODELS FROM A HYBRID FEM/MOM SOLUTION. M Bingle, F.J.C Meyer, EM Software and Systems-S.A., EMSS Building, 32 Techno Avenue, Technopark, Stellenbosch, 7599, South Africa.

P-C-9
EXPOSURE ANALYSIS IN TERM OF LOCAL AND WHOLE BODY SAR IN A RAYLEIGH (INDOOR) ENVIRONMENT AT 900 MHZ, 1800 MHZ AND 2100 MHZ. C. Dale, J. Wiart. France Telecom R&D, DMR/IIM, 38-40 rue du Général Leclerc, 92794 Issy-les-Moulineaux Cedex 9, France.

P-A-10
NEW EXPOSURE SYSTEM FOR HUMAN STUDIES ON EFFECTS OF RADIO FREQUENCIES ON BRAIN FUNCTIONS. G. Schmid¹, M. Kundl², H. Molla-Djafari³. ¹ARC Seibersdorf research GmbH, A-2444 Seibersdorf, Austria, ²Institute of Environmental Health, Medical University of Vienna, A-1090 Vienna, Austria, ³Austrian Workers Compensation Board (AUVA), A-1200 Vienna, Austria.

P-B-11
STUDENT
COMPARISON OF VOLUMES USED FOR AVERAGING OF LOCAL SAR. G. Vermeeren, L. Martens; Department of Information Technology, Ghent University, Ghent 9000, Belgium.

P-C-12 WITHDRAWN

P-A-13
DIELECTRIC MEASUREMENT OF MICROSOMES BY THE TRANSMISSION METHOD USING A COAXIAL LINE. H. Ebara¹, K. Tani², M. Sekijima³. T. Onishi¹, S. Uebayashi¹, and O. Hashimoto². ¹NTT DoCoMo, Inc., 3-5 Hikari-no-oka, Yokosuka-shi, Kanagawa, 239-8536, Japan. ²Aoyama Gakuin University, 5-10-1 Fuchinobe, Sagamihara-shi, Kanagawa, 229-8558, Japan. ³Mitsubishi Chemical Safety Institute Ltd., 14 Sunayama, Hasaki-machi, Kashima-gun, Ibaraki, 314-0255, Japan.

P-B-14

DESIGN AND FABRICATION OF LOCAL-EXPOSURE SYSTEMS FOR *IN VIVO* STUDY ON MOBILE FREQUENCY BANDS. H.J. Doh¹, J.K. Pack¹. ¹Dept. of Radio Science & Engineering, Chungnam National University, 220 Gung-dong, Yuseong-gu, Daejeon 305-764, Korea.

P-C-15 **Reinstated**

THE DETERMINATION OF CENTRAL MICROWAVE OPERATING FREQUENCY IN THE SOURCE OF MICROWAVE-INDUCED THERMOACOUSTIC TOMOGRAPHY. J.Yan*, SH.Z. Wu*, BEM Lab., Institute of Electrical Engineering, Chinese Academy of Sciences, 100080, Beijing, P.R.China.

P-A-16

FACTORS AFFECTING OUTPUT POWER (AND RADIOFREQUENCY EXPOSURE) OF GSM MOBILE PHONES. L.S. Erdreich, Van Kerkhove M. McNeely, Exponent, Inc., New York, NY 10170, USA.

P-B-17

TEM CELL SETUP FOR STUDIES ON THE BIOLOGICAL EFFECTS OF THE RADIO-FREQUENCY EXPOSURE ON THE NERVOUS CELLS SYSTEM. L. Ardoino¹, F. Apollonio², G.A. Lovisolo¹, S. Mancini¹, R. Pinto¹. ¹Section of Toxicology and Biomedical Sciences, CR ENEA, Roma, Italy; ²Dept. of Electronic Engineering, "La Sapienza" University, Roma, Italy.

P-C-18

INFLUENCE OF CUBE ORIENTATION ON PEAK SPATIAL-AVERAGED SAR. M.G. Douglas, C-K. Chou. Motorola Florida Research Laboratories, Ft. Lauderdale, Florida, 33322, USA.

P-A-19

SAR MEASUREMENTS AT MULTIPLE FREQUENCIES USING A SINGLE TISSUE-EQUIVALENT LIQUID. M.G. Douglas, M.Y. Kanda, C-K. Chou. Motorola Florida Research Laboratories, Ft. Lauderdale, Florida, 33322, USA.

P-B-20

INVESTIGATION OF APPROACHES FOR FAST SAR TESTING OF MOBILE PHONES. M. Siegbahn, T. Persson, C. Törnevik, Ericsson Research, Ericsson AB, SE-164 80 Stockholm, Sweden.

P-C-21**STUDENT**

CALCULATIONS OF INDUCED CURRENT DENSITIES FOR HUMANS BY MAGNETIC FIELDS FROM EAS COUNTERTOP ACTIVATION/DEACTIVATION DEVICES USING FERRO-MAGNETIC CORES. Qingxiang Li, Om P. Gandhi, and

Gang Kang, Department of Electrical and Computer Engineering, University of Utah, Salt Lake City, Utah 84112, USA.

P-A-22

AN *IN VITRO* STUDY IN THE FRAMEWORK OF CTIA- FDA PROJECT: DESIGN AND DOSIMETRY OF A FOUR CHANNEL SET UP OPERATING AT 900 MHZ. R. Pinto¹, L. Ardoino¹, V. Lopresto¹, C. Marino¹, S. Mancini¹, M. Sarti², M.R. Scarfi², and G.A. Lovisolo¹. ¹ICEmB at ENEA, Section of Toxicology and Biomedical Sciences, Roma, Italy; ²ICEmB at CNR-IREA, Napoli, Italy.

P-B-23 MOVED TO SESSION 3-4.

EFFECTS OF PULSED ELECTROMAGNETIC FIELDS (PEMFs) ON EXPERIMENTAL DEGENERATIVE OSTEOARTHRITIS. S.Setti¹, M. Fini², F. Cavani³, R. Cadossi¹. ¹Laboratorio di Biofisica Clinica, IGEA, 41012 Carpi (Mo), Italy; ²Laboratorio di Chirurgia Sperimentale, Istituti Ortopedici Rizzoli, 40126 Bologna, Italy; ³Università degli Studi di Modena e Reggio Emilia, Dipartimento di Anatomia e Istologia, Policlinico di Modena, 41100 Modena, Italy.

P-C-24

VARIATION OF SAR VALUES MEASURED BY COMMERCIAL MEASUREMENT SYSTEMS COMPATIBLE TO INTERNATIONAL STANDARDS. S. Watanabe¹, Y. Miyota², K. Satoh², and Y. Yamanaka¹, ¹National Institute of Information and Communications Technology, Tokyo 184-8795, Japan, ²NTT Advance Technology Co., Tokyo 180-0012, Japan.

P-A-25

EMPIRICAL DOSIMETRY IN SUPPORT OF 220 MHZ WHOLE BODY RF EXPOSURE IN HUMAN VOLUNTEERS. S. J. Allen¹, E. R. Adair², K. S. Mylacraine¹. ¹General Dynamics, Brooks City Base, TX 78235, ²US Air Force Research Laboratory HEDR, Brooks City-Base, TX 78235, USA.

P-B-26

THE INFLUENCE OF A PHANTOM SHELL ON SAR MEASUREMENT IN HIGHER FREQUENCY RANGE (3-6 GHZ). T. Onishi¹, R. Ishido², K. Saito², S. Uebayashi¹, and K. Ito². ¹NTT DoCoMo, Inc., Kanagawa 239-8536, Japan, ²Chiba University, Chiba 263-8522, Japan.

P-C-27 WITHDRAWN**P-C-173**

EXPOSURE COMPARISON BETWEEN A MOBILE PHONE AND A BASE STATION AT 900 MHZ, 1800 MHZ AND 2100 MHZ. C. Dale, J. Wiart. France Telecom R&D, DMR/IIM, 38-40 rue du Général Leclerc, 92794 Issy-les-Moulineaux Cedex 9, France.

P-A-28

COMPARISON OF PERSONAL EXPOSURE TO MAGNETIC FIELDS ON CHILDREN IN PRIMARY SCHOOLS NEARBY AND AWAY FROM HIGH VOLTAGE POWER LINE. Y. Shin Kim, Y.J. Hyun, Y.S. Cho, S.C. Hong, and J.H. Cho. Institute of Environmental and Industrial Medicine, College of Medicine, Hanyang University, Seoul, 133-791, Korea.

P-B-29 WITHDRAWN

P-B-172

COMPARATIVE ANALYSIS OF SAR INDUCED BY MOBILE PHONE IN CHILD-LIKE HEAD. A Hadjem¹, C. Dale¹, D Lautru², M.F Wong¹, VFouad Hanna², N Gadi³, I Bloch³ and J. Wiart¹. ¹France Telecom R&D, DMR/IIM, 38-40 rue du Général Leclerc, 92794 Issy-les-Moulineaux Cedex 9, France. ; ² Université de Paris 6, Laboratoire LISIF, 4, place Jussieu, 75252 Paris Cedex 05, France. ³ENST Paris, 46, rue Barrault, 75013 Paris, France.

EPIDEMIOLOGY

P-C-30

CELLULAR TELEPHONE USE AMONG PRIMARY SCHOOL CHILDREN IN GERMANY. E. Böhler, J. Schüz., Institute for Medical Biostatistics, Epidemiology and Informatics (IMBEI), University of Mainz, D-55101, Mainz, Germany.

P-A-31

SARS NEEDED TO SUPPRESS SARS—AND OTHER EPIDEMICS. H. Wachtel, Department of Electrical and Computer Engineering and of Neuroscience, University of Colorado, Boulder, Colorado 80309-0425, USA.

P-B-32

DESIGN OF A PROSPECTIVE COHORT STUDY: AIRWAVE HEALTH MONITORING FOR ASSESSMENT OF POSSIBLE HEALTH RISKS ASSOCIATED WITH TETRA. Paul Elliott, David Neasham, Mark Little, Nada Khan, Adrian Burgess, Andy Heard. Department of Epidemiology and Public Health, Faculty of Medicine, Imperial College London, Norfolk Place, London, W2 1PG, United Kingdom.

HIGH THROUGHPUT SCREENING – GENOMICS

P-C-33

MICROARRAY GENE EXPRESSION PROFILING OF A HUMAN GLIOBLASTOMA CELL LINE EXPOSED *IN VITRO* TO 1.9 GHZ PULSE-MODULATED RADIOFREQUENCY FIELDS. S.S. Qutob, P.V. Bellier, C.L. Yauk¹, G.R. Douglas¹, G. Gajda, P. Lymyre, E. Lemay, A. Thansandote, and J.P. McNamee. Consumer and Clinical Radiation Protection Bureau, Health Canada, 775 Brookfield Rd., Ottawa, Ontario, Canada K1A 1C1, ¹Mutagenesis Section, Environmental Health Sciences Bureau, Health

Canada, Environmental Health Centre, Tunney's Pasture, Ottawa, Ontario, K1A 0L2, Canada.

HIGH THROUGHPUT SCREENING – PROTEOMICS

P-A-34

EFFECT OF CW AND W-CDMA MODULATED SIGNALS AT 2-GHZ BAND MICROWAVES ON GENOME-WIDE EXPRESSION PROFILING IN HUMAN CELL LINES. M. Sekijima¹, H. Takeda¹, K. Yasunaga¹, T. Nojima² and J. Miyakoshi³. ¹Mitsubishi Chemical Safety Institute Ltd., Kashima-Gun, Ibaraki 314-0255, Japan, ²Hokkaido University, Sapporo, Hokkaido 060-8628, Japan ³Hirosaki University, Hirosaki, Aomori 036-8563, Japan.

P-B-35

Presented as ST-2.

P-C-36

INTEGRATED APPROACH TO MILLIMETER WAVE BIOMARKER DISCOVERY. N.J. Millenbaugh^{2,3}, R. Sypniewska^{2,3}, J.E. Kalns⁴, P.A. Mason², J.S. Eggers², R.V. Blystone⁵ and J.L. Kiel¹. ¹Biosciences and Protection Division, Air Force Research Lab, Brooks City-Base, TX, 78235, USA, ²Directed Energy Bioeffects Division, Air Force Research Lab, Brooks City-Base, TX, 78235, USA, ³General Dynamics, San Antonio, TX, 78235, USA, ⁴Hyperion Biotechnology, San Antonio, TX, 78235, USA, ⁵Dept of Biology, Trinity Univ, San Antonio, TX, 78212, USA.

HIGH THROUGHPUT SCREENING – TRANSCRIPTOMICS

P-A-37

STUDENT

PRELIMINARY PROTEOMIC EVIDENCE OF 1.8 GHZ MOBILE PHONE SIGNAL-INDUCED CELLULAR REACTION *IN VITRO*. QL.Zeng, Y.Weng, H.Li, DQ.Lu, H.Chiang, ZP.Xu. Bioelectromagnetics Lab, Zhejiang Univ School of Medicine, Hangzhou, Zhejiang, 310031 China.

HUMAN STUDIES

P-B-38

EFFECT OF CONTINUOUS OR INTEREMITTENT EXPOSURE TO ELECTROMAGNETIC FIELDS EMITTED BY MOBILE PHONES ON CARDIOVASCULAR SYSTEM. A. Bortkiewicz¹, E. Gadzicka¹, W. Szymczak². ¹Nofer Institute of Occupational Medicine, Department of Work Physiology and Ergonomics, 90-950 Lodz, Poland. ²Nofer Institute of Occupational Medicine, Department of Environmental Epidemiology, 90-950 Lodz, Poland.

P-C-39

STUDENT

EFFECTS OF MOBILE PHONE-LIKE RF EXPOSURE ON SUBJECTIVE SYMPTOMS AND PHYSIOLOGICAL RESPONSES. A. Johansson¹, J. Wilén¹, M. Sandström¹, E. Lyskov², N. Kaledzic², O. StenSSon¹ and K. Hansson Mild¹. ¹National Institute for Working Life (NIWL), Umeå, Sweden. ²Centre for Musculoskeletal Research, Gävle, Sweden.

P-A-40

STUDENT

RADIO FREQUENCY RADIATION EFFECTS ON HUMAN LEUKOCYTES IN VITRO. A. Aly, E. Zhou, K. Rathnabharathi, and F. Barnes. Department of Electrical Engineering, University of Colorado, Boulder, Colorado, USA.

P-B-41

STUDENT

HUMAN ELECTROENCEPHALOGRAPH RECORD-ED DURING PULSED (200 µT) MAGNETIC FIELD EXPOSURE C.M. Cook, A.W. Thomas & F.S. Prato. Lawson Health Research Institute, St. Joseph's Health Centre and Dept. of Medical Biophysics, University of Western Ontario, London, Ontario, N6A 4V2, Canada.

P-C-42

EFFECT OF OCCUPATIONAL EXPOSURE TO VHF-UHF ELECTROMAGNETIC FIELDS (EMF) ON BLOOD PRESSURE. E. Gadzicka¹, A. Bortkiewicz¹, M. Zmyslony². ¹Nofer Institute of Occupational Medicine, Department of Work Physiology and Ergonomics, 90-950 Lodz, Poland. ²Nofer Institute of Occupational Medicine, Department of Physical Hazards, 90-950 Lodz, Poland.

P-A-43

STUDENT

A PULSED 2.45 GHz EXPOSURE SYSTEM FOR BIOLOGICAL STUDIES. H.L. Gerber¹, A. Bassi¹, C.Q. Zhou¹, S. Lee², S.M. Wang³, C.C. Tseng¹. ¹Purdue University Calumet, Hammond, Indiana 46323, USA; ²Department of Medicine, University of Chicago, Chicago, Illinois 60637, USA; ³ENH Research Institute, Northwestern University, Evanston, Illinois 60201, USA.

P-B-44

USE CELLULAR AND CORDLESS TELEPHONES AND THE ASSOCIATION WITH BRAIN TUMORS IN DIFFERENT AGE GROUPS. L. Hardell^{1,2}, K. Hansson Mild^{1,3}. ¹Department of Natural Sciences, Örebro University, SE-701 82 Örebro, Sweden. ²Department of Oncology, University Hospital, SE-701 85 Örebro, Sweden. ³National Institute for Working Life, SE-907 13 Umeå, Sweden.

P-C-45

STUDENT

THE 2.45 GHz RADIO FREQUENCY FIELDS ALTER HUMAN GENE EXPRESSION. S. Lee¹, C.C. Tseng², J.

Chen¹, M. Sun¹, H.L. Gerber², C.Q. Zhou², D.S. Johnson², K. Dunbar², S.M. Wang³. ¹Department of Medicine, University of Chicago, Chicago, Illinois 60637, USA; ²Purdue University Calumet, Hammond, Indiana 46323, USA; ³ENH Research Institute, Northwestern University, Evanston, Illinois 60201, USA.

P-A-46

INVESTIGATION INTO THE EFFECTS OF MILITARILY RELEVANT RADIO FREQUENCY EXPOSURE ON COGNITION. S. C. Bowditch, L. O. Evans, M. Fricker, R.I. Grose, S. J. Holden, R.H. Inns, R. Lane, L. Richards, S. J. Smith. Defence Science Technology Laboratory (Dstl), Porton Down, Salisbury, Wiltshire, SP4 0JQ, UK. J. A. Groeger, Surrey University, Guildford, Surrey, GU2 7XH, UK.

P-B-47

PSYCHOPHYSIOLOGICAL REACTIONS IN HUMAN TO ELF MAGNETIC FIELDS. V.N. Binhi, S.V. Kapranov, V.A. Milyaev, R.M. Sarimov. General Physics Institute of the Russian Academy of Sciences, Moscow 119991, Russian Federation.

P-C-48

DESIGN OF FOLDER-TYPE MOBILE PHONE WITH LOW SAR IN HUMAN HEAD. Y.H. Choi¹, N. Kim¹, J.D. Park², H.T. Oh³. ¹Radio and Communication Lab, Chungbuk Nat'l University, Cheongju, 361-763, Korea., ²ETRI, Taejon 305-350, Korea., ³Radio Research Laboratory, Seoul 140-848, Korea.

P-A-49

SAMPLE KOREAN'S OCCUPATIONAL AND RESIDENTIAL EXPOSURES TO ELF MAGNETIC FIELD OVER A 24-HOUR PERIOD. K.H. Yang, M.N. Ju, S.H. Myung. Electrical Environment & Transmission Group, Electric Power Research Lab., Korea Electrotechnology Research Institute (KERI), Changwon, Gyeongnam 641-120, Korea.

P-B-50

STUDENT

A DOUBLE-BLIND, RANDOMIZED ANALYSIS OF EXPOSURE TO A SPECIFIC PULSED EXTREMELY LOW FREQUENCY MAGNETIC FIELD ON PAIN RATINGS IN FIBROMYALGIA PATIENTS. N.M. Shupak^{1,3}, W.R. Nielson^{2*}, L. Keenlside^{3*}, G.B. Rollman^{4*}, F.S. Prato^{1,3}, A.W. Thomas^{1,3}. ¹Dept of Med Biophysics, Univ of Western Ontario; ²Dept of Med, Div of Rheumatology, Univ of Western Ontario; ³Lawson Hlth Res Inst and Dept of Nuclear Med & MR, St. Joseph's Health Care (London), London, ON, Canada, N6A 4V2; ⁴Dept of Psych, Univ of Western Ontario; London, ON, Canada.

**MEDICAL APPLICATION STUDIES –
THERAPEUTIC**

P-C-51

PULSING ELECTROMAGNETIC FIELDS SUCCESSFULLY TREAT NEUROMUSCULAR INJURIES AND DISORDERS. F. Sivo and A. Pilla, Department of Biomedical Engineering, Columbia University and Department of Orthopaedics, Mount Sinai School of Medicine, New York, NY, USA.

P-A-52

STUDENT

OPTIMIZATION OF CURRENT DISTRIBUTION IN TRANSCRANIAL MAGNETIC STIMULATION AS AN ALTERNATIVE TO ELECTROCONVULSIVE THERAPY. M. Sekino, S. Ueno. Department of Biomedical Engineering, Graduate School of Medicine, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan.

P-B-53

STUDENT

THE EFFECT OF REPETITIVE MAGNETIC STIMULATION ON THE TUMOR DEVELOPMENT. S. Yamaguchi, M. Ogiue-Ikeda, M. Sekino, and S. Ueno; Dept of Biomedical Engineering, Graduate School of Medicine, Univ of Tokyo. 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-0033, Japan.

P-C-54

MAGNETIC FIELD THERAPY OF PAIN. M. Markov. Research International, Buffalo, USA.

IN VITRO STUDIES – CELLULAR

P-A-55

EVALUATION OF DNA DAMAGE ON HUMAN FIBROBLASTS FOLLOWING EXPOSURE TO 50 Hz ELECTROMAGNETIC FIELDS: A REPLICATION STUDY. A. Sannino¹, O. Zeni¹, M. Romanò¹, P. Mesirca², F. Bersani², M.R. Scarfi¹. ¹ICEmB at CNR- Institute for Electromagnetic Sensing of Environment (IREA), via Diocleziano, 328, 80124, Napoli, Italy, ²ICEmB at Dept. of Physics, University of Bologna, Viale Berti Pichat 6/2, 40126, Bologna, Italy.

P-B-56

STUDENT

ELECTRICAL PULSE-INDUCED CHANGES IN HL-60 DIELECTRIC PROPERTIES. A.L. Garner¹, J. Yang, N. Chen, J. Kolb, K.C. Loftin, R.J. Swanson, S. Beebe, R.P. Joshi, K.H. Schoenbach. Center for Bioelectrics, Old Dominion University, Norfolk, Virginia, 23510, USA. ¹ Department of Nuclear Engineering and Radiological Sciences, University of Michigan, Ann Arbor, Michigan, 48109, USA.

P-C-57

EVALUATION OF GENOTOXIC EFFECTS IN HUMAN PERIPHERAL BLOOD LYMPHOCYTES FOLLOWING RF EXPOSURES AT BOTH GSM 1800 AND UMTS 1950 SIGNALS. O. Zeni¹, A. Schiavoni², A. Perrotta¹, D. Forigo², M.R. Scarfi¹. ¹CNR- Institute for Electromagnetic Sensing of Environment (IREA), via Diocleziano, 328, 80124, Napoli, Italy, ²TILAB, via G. Reiss Romoli 274, 10148, Torino, Italy.

P-A-58

STUDENT

THE EFFECT OF EXTREMELY HIGH POWER PULSES (EHPP) - TREATED WATER ON BARLEY SEEDS' DRY WEIGHT KINETICS DURING THEIR AWAKENING. A.M. Amyan, S.N. Ayrapetyan. UNESCO Chair-Life Sciences International Center, 31 Acharyan st. Yerevan, 375040 Armenia.

P-B-59

STUDENT

THE EFFECT OF EXTREMELY HIGH POWER PULSES (EHPP) –TREATED PHYSIOLOGICAL SOLUTION ON ACH-INDUCED CURRENT IN SNAIL NEURONAL MEMBRANE. A. Hunanyan, S.N. Ayrapetyan. UNESCO Chair-Life Sciences International Center, 31 Acharyan st. Yerevan, 375040 Armenia.

P-C-60

ELEVATION OF GENOMIC INSTABILITY FOLLOWING EXPOSURE OF CELLS TO THz RADIATION. A. Korenstein-Ilan¹, A. Barbul¹, A. Eliran², A. Gover², and R. Korenstein¹. ¹Dept of Physiology and Pharmacology, and ²Department of Electrical Engineering-Physical Electronics, Tel-Aviv University, 69978 Tel-Aviv, Israel.

P-A-61

Presented as ST-6.

P-B-62

STUDENT

TWO SIMILAR EMF SIGNALS ELICIT DIFFERENT EFFECTS ON NEURITE OUTGROWTH OF SPINAL CORD EXPLANTS IN VITRO. A. Chan¹, J. Smith¹, M.S. Markov² and B.F. Siskin¹. ¹Center for Biomedical Engineering and Dept Anatomy and Neurobiology, University of Kentucky, Lexington, Kentucky, 40506-0070, United States. ²Research International, Buffalo, New York 14221 USA.

P-C-63

MAGNETIC FIELD INFLUENCE ON NGF-STIMULATED NEURITE OUTGROWTH IN PC-12 CELLS: EFFECT OF PAINT FUMES. C. F. Blackman¹, D. E. House², S. G. Benane³, A. Ubeda⁴, M.A. Trillo⁴. ¹National Health and Environmental Effects Research Laboratory, EPA, Research Triangle Park, North Carolina

27711 USA, ²Durham, NC, ³Wendell, NC, ⁴Dept. Investigacion, Hospital Ramon y Cajal, 28034 Madrid, Spain.

P-A-64

STUDENT

MEMBRANE EFFECTS OF PULSED HIGH POWER RADIOFREQUENCY RADIATION IN MAMM-ALIAN CELLS. D. W. Jordan, R. M. Gilgenbach, M. D. Uhler, A. L. Garner, L. Gates, Y. Y. Lau. Dept of Nuclear Engineering and Radiological Sciences and Mental Health Research Inst, Univ of Michigan Medical School, Ann Arbor, MI, 48109, USA.

P-B-65

DESIGN AND FABRICATION OF LOCAL-EXPOSURE SYSTEMS FOR *IN VIVO* STUDY ON MOBILE FREQUENCY BANDS. H.J. Doh¹, J.K. Pack¹. ¹Dept. of Radio Science & Engineering, Chungnam National University, 220 Gung-dong, Yuseong-gu, Daejeon 305-764, Korea.

P-C-66

EXPOSURE TO ELF MAGNETIC FIELD TUNED TO Zn INHIBITS GROWTH OF CANCER CELLS. E. Markova^{1,2}, R. Sarimov^{1,3}, F. Johansson¹, D. Jenssen¹, G. Selivanova⁴, I. Belyaev^{1,3}. ¹Department of Genetics, Microbiology and Toxicology, Stockholm University, Stockholm, Sweden; ²Department of Molecular Genetics, Cancer Research Institute, Bratislava, Slovak Republic; ³Department of Biophysics, Radiation Physics and Ecology, Moscow Engineering Physics Institute, Russia; ⁴Cancer Centrum Karolinska, Karolinska Institutet, Stockholm, Sweden.

P-A-67

RADIOFREQUENCY ELECTROMAGNETIC FIELDS (1800 MHZ) INDUCE ELEVATED PRODUCTION OF REACTIVE OXYGEN SPECIES IN HUMAN PROMYELOCYTIC HL-60 CELLS. R. Fitzner, R. Gminski, K. Schlatterer. Dept. Clinical Chemistry and Pathobiochemistry, Dir.: Prof. R. Tauber, Charité - University Medicine Berlin, Campus Benjamin Franklin, Hindenburgdamm 30, D - 12200 Berlin, Germany.

P-B-68

STUDENT

EFFECTS OF LOW AND HIGH STATIC MAGNETIC FIELD ON MAMMALIAN CELLS. H. Yuan, G. S. Schneiderman, Y. Haik, C. J. Chen. Center for Nanomagnetism and Biotechnology, Florida State University, Tallahassee, Florida, USA 32310.

P-C-69

STATIC MAGNETIC FIELD WITH A STRONG MAGNETIC FIELD GRADIENT INDUCES C-JUN EXPRESSION IN HL-60 CELLS. H. Hirose^{1,2}, T. Nakahara³, Q.-M. Zhang¹, S. Yonei¹, J. Miyakoshi³. ¹Lab of Radiation Biology, Graduate School of Science, Kyoto Univ, Sakyo, Kyoto 606-8502, Japan. ²Applied Biology Div,

Kashima Lab, Mitsubishi Chemical Safety Institute Ltd., Kashima, Ibaraki 314-0255, Japan. ³Dept of Radiological Tech, School of Health Sciences, Faculty of Medicine, Hirosaki Univ, Hirosaki, 036-8564, Japan.

P-A-70

EFFECTS OF ELF MAGNETIC FIELDS ON SIGNALS FOR DIFFERENTIATION OF CULTURED OSTEOBLASTIC CELLS BY MULTISPECTRAL IMAGING SYSTEM. H. Yamaguchi¹, K. Hosokawa², H. Shichijo³, M. Kitamura², A. Soda², T. Ikehara², Y. Kinouchi³, K. Yoshizaki², H. Miyamoto², K. Aizawa⁴. ¹Dept of Environmental Physiology, Faculty of Human Life Sciences, Tokushima Bunri Univ, Tokushima 770-8514, Japan, ²Dept of Molecular and Cellular Physiology, School of Medicine, ³Dept of Electrical & Electronic Engineering, Faculty of Engineering, The Univ of Tokushima 770-8503, Japan, ⁴Dept of Physiology, Tokyo Medical College, Tokyo 160-8402, Japan.

P-B-71

STUDENT

ON SPECIFIC EFFECT OF EXTREMELY HIGH POWER PULSES ON PHYSICAL PROPERTIES OF WATER. H.V. Hayrapetyan¹, R.H. Simonyan¹, A.S. Avanesyan², S.N. Ayrapetyan¹. ¹UNESCO Chair-Life Sciences International Center, 31 Acharyan St., Yerevan, 375040 Armenia, ²Biophysical Department of Artsakh State University, Nagorni Karabagh Republic.

P-C-72

MICROWAVES OF MOBILE PHONES AFFECT HUMAN LYMPHOCYTES FROM NORMAL AND HYPERSENSITIVE SUBJECTS DEPENDENT ON FREQUENCY. I. Belyaev^{1,2}, L. Hillert^{3,4}, E. Markova^{1,5}, R. Sarimov^{1,2}, L. Malmgren⁶, B. Persson⁶, M. Harms-Ringdahl¹. ¹Dept of Genetics, Microbiology and Toxicology, Stockholm Univ, Stockholm, Sweden; ²Dept of Biophysics, Radiation Physics and Ecology, Moscow Engineering Physics Inst, Russia; ³Occupational and Env Hlth, Stockholm County Council, Stockholm, Sweden; ⁴Dept of Pub Health Sci, Div of Occupational Med, Karolinska Institutet, Stockholm, Sweden; ⁵Dept of Molecular Genetics, Cancer Res Inst, Bratislava, Slovak Republic; ⁶Dept of Radiation Physics, Lund Univ Hospital, Lund, Sweden.

P-A-73

EFFECTS OF EXPOSURE TO 1950 MHz RADIO-FREQUENCY FIELD ON EXPRESSION OF HSP 27 AND HSP 70 IN HUMAN GLIOMA MO54 CELLS. J. Miyakoshi¹, Y. Takashima¹, G-R. Ding¹, H. Hirose², S. Koyama³. ¹Department of Radiological Technology, School of Health Sciences, Faculty of Medicine, Hirosaki University, 66-1 Hon-cho, Hirosaki, 036-8564, Japan, ²Graduate School of Science and ³Graduate School of Human and Environmental Studies, Kyoto University, Yoshida-Konoe-cho, Sakyo-Ku, Kyoto 606-8501, Japan.

P-B-74

STUDENT

LOW FREQUENCY AC AND DC ELECTRIC FIELD EFFECTS ON WHITE BLOOD CELL MOBILITY. K.N Rathnabharathi, A. Aly, R. Zhou, F.S. Barnes. Department of Electrical and Computer Engineering, University of Colorado, Boulder, CO 80302, USA.

P-C-75

NEURONAL OUTGROWTH OF PC-12 CELLS AFTER COMBINED TREATMENT WITH NERVE GROWTH FACTOR AND A MAGNETIC FIELD: INFLUENCE OF THE INDUCED ELECTRIC FIELD STRENGTH. J. Schimmelpfeng, K.-F. Weibezahn and H. Dertinger. Forschungszentrum Karlsruhe, Institute for Medical Engineering and Biophysics, POB 3640, D-76021 Karlsruhe, Germany.

P-A-76

LOW-FREQUENCY ELECTROMAGNETIC FIELD AS A TOOL TO TRIGGER PLURIPOTENT HUMAN STEM CELLS DIFFERENTIATION. A. Lisi¹, M. Ledda¹, A.M. Patti², A. Vulcano², S. Rieti¹, E. Rosola¹ and S. Grimaldi¹. ¹Istituto di Neurobiologia e Medicina Molecolare C.N.R. Rome Italy. ²Dipartimento di Scienze di Sanità Pubblica G. Sanarelli Università "La Sapienza" Rome, Italy.

P-B-77

A PROJECT IN THE FRAMEWORK OF THE "CAMPANIA EU-REGION CENTER OF COMPETENCE ON INFORMATION AND COMMUNICATION TECHNOLOGIES" RELATED TO THE EVALUATION OF CANCER RELATED ENDPOINTS IN MAMMALIAN CELLS FOLLOWING *IN VITRO* EXPOSURES TO UMTS RADIOFREQUENCY SIGNAL. M. Calabrese¹, G. Castello⁴, G. d'Ambrosio¹, F. Izzo⁴, G.F.Grossi², R. Massa¹, M. Napolitano⁴, G. Petraglia¹, A. Sannino³, M. Sarti³, P. Scampoli², M.R. Scarfi³, O. Zeni³. ¹Università di Napoli Federico II - DIET - Via Claudio, 80125 Napoli, Italy, ²Università di Napoli Federico II -DSF- Monte S.Angelo, 80126, Napoli, Italy, ³CNR-IREA - Via Diocleziano 328 , 80124, Napoli, Italy, ⁴INSCT-Pascale-Via M.Semmola, 80131, Napoli, Italy.

P-C-78

THE SPECIFIC EFFECT OF EXTREMELY HIGH POWER PULSES (EHPP)- TREATED PHYSIOLOGICAL SOLUTION ON CELL VOLUME OF SNAIL NEURON. M.G. Khachatryan, S.N. Ayrapetyan. UNESCO Chair-Life Sciences International Center, 31 Acharyan st. Yerevan, 375040 Armenia.

P-A-79

STUDENT

1800 MHZ RF-EMF DO NOT INDUCE FREE RADICAL PRODUCTION IN DIFFERENT IMMUNE

RELEVANT CELLS. M. Lantow and M. Simkó. University of Rostock, Institute of Cell Biology and Biosystems Technology, Division of Environmental Physiology, Albert Einstein Str.3, D-18059 Rostock, Germany.

P-B-80

STUDENT

THE ATOM FORCE MICROSCOPY STUDY ON THE HIPPOCAMPUS NEURON MEMBRANE PERFORATE INDUCED BY EMP. ¹M. Zhao, ²Xiaozhe Cao, ³D. Wang, ³S. Zhang, ³J. Liu. ¹NIEHS/NIH, BIDG 101, MD F2-04, Res. Triangle Park, NC 27709, ²Department of Pathology, Lanzhou General Hospital, Lanzhou 730050, Gansu province ,China; ³Beijing Institute of Radiation Medicine, Beijing 100850, China.

P-C-81

STUDENT

THE EFFECT OF EXTREMELY HIGH POWER PULSES- TREATED WORT ON GROWTH AND DEVELOPMENT OF YEASTS. N. S. Baghdasaryan, S.N. Ayrapetyan. UNESCO Chair-Life Sciences International Center, 31 Acharyan st. Yerevan, 375040 Armenia.

P-A-82

LOW FREQUENCY AC AND DC MAGNETIC FIELD EFFECTS ON WHITE BLOOD CELL MOBILITY. R. Zhou, K. Rathnabharathi, A. Aly, F. Barnes. Department of Electrical and Computer Engineering, University of Colorado, Boulder, Colorado, 80309, USA.

P-B-83

STUDENT

EFFECTS OF HIGH FREQUENCY ELECTROMAGNETIC FIELDS ON MICRONUCLEUS FORMATION IN CHO-K1 CELLS. S. Koyama^{1, 2}, T. Sakurai¹, T. Nakahara¹, K. Wake³, M. Taki⁴, Y. Isozumi² and J. Miyakoshi¹. ¹Dept of Radiological Tech, School of Hlth Sciences, Faculty of Medicine, Hirosaki Univ; ²Dept of Molecular Environment of Life and Nature, Graduate School of Human and Environmental Studies, Kyoto Univ; ³EMC Research Group, Communications Research Lab, Independent Administrative Inst; ⁴Dept of Electrical Engineering, Graduate School of Engineering, Tokyo Metropolitan Univ., Hachioji-shi , Tokyo 192-0397, Japan.

P-C-84

CELL BATHING SOLUTION AS TARGET FOR SPECIFIC BIOLOGICAL EFFECT OF MICROWAVES. S.N. Ayrapetyan. UNESCO Chair-Life Sciences International Center, 31 Acharyan St. Yerevan, 375040 Armenia.

P-A-85

DIVALENT CATION ENTRY INTO HUMAN POLYMORPHONUCLEAR LEUKOCYTES (PMN) FOLLOWING SUBMICROSECOND, INTENSE

PULSED ELECTRIC FIELD (sm/i-PEF) APPLICATIONS DOES NOT OCCUR VIA CALCIUM STORES-OPERATED CATION ENTRY CHANNELS.

E. S. Buescher, R. R. Smith and K. H. Schoenbach. Center for Pediatric Research, Eastern Virginia Medical School/Children's Hospital of The King's Daughters and Center for Bioelectrics, Old Dominion University, Norfolk, Virginia, USA.

P-B-86

CELLULAR RESPONSE OF HELA CELLS EXPOSED TO REPEATED 10 NANOSECOND, HIGH ELECTRIC FIELD PULSES. T.D. Whitehead, R. Higashikubo, and J.L. Roti Roti, Radiation Oncology Department, Radiation and Cancer Biology Division, Washington University School of Medicine, St. Louis, Missouri 63108 USA.

P-C-87

REAL-TIME IMAGING OF HL-60 CELLS EXPOSED TO NANOSECOND PULSED ELECTRIC FIELDS. W. Frey^{1,2}, M. Artemiou¹, J. Kolb¹, N. Chen¹, S.J. Beebe³, K.H. Schoenbach¹, ¹Old Dominion University, Center for Bioelectrics, Norfolk, VA 23510; ²Forschungszentrum Karlsruhe GmbH, D-76021, Karlsruhe, Germany; ³Eastern Virginia Medical School, Norfolk, VA 23510, USA.

P-A-88

EFFECTS OF ELF PULSED MAGNETIC FIELDS ON THE PROLIFERATION OF MC3T3-E1 CELLS. XL Huo, W Yang, T Song. Bioelectromagnetic Lab, Institute of Electrical Engineering, Chinese Academy of Sciences, Beijing 100080, China.

P-B-89

STUDENT

MAGNETICALLY ALIGNED COLLAGEN GUIDES AXON ELONGATION. Y. Eguchi and S. Ueno. Department of Biomedical Engineering, Graduate School of Medicine, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-0033 Japan.

P-C-90

DNA DAMAGE IN HUMAN CELL LINES AFTER 24H IN VITRO EXPOSURE TO W-CDMA MODULATED SIGNALS AT 2-GHZ BAND MICROWAVES. Y. Komatsubara¹, M. Sekijima¹, H. Takeda¹, N. Sakuma¹, T. Nojima², and J. Miyakoshi³. ¹Mitsubishi Chemical Safety Institute Ltd., Kashima-Gun, Ibaraki 314-0255, Japan, ²Hokkaido University, Sapporo, Hokkaido 060-8628, Japan ³Hirosaki University, Hirosaki, Aomori 036-8563, Japan.

P-A-91

EFFECTS OF HIGH-FREQUENCY ELECTROMAGNETIC FIELDS ON CELL GROWTH, CELL SURVIVAL AND CELL CYCLE DISTRIBUTION. Y. Takashima¹, H. Hirose², S. Koyama³, Y. Suzuki⁴, M. Taki⁴, J. Miyakoshi¹. ¹Faculty of Medicine, Hirosaki University, ²Graduate School of Science, Kyoto University, ³Graduate School of Human and Environmental Studies, Kyoto

University, ⁴Graduate School of Engineering, Tokyo Metropolitan University, ¹66-1 Hon-cho, Hirosaki, 036-8564 Aomori, Japan.

P-B-92

MUTAGENIC EFFECTS OF HIGH-FREQUENCY ELECTROMAGNETIC FIELDS USING A BACTERIAL MUTATION ASSAY Y. Takashima¹, Y. Suzuki², M. Taki², J. Miyakoshi¹. ¹Faculty of Medicine, Hirosaki University, ²Graduate School of Engineering, Tokyo Metropolitan University, ¹66-1 Hon-cho, Hirosaki 036-8564 Aomori Japan.

IN VITRO STUDIES – SIGNAL TRANSDUCTION

P-C-93

HSP70 REGULATION IN HUMAN CELLS AFTER EXPOSURE TO 50 HZ MAGNETIC FIELDS. A.C. Mannerling¹, S. Hannemann², Myrtil Simkó², K. Hansson Mild^{1,3}, M. Mattsson¹. ¹Cell Biology Laboratory, Department of Natural Sciences, Örebro University, SE-701 82 Örebro, Sweden. ² Division for Environmental Physiology, Institute for Cell Biology and Biosystems Technology, University of Rostock, D-18059 Rostock, Germany, ³National Institute for Working Life, SE-907 13 Umeå, Sweden.

IN VITRO STUDIES – SUB CELLULAR

P-A-94

DEPENDENCE OF THE SPIN-SPIN RELAXATION TIME OF COLLAGEN GELS ON COLLAGEN FIBER DIRECTIONS. M. Takeuchi, M. Sekino, and S. Ueno, Dept of Biomedical Engineering Graduate School of Medicine Univ of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan.

P-B-95

MODIFICATIONS IN CELL CYCLE KINETICS AND IN EXPRESSION OF G1 PHASE-REGULATING PROTEINS IN HUMAN AMNIOTIC CELLS AFTER EXPOSURE TO 50 HZ ELECTROMAGNETIC FIELDS AND IONIZING RADIATION. M. Simkó¹, S. Hannemann¹ and S. Lange². ¹University of Rostock, Institute of Cell Biology and Biosystems Technology, Division of Environmental Physiology, D-18059 Rostock, Germany, ²Research Centre Rossendorf, Institute of Bioinorganic and Radiopharmaceutical Chemistry, D-01328 Dresden, Germany.

P-C-96

STUDENT

REAL-TIME STUDY OF ACCUMULATION EFFECTS OF ELECTRIC FIELDS UPON MEMBRANE TRANSPORT IN SINGLE LIVING CELLS Q. Wan and X. N. Xu, Department of Chemistry & Biochemistry; J. Kolb and K. H. Schoenbach, Dept of

Electrical and Computer Engineering; Old Dominion Univ,
Norfolk, VA 23529, USA.

P-A-97

STUDENT

COMBINED EFFECTS OF ELF ELECTRO-MAGNETIC FIELDS AND X-RAYS ON MUTATION IN pTN89 PLASMIDS. S. Koyama^{1, 2}, H. Hirose³, T. Nakahara¹, G. Ding¹, Y. Isozumi² and J. Miyakoshi¹.
¹Department of Radiological Technology, School of Health Sciences, Faculty of Medicine, Hirosaki University;
²Department of Molecular Environment of Life and Nature, Graduate School of Human and Environmental Studies, Kyoto University;
³Laboratory of Radiation Biology, Graduate School of Science, Kyoto University, Japan.

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STUDENT

RADICAL SCAVENGING ACTIVATION PROCESSES OF XANTHOPHYLLS IN BIOMEMBRANE. H. Nakagawa¹, S. Ueno², H. Kotani², M. Murakami¹, H. Abel.
¹Laboratory of Marim Biochemistry, Graduate School of Agricultural and Life Sciences, The University of Tokyo, Bunkyo-ku Tokyo 113-8657, Japan; ²Department of Biomedical Engineering, Graduate School of Medicine, The University of Tokyo, Bunkyo-ku, Tokyo 113-0033, Japan.

P-C-99

NUCLEAR CHANGES AFTER ULTRASHORT ELECTRIC PULSES. N. Chen, J. Kolb, J. Yang, W. Frey, R.J. Swanson, K.C. Loftin, S.J. Beebe. R.P. Joshi, K.H. Schoenbach. Center for Bioelectrics, Old Dominion University, Norfolk, Virginia 23510, USA.

STUDENT

P-A-100

EFFECT OF STRONG MAGNETIC FIELD ON CHONDROGENIC DIFFERENTIATION OF ATDC5 CELLS. Y. Eguchi, S. Ueno. Department of Biomedical Engineering, Graduate School of Medicine, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-0033 Japan.

P-B-101

STUDENT

IN VITRO 1800 MHZ RADIOFREQUENCY EXPOSURE DOES NOT AFFECT HUMAN THYMOCYTE DIFFERENTIATION. M. Capri¹, E. Bianchi¹, S. Carosella¹, C. Lanzarini¹, L. Ugolini¹, G. Gargiulo², J. Schuderer³, N. Kuster³, P. Mesirca⁴, C. Franceschi¹ and F. Bersani⁴. ¹Department of Experimental Pathology, Section of Immunology, University of Bologna, 40126 Bologna, Italy; ²S. Orsola-Malpighi Hospital, 40126 Bologna, Italy; ³Foundation for Research on Information Technologies in Society IT²IS, Zurich, Switzerland; ⁴Department of Physics, University of Bologna, 40126 Bologna, Italy.

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STUDENT

CHARACTERISTICS OF A 10 NANOSECOND BLUMLEIN GENERATOR FOR CELL SUSPENSION STUDIES. H.L. Gerber¹, J. Kolb², Q. Zhou¹, A. Bassi¹, K.H. Schoenbach². ¹Purdue University Calumet, Hammond, Indiana 46323, USA; ²Old Dominion University, Norfolk, Virginia 23510, USA.

IN VITRO STUDIES – TISSUE AND ORGAN

P-A-103

EFFECT OF EXPOSURE TO RADIO FREQUENCY ELECTROMAGNETIC FIELDS ON CYTOKINE-INDUCED NITRIC OXIDE PRODUCTION IN ORGAN CULTURED RAT AORTA. H. Masuda^{1, 2}, F. Poulletier de Gannes¹, S. Sanchez¹, E. Haro¹, I. Lagroye¹, B. Billaudel¹ and B. Veyret¹. ¹PIOM Laboratory CNRS-ENSCP, University of Bordeaux, 33607, Pessac-France. ²Department of Environmental Health, National Institute of Public Health, Tokyo 108-8638, Japan.

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STUDENT

THE EMP INFLUENCED THE EXPRESSION OF BAX, P53 AND BCL-2 IN THE HIPPOCAMPUS, CEREBELLUM AND CEREBRAL CORTEX. ¹X. Qian, ²X. Cao, ³D. Wang, ³X. Cui, ³J. Liu, ¹NIEHS/NIH, BIDG 101, MD F2-04, Res. Triangle Park, NC 27709, ²Department of Pathology, Lanzhou General Hospital, Lanzhou 730050, Gansu Province, China; ³Beijing Institute of Radiation Medicine, Beijing 100850, China.²

P-C-105

STUDENT

INDUCTION OF SECONDARY METABOLISM BY PULSED ELECTRIC FIELD IN SUSPENSION CULTURES OF TAXUS CHINENSIS. H. Ye, L.L. Huang, S.D. Chen¹, Key Laboratory of Optical and Magnetic Resonance Spectroscopy, East China Normal University, 3663 North Zhongshan Road, Shanghai 200062, China.

P-A-106

EFFECT OF EXPOSURE TO STATIC MAGNETIC FIELDS ON ENDOTOXIN-INDUCED NITRIC OXIDE PRODUCTION IN ORGAN CULTURED RAT AORTA. T. Kishimoto^{1,2}, H. Masuda¹, A. Ushiyama¹, S. Hirota¹ and C. Ohkubo¹. ¹Department of Environmental Health, National Institute of Public Health, Tokyo 108-8638, Japan. ²Department of Science, Pip Tokyo Co., Ltd., Tokyo 101-8528, Japan.

P-B-107

NITRATION PATHWAYS ACTIVATED IN MACROPHAGE CELLS TREATED WITH PLASMA FROM 35GHZ MMW EXPOSED RATS. R. Sypniewska³, J. Kiel¹, N. Millenbaugh³, J. Kalns⁴, R. Blystone⁴, P. Mason², C. Cerna⁴, B. Brott⁴, M. Tarango³, H.

Coppage⁵, N. Pedrick⁵, J. Tan⁵, F. Witzmann⁵. ¹Air Force Research Laboratory, Biosciences and Protection Division, Brooks City-Base, TX, ²Air Force Research Laboratory, Directed Energy Bioeffects Division, Brooks City-Base, TX, ³General Dynamics Advanced Information Systems, San Antonio, TX, ⁴Trinity University, Department of Biology, San Antonio, TX, ⁵Dept. of Cellular & Integrative Physiology, Indiana University School of Medicine, Indianapolis IN, USA.

MEDICAL APPLICATIONS STUDIES – DIAGNOSTIC

P-C-108

METHOD FOR ESTIMATION OF STIMULATING POINTS BASED ON STRUCTURE OF CORTEX IN TRANSCRANIAL MAGNETIC STIMULATION. O. Hiwaki. Faculty of Information Sciences, Hiroshima City University, 731-3194 Hiroshima, Japan.

P-A-109 Withdrawn

P-B-110

STUDENT

ESTIMATION OF THE MUSCLE FIBER DIAMETER BASED ON DIFFUSION MAGNETIC RESONANCE IMAGING. T.Saotome^{1,2}, M.Sekino¹, F.Etou², S.Ueno¹. ¹Department of Biomedical Engineering, Graduate School of Medicine, University of Tokyo, ²Department of Rehabilitation Medicine, Graduate School of Medicine, University of Tokyo, 113-0033, Japan.

INSTRUMENTATION AND METHODOLOGY

P-C-111

ELECTROPHYSIOLOGICAL PROPERTIES OF HIPPOCAMPAL SLICES FROM MICE EXPOSED TO 900MHz GSM FIELDS. A.J. Smith, P.K. Harrison, G. Underwood and J.E.H. Tattersall. Biomedical Sciences Department, Dstl Porton Down, Salisbury, Wiltshire SP4 0JQ, UK.

P-A-112

EFFECTS OF CONTINUOUS WHOLE-BODY EXPOSURE TO 50 Hz ELECTROMAGNETIC FIELDS WITH TRANSIENT MAGNETIC FIELDS IN MICE WITH BRAIN TUMOR. A. Ushiyama¹, Y. Suzuki², H. Masuda¹, S. Hirota¹, M. Taki², C. Ohkubo¹. ¹Department of Environmental Health, National Institute of Public Health, Tokyo, Japan. ²Department of Electrical Engineering, Tokyo Metropolitan University, Tokyo, Japan.

P-B-113

NO EFFECT FROM 900 MHZ ELECTRO-MAGNETIC FIELDS ON THE SPONTANEOUS DEVELOPMENT OF LYMPHOMA IN FEMALE AKR/J MICE. A.M. Sommer¹, A. Bitz², J. Streckert², V. Hansen², A. Lerchl¹, ¹School of Engineering and Science, International University Bremen, D-28759 Bremen, ²Chair of Electromagnetic Theory, University of Wuppertal, D-42097 Wuppertal, Germany.

P-C-114

EFFECTS OF HEAD-ONLY EXPOSURE TO RADIOFREQUENCY FIELDS ON LEARNED BEHAVIOUR IN MICE. A. L. Bottomley, R. Bartram, R.P.Blackwell, R.G.E.Haylock and Z.J.Sienkiewicz, National Radiological Protection Board, Chilton, Didcot, Oxfordshire, OX11 0RQ, UK.

P-A-115

ARE THERE ANY HEALTH CONSEQUENCES OF CHRONIC EXPOSURE TO GSM- OR UMTS-FIELDS? RESEARCH PROJECT ON EVENTUAL COGNITIVE, IMMUNOLOGICAL, AND BLOOD-BRAIN-BARRIER EFFECTS IN THREE GENERATIONS OF RATS. M. Bornhausen¹, S. Okorn¹, M. Stangassinger¹, M. Erhard², M. Stohrer¹, J. Detlefsen³, S. Schelkshorn³, J. Eberle⁵, O. Petrowicz⁴. ¹Institutes of Animal Physiology and ²Animal Welfare, Faculty of Veterinary Medicine, Ludwig-Maximilians-University Muenchen; ³Institute of High-Frequency Engineering HFS, Department of Electrical Engineering and Information Technology, ⁴Institute of Experimental Oncology, Faculty of Medicine, and ⁵Council of the Technical University Muenchen, Germany.

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STUDENT

THE POSSIBLE INFLUENCE OF MICROWAVES ON LEUCOCYTES: AN IN VIVO METHOD. D. Adang^{1,2}, M.A. VanderVorst¹, ¹Catholic University Louvain, Emic Division, 1348 Louvain-la-Neuve, Belgium, ²ACOS Well Being, Epidemiology Division, 1120 Neder-over-Heembeek, Belgium.

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STUDENT

MAINLY-HEAD EXPOSURE SYSTEM FOR BEHAVIORAL STUDIES WITH A SMALL NUMBER OF MICE AT 900 MHZ. S. J. Eom, J. Fröhlich, N. Nikoloski, N. Kuster. Foundation for Research on Information Technologies in Society (IT²IS), Swiss Federal Institute of Technology (ETH), Zurich, Switzerland.

P-A-118

PHYSIOLOGICAL ROLE OF BLOOD FLOW ON ELEVATED SKIN TEMPERATURE INDUCED BY RF ELECTROMAGNETIC WAVES IRRADIATION IN RABBITS. F. Jia, A. Ushiyama, H. Masuda, L.L. Traikov, C. Ohkubo. Department of Environmental Health, National Institute of Public Health, 4-6-1 Sirokanedai, Minato-ku, Tokyo 108-8638, Japan.

MECHANISMS OF INTERACTION – BIOLOGICAL TRANSDUCTION

P-B-119

SUPPRESSION OF PLASMA NOREPINEPHRINE DEPLETION IN RESERPINE-INDUCED HYPOTENSIVE WISTAR-KYOTO RATS EXPOSED TO 25 MT STATIC MAGNETIC FIELD. H. Okano^{1,2}, H. Masuda¹, C. Ohkubo¹. ¹Department of Environmental Health, National Institute of Public Health, Tokyo 108-8638, Japan. ²Department of Science, Pip Tokyo Co., Tokyo 101-8528, Japan.

P-C-120

STATIC MAGNETIC FIELDS ENHANCE THE HYPOTENSIVE EFFECT OF A CALCIUM CHANNEL BLOCKER IN SPONTANEOUSLY HYPERTENSIVE RATS. H. Okano^{1,2}, H. Masuda¹, S. Hirota¹, C. Ohkubo¹. ¹Department of Environmental Health, National Institute of Public Health, Tokyo 108-8638, Japan. ²Department of Science, Pip Tokyo Co., Tokyo 101-8528, Japan.

P-A-121

EFFECTS OF MOBILE PHONE RADIATION ON CELL PROLIFERATION, APOPTOSIS AND STRESS RESPONSE IN C57BL/6 MICE. J.-S. Lee^{1,3}, T.-Q. Huang^{1,2}, Y.-C. Chung⁴, J.-K. Pack⁵, J.-J. Jang⁶, J.-S. Seo^{1,2}. ¹ILCHUN Molecular Medicine Institute MRC, Seoul National Univ College of Medicine, Seoul 110-799, Korea, ²Dept of Biochemistry and Molecular Biology, Seoul National Univ College of Medicine, Seoul 110-799, ³BK21 Human Life Science, Seoul National Univ College of Medicine, Seoul 110-799, ⁴Dept of Information & Communication, Seokyeong Univ, Seoul 136-704, ⁵Dept of Radio Sciences & Engineering, Chungnam National Univ, Daejeon 305-764, ⁶Dept of Pathology, Seoul National Univ College of Medicine, Seoul 110-799, Korea.

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SUBCHRONIC EXPOSURE OF *hsp70.1*-DEFICIENT MICE TO MOBILE PHONE RADIATION. J.-S. Lee^{1,3}, T.-Q. Huang^{1,2}, J.-J. Lee¹, J.-K. Pack⁴, J.-J. Jang⁵, J.-S. Seo^{1,2}. ¹ILCHUN Molecular Medicine Institute MRC, Seoul National University College of Medicine, Seoul 110-799, ²Department of Biochemistry and Molecular Biology, Seoul National University College of Medicine, Seoul 110-799, ³BK21 Human Life Science, Seoul National University College of Medicine, Seoul 110-799, ⁴Department of Radio Sciences & Engineering, Chungnam National University, Daejeon 305-764, ⁵Department of Pathology, Seoul National University College of Medicine, Seoul 110-799, Korea.

P-C-123

WEIGHT GAIN IN MICE EXPOSED TO POWER FREQUENCY MAGNETIC FIELDS IS ASSOCIATED WITH INCREASED FAT MASS. J.T. Babbitt^{1,4}, S.S. Murray^{2,5}, L. Kheifets³, T.J. Hahn^{1,5}. ¹Geriatric Research, Educational and Clinical Center, V.A. Medical Center West

Los Angeles, Los Angeles, California 90073, ²Sepulveda Ambulatory Care Center, North Hills, California 91343, ³Department of Epidemiology, and ⁴Department of Community Health Sciences, School of Public Health, and ⁵Department of Medicine, University of Los Angeles, Los Angeles, California 90095, USA.

MECHANISMS OF INTERACTION – PHYSICAL TRANSDUCTION

P-A-124

THE EFFECT OF 3 EMF SIGNALS ON NERVE REGENERATION IN A SCIATIC NERVE CRUSH INJURY MODEL. J.L. Walker^{1,2}, J.M. Smith¹, P. Resig⁴, E. Herbst⁴, B.F. Siskin^{1,3}. ¹Univ. of Kentucky Wenner-Gren Center for Biomedical Engineering, ²Univ. of Kentucky, Division of Orthop. Surg. and Shriners Hospitals for Children and ³Univ. of Kentucky Dept. of Anatomy and Neurobiology, Lexington Kentucky 40536 USA, ⁴Herbst Research, Inc., Edgewater New Jersey 07020 USA.

P-B-125

STUDENT

PULSED EXTREMELY LOW FREQUENCY MAGNETIC FIELD INDUCTION OF HEAT SHOCK PROTEINS. J.A. Robertson^{1,2}, Y. Bureau¹, F.S. Prato^{1,2}, A.W. Thomas^{1,2}. ¹Bioelectromagnetics, Lawson Health Research Institute, St. Joseph's Health Care, 268 Grosvenor St. London, ON, Canada, N6A 4V2, ²Dept. of Medical Biophysics, University of Western Ontario, London, ON, Canada.

P-C-126

EFFECT OF 50 HZ MAGNETIC FIELDS ON THE 5-HT1B SEROTONINERGIC RECEPTOR: A REPLICATION STUDY. J.M. Espinosa, E. Haro, I. Lagroye, B Veyret. PIOM/Bioelectromagnetics lab, ENSCPB/EPHE, University of Bordeaux, Pessac, France.

IN VIVO STUDIES – ANIMAL

P-A-127

EXPOSURE OF EXTREMELY LOW FREQUENCY ELECTROMAGNETIC FIELDS IMPROVES SOCIAL RECOGNITION IN RATS. L. Verdugo-Díaz, G. Reyes-Guerrero¹, D. Elías-Viñas², A. Domínguez-González¹, M. Vázquez¹ and R. Guevara-Guzmán¹. ¹Departamento de Fisiología, Facultad de Medicina, UNAM, México D.F. 04510, ²Departamento de Ingeniería Eléctrica, Sección de Bioingeniería, CINVESTAV, IPN, México, D. F., 07360, México.

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Presented as ST-1.

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CHANGES IN INFRADIAN ACTIVITY OF PHYSIOLOGICAL PROCESSES IN RATS EXPOSED TO LOW INTENSITY, ULTRA-HIGH OR ULTRA-LOW FREQUENCY ELECTROMAGNETIC RADIATION. N.A. Temuryants, V.S. Martynyuk, O.B. Moskovchuk, E.N. Chuyan, V.A. Minko, E.I. Nagaeva, I.A. Brusil. V.I. Vernadskiy Tavrida National University, 4 Prospekt Vernadskogo, Simferopol, 95007, Ukraine.

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EFFECTS OF GSM-RELATED ELECTROMAGNETIC FIELDS ON COCHLEAR OUTER HAIR CELLS IN SPRAGUE-DAWLEY RATS. P. Galloni¹, A. Brazzale², M. Parazzini², M. Piscitelli¹, P. Ravazzani², C. Marino¹, ¹Toxicology and Biomedical Sciences Unit, Enea Casaccia, Via Anguillarese 301, 00060 Rome, Italy;² Biomedical Engineering Institute, CNR, Piazza Leonardo da Vinci 32, 20133 Milan, Italy.

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A NOVEL HEAD-ONLY RF EXPOSURE SYSTEM FOR MICE. R.P.Blackwell, D.Addison, A.L.Bottomley and Z.J.Sienkiewicz, National Radiological Protection Board, Chilton, Didcot, Oxfordshire, OX11 0RQ, UK.

P-C-132

COMBINED EFFECTS OF PULSED MICROWAVES AND A CNS MITOCHONDRIAL TOXIN ON BEHAVIOR DEPEND ON MICROWAVE-EXPOSURE PARAMETERS. R.L. Seaman¹, M.F. Chesselet², S.P. Mathur¹, C.D. DiCarlo³, S.M. Fleming², J.L. Ashmore¹, T.H. Garza¹, J.M. Morin¹, A.R. Grado³, S.L. Adam^{1,3}. ¹McKesson BioServices at US Army Medical Research Detachment, Brooks City-Base, Texas 78235; ²Dept. of Neurology, UCLA School of Medicine, Los Angeles, CA 90095; ³US Army Medical Research Detachment, Brooks City-Base, Texas 78235, USA.

P-A-133**STUDENT**

THE EFFECT OF A MAGNETIC FIELD AT 9.45 GHz ON THE GROWTH PROCESS OF SILKWORMS. S. Yokoi¹, T. Komuratani², M. Ikeya¹, ²Kinugasa Textile Research Institute, Kyoto, Japan; ¹Department of Earth and Space Science, Graduate School of Science, OSAKA University, Toyonaka, Osaka, 560-0043, Japan.

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LOW FREQUENCY (50 HZ, 1 MT) MAGNETIC FIELD INDUCE IMPAIRMENT IN *XENOPUS LAEVIS* TADPOLES METAMORPHOSIS. S. Grimaldi, A. Lisi, S. Rieti, M. Ledda, D. Sacco[§], E. D'Emilia[§], E. Rosola. Institute of Neurobiology and Molecular Medicine, CNR, Rome, Italy [§]ISPESL-DIPIA, Rome, Italy.

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GUARD PROJECT: EXPOSURE SYSTEM, RF DOSIMETRY AND THERMAL IMAGING FOR HUMAN STUDIES ON POTENTIAL HEARING EFFECTS OF CELLULAR PHONE. G. Thuróczy¹, B. F. Molnár¹, E. Rahne², J. Bakos¹; ¹Natl. Research Institute for Radiobiology and Radiohygiene, H-1775 Budapest, POB.101., Hungary, ²Professional Industrial Measurement Techniques (PIM) Ltd. Budapest, Hungary.

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EFFECTS OF SHORT-TERM ELF-MF OF 20mT (A COMMERCIALY AVAILABLE POWER-SOURCE OF 50Hz) ON WHOLE RAT EMBRYO CULTURE. T. Ogasawara, F. Hirahara, Department of Obstetrics and Gynecology, Yokohama City University Graduated School of Medicine, 3-9 Fukuura, Kanazawa-ku, Yokohama, Kanagawa, 236-0004, Japan.

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STUDY ON TESTICULAR GERM CELL APOPTOSIS OF MICE TO 60 Hz MAGNETIC FIELD EXPOSURE Y.W. Kim^{1,2}, J.S. Lee^{1,2}, S.S. Ahn³, K.C. Jung⁴, S.K. Lee³, J.Y. Lee⁵, Y.M. Gimm⁶. ¹Institute of Medical Science, ²Department of Microbiology, ³Department of Urology, ⁴Department of Pathology, School of Medicine, Hallym University, Chunchon, 200-702, ⁵Research Institute of Industrial Science & Technology, Pohang, 790-800, ⁶School of Electrical, Electronic and Computer, Dankook University, Seoul, 140-714, Korea.

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BIOLOGICAL EFFECTS OF 20 KHZ MF EXPOSURE. S. Kim¹, D.S. Yoo², Y.M. Gimm³, J.K. Pack⁴, H.D. Choi³ and Y.S. Lee². ¹College of Veterinary Medicine, Chonnam National University, Kwangju, Korea. ²EME Research Team, Radio & Broadcasting Technology Lab, ETRI, Taejon, Korea. ³Department of Radio Sciences & Engineering, College of Engineering, Chungnam National University, Taejon, Korea. ⁴Lab of Radiation Effect, Korea Institute of Radiological and Medical Sciences, Seoul, Korea.

P-A-139**STUDENT**

EFFECT ON NEURONAL BRAIN ACTIVATION IN MICE FROM PULSED EXTREMELY LOW FREQUENCY MAGNETIC FIELDS. Y. Bureau², K. Marseu¹, A.W. Thomas^{1,2}, F.S. Prato^{1,2}. ¹University of Western Ontario, London, Ontario, Canada; ²Lawson Health Research Institute and Department of Diagnostic Imaging, St. Joseph's Health Care (London), London, Ontario, N6A 4V2, Canada.

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THE ENVIRONMENTAL IMPACT OF R.F. ELECTROMAGNETIC FIELDS IN ITALY: MANAGEMENT OF SCIENTIFIC AND SOCIAL ASPECTS. B. Bisceglia¹, M. Boumis² ¹Università del

Sannio at Benevento, ² Fondazione Ugo Bordoni – Roma, Italy.

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RATIONALE FOR THE DRAFT OF CHINA EMF EXPOSURE STANDARDS. H. Chiang Z. Xu. Bioelectromagnetics Lab, Zhejiang University School of Medicine, China.

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EVALUATION OF HUMAN EXPOSURE TO RF ELECTROMAGNETIC FIELDS FROM MOBILE WIRELESS DEVICES. E.D. Mantiply, R.F. Cleveland, Jr., M.Perrine, T. Harrington. Office of Engineering and Technology, Federal Communications Commission, Washington DC 20554, USA.

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THE PRACTICAL APPLICATION – REALISATION OF THE “ROUND-TABLE-CONSENSUS-MODEL” FOR MOBILE-PHONE-BASE-STATION-SITING. E. Maršálek, Plattform Mobilfunk-Initiativen PMI, Lenaugasse 36, A-3400 Klosterneuburg-Kierling, Austria.

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THE AUSTRALIAN CENTRE FOR RF BIOEFFECTS RESEARCH (ACRBR) - AN NHMRC CENTRE OF RESEARCH EXCELLENCE. R.J. McKenzie, R.J. Croft, V. Anderson, Australian Centre for Radiofrequency Bioeffects Research, RMIT University, Melbourne, Victoria, 3000, Australia.

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WHY TO APPLY THE PRECAUTIONARY PRINCIPLE AGAINST MOBILE PHONE BASE STATIONS. R. Santini. National Institute of Applied Sciences (INSA), Villeurbanne, Cedex, 69621, France.

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NEURAL NETWORK MODELS OF THE PERIPHERAL AND THE CENTRAL NERVOUS SYSTEM IN THE PRESENCE OF THE ELECTROMAGNETIC FIELD. A.M. Tranquilli, F. Apollonio, M. Liberti, G. D’Inzeo. ICEmB at Department of Electronic Engineering, “La Sapienza” University of Rome, 00184 Rome, Italy.

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BIOLOGICAL EFFECTS OF ULTRA-WIDE-BAND PULSES. S.-T. Lu. McKesson BioServices, U.S. Army Medical Research Detachment, Microwave Bioeffects Branch, Brooks City-Base, Texas 78235, USA.

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EFFECTIVE PERMITTIVITY OF BIOLOGICAL MATERIALS: AN ANALYSIS ON THE ROLE OF

WATER CONTENT USING MIXING FORMULAS.

A.Sadasiva, M.J. Schroeder, R.M. Nelson. Department of Electrical and Computer Engineering, North Dakota State University, Fargo, North Dakota, 58105, USA.

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THE EFFECT OF FLUID LEVELS ON THE DISTRIBUTION OF ELECTROMAGNETIC FIELDS IN THE BODY. A. Sadasiva, M.J. Schroeder, R.M. Nelson. Department of Electrical And Computer Engineering, North Dakota State University, Fargo, North Dakota, 58105, USA.

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USING SCALABLE VECTOR GRAPHICS TO MODIFY REALISTIC ANATOMICAL VOXEL MODELS. J. M. Ziriaux¹, D. D. Cox¹, P. A. Mason², and W. D. Hurt². ¹Naval Health Research Center Detachment, Brooks City-Base, TX 78235-5320, USA; ²Directed Energy Bioeffects Division, Human Effectiveness Directorate, Air Force Research Laboratory, Brooks City-Base, Texas, 78235-5365, USA.

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COMPUTION OF COMPLIANCE DISTANCE NEAR THE BASE STATION PANEL ANTENNA (4X2 DIPOLE ARRAY). J.D Park¹, H.D. Choi¹, N. Kim², ¹Advanced Radio Technology Department, Electronics and Telecommunications Research Institute, Korea., ²Dept. of Computer & Communication Eng., Chungbuk Nat'l Univ., Korea.

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SIGNAL-TO-NOISE RATIO AND SENSITIVITY LIMIT FOR DETECTING MAGNETIC FIELDS USING MAGNETIC RESONANCE IMAGING. T. Hatada, M. Sekino, S. Ueno. Department of Biomedical Engineering, Graduate School of Medicine, University of Tokyo, Tokyo, 113-0033, Japan.

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NOVEL TRANSFER STANDARD FOR SAR-PROBE CALIBRATION IN GSM BANDS. A.P. Sihvonen, T. Toivonen, L. Puranen, K. Jokela. STUK Radiation and Nuclear Safety Authority, FIN-00881 Helsinki, Finland.

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EVALUATION OF CELL COMPARTMENTS DIELECTRIC CONSTANT WITH EXPERIMENTAL TECHNIQUES AND NUMERICAL METHOD-

OLOGIES. C. Merla¹, L. De Gregori², A. Ramundo Orlando², M. Liberti¹, F. Apollonio¹, G. D'Inzeo¹. ¹ICEmB @ Department of Electronic Engineering, "La Sapienza" University of Rome, 00184 Rome Italy, ²ICEmB @ Institute of Neurobiology and Molecular Medicine. CNR, Rome, Italy.

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NEW INSTRUMENT FOR MEASUREMENT OF CELLULAR BASE-STATION EMISSIONS. G. Gajda, E. Lemay, A. Thansandote, P. Lemyre & J. McNamee. Consumer & Clinical Radiation Protection Bureau, Health Canada, Ottawa, Ontario, K1A 1C1, Canada.

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METHOD, MATERIAL AND DEVICE PROVIDING ELECTROMAGNETIC COMPATIBILITY BETWEEN TECHNOLOGICALLY ORIGINATED EMR AND BIOLOGICAL SYSTEMS. I. Smirnov. Global Quantech, Inc., 391 Avenida La Cuesta, San Marcos, CA 93078, USA.

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STRAIN MAPPING OF BIOLOGICAL TISSUES USING DIFFUSION TENSOR MAGNETIC RESONANCE IMAGING. M. Sekino, A. Kaneko, Y. Eguchi, K. Yamaguchi, S. Ueno. Department of Biomedical Engineering, Graduate School of Medicine, University of Tokyo, Tokyo 113-0033, Japan.

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DESIGN OF AN EXPERIMENTAL SETUP AND PROTOCOL FOR EVALUATING IN VITRO AND IN VIVO POTENTIAL GENOTOXIC AND THERAPEUTIC EFFECTS OF rTMS SIGNALS. R. Charlet de Sauvage, I. Lagroye, B. Billaude and B. Veyret. PIOM/Bioelectromagnetics laboratory, ENSCPB/EPHE, University of Bordeaux, Pessac, France.

THEORETICAL AND PRACTICAL MODELING

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SOME SPATIAL & TEMPORAL PECULIARITIES OF THE SKIN ELECTRICAL LANDSCAPE AFFECTED BY WEAK CONSTANT MAGNETIC FIELD AND NON-THERMAL MILLIMETER EMF. Y.F. Babich, M.A. Nuzhdina. Institute for Applied Problems of Physics & Biophysics, NAS of Ukraine, 03049-Kiev, Ukraine.

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THE CLUSTERING EFFECT OF PURIFIED EPIDERMAL GROWTH FACTOR RECEPTOR INDUCED BY ELF MAGNETIC FIELD. C. Jia, R. Xia, S. Chen, B. Tian. Key Laboratory of Optical and Magnetic Resonance Spectroscopy, East China Normal University, Shanghai 200062, China.

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EXPERIMENTAL PREDICTION METHOD FOR EXTREMELY LOW FREQUENCY TRANSIENT MAGNETIC FIELD FROM ELECTRIC APPLIANCES. S.H. Myung, K.H. Yang, M.N. Ju, S.W. Min¹. Electrical Environment & Transmission Group, Electric Power Research Lab., Korea Electrotechnology Research Institute (KERI), Changwon, Gyeongnam 641-120, Korea, ¹Division of Information Technology Engineering, Soonchunhyang University, Asan, Chungnam 336-745, Korea.

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SKIN HEATING BY MILLIMETER WAVES: THEORY BASED ON A SKIN MODEL COUPLED TO A WHOLE BODY MODEL. D.A. Stewart Jr, T.R. Gowrishankar, G.T. Martin, J.C. Weaver. Harvard-MIT Division of Health Sciences and Technology Massachusetts Institute of Technology, Cambridge, MA 02139, USA.

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BIOLOGICAL CRITERIA FOR REALISTIC MOBILE PHONE SAFETY STANDARDS. D. Weisbrot¹ M. Blank², H. Lin³ and R. Goodman¹. Departments of Pathology¹ Physiology² and Anatomy³ Columbia University, New York, NY 10032, USA.

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MOLECULAR MECHANISM FOR THE BIOLOGICAL SIGNIFICANCE OF THE GEOMAGNETIC FIELD. V.N. Binhi. General Physics Institute of the Russian Academy of Sciences, Moscow 119991, Russian Federation.

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EXPOSING TO INDUSTRIAL EM FIELDS, STANDARDS, DEVELOPING MEASUREMENT PROCEDURES AND SIMULATION OF MEASUREMENTS. O. Ulukut, S. Comlekci. Department of Electronics and Communication Engineering, Suleyman Demirel University, Isparta, Turkey.

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EFFECTS OF A SWITCHED 1.5 Tesla MAGNETIC FIELD ON INTRACELLULAR Ca²⁺ SIGNALING PATHWAYS OF ADRENAL CHROMAFFIN CELLS. T. Ikehara¹, T. Teramoto³, H. Houchi³, K. Hosokawa¹, H. Yamaguchi⁴, Y.

Kinouchi², M. Kitamura¹, M. Shono¹, K. Yoshizaki¹, and H. Miyamoto¹. ¹Department of Physiology, School of Medicine, ²Department of Electrical and Electronic Engineering, Faculty of Engineering, ³Department of Pharmacy, School of Medicine, The University of Tokushima 770-8503, ⁴Department of Environmental Physiology, Faculty of Human Life Sciences, Tokushima Bunri University, Tokushima 770-8514, Japan.

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15 YEARS OF RESEARCH INTO THE BIOMEDICAL EFFECTS OF ELECTROMAGNETIC FIELDS AT THE ELECTROPATHOLOGICAL RESEARCH CENTER OF WITTEN/HERDECKE UNIVERSITY – AN INTERIM STATEMENT. J. Reißweber, A. Wojtysiak*, E. David, Electropathological Research Center, Witten/Herdecke University, D-58453 Witten, Germany.

P-B-172 and P-C-173

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DESTRUCTION OF GASTRIC CANCER CELLS USING MAGNETIZABLE BEADS AND PULSED MAGNETIC FORCE. POSSIBLE RELATIONSHIP BETWEEN BEADS' SIZE AND CYTOTOXIC EFFICIENCY. H. Yamashita^{1*}, J. Kitayama^{1*}, M. Ogiue-Ikeda^{2*}, S. Ueno², H. Nagawa^{1*}. ¹Department of Surgical Oncology, Graduate School of Medicine, University of Tokyo, Tokyo, Japan. ²Department of Biomedical Engineering, Graduate School of Medicine, University of Tokyo, Tokyo, Japan.

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TREATMENT OF PERIPHERAL NEUROPATHY WITH HIGH STRENGTH MAGNETIC FIELDS: A PRELIMINARY STUDY SUGGESTIVE OF NERVE REGENERATION. T.W. Nichols, L.A. Pearce*, D.A. Bonlie. AMRI Pennsylvania 17331, AMRI North Carolina USA, AMRI Int. Calgary Alberta, Canada.

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ELECTROMAGNETIC HYPERSENSITIVITY IS A PROGRESSIVE DISEASE. M.M. Hughes, Hughes Press, Washington, District of Columbia 20037, USA.

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THEORETICAL DERIVATION OF VALID BIOLOGICAL EXPOSURE METRICS FROM MAXWELL'S EQUATIONS OF ELECTROMAGNETISM: CURRENT STATUS RE STATIC FIELDS AND CELLULAR PHONE ANTENNAS. M. A. Lundquist. The Bioelectromagnetic Hygiene Institute, P. O. Box 11831, Milwaukee, Wisconsin 53211-0831 USA.

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DATA FROM CONTROLLED STUDIES OF LABORATORY ANIMALS, PROPERLY INTERPRETED, SHOW THAT CHRONIC EXPOSURE TO LOW-INTENSITY PULSED MICROWAVE RADIATION IS CARCINOGENIC AND TUMOROGENIC. M. A. Lundquist. The Bioelectromagnetic Hygiene Institute, P. O. Box 11831, Milwaukee, WI 53211-0831 USA.

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A PREDICTED PHOTON CHEMISTRY A.H.J. Fleming*, E.B. Colorio*, Biophotonics Research Institute, Boston, MA 02148, sponsor M.S. Markov, Research International NY 14221.

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THE MONITORING OF BTS IN ITALY SHOWS LOWER ENVIRONMENTAL LIMITS ARE ACHIEVABLE . L. Giuliani, F. Boella, ISPEL (Istituto Superiore Prevenzione E Sicurezza Lavoro)-Italian Health Ministry, Venezia, Corso del Popolo, 133.

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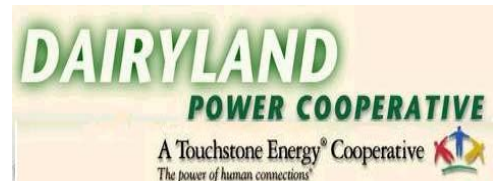
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The MMF was formed in 1998 to jointly fund key research projects, as well as to cooperate on standards, regulatory issues and communications activities concerning mobile phones, base stations and health. Michael Milligan is the Secretary General of the MMF.

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