Winter Workshop Was Enriched by Discussion

The annual BEMS Winter Workshop was held in Tempe, Arizona, on February 3, 2006, with a total of 35 participants in attendance. Six invited speakers and two invited panelists provided everyone with a very lively day of discussions revolving around the subject, “Exploring the Boundaries of Electromagnetic Field Intervention Techniques.”

For the most part, the focus was on interventions at the cellular or whole-body level, but in his opening presentation Dr. Jim Weaver of the Massachusetts Institute of Technology, Cambridge, Mass., USA, outlined how EM field, biological system research can and perhaps should be looked at as a continuum of electric, magnetic or electromagnetic fields being used to interact with biological systems from the subcellular level to an entire body. He also presented ideas about the area of “in silico bioelectromagnetics,” a general term for using silicon-based technology (e.g., computers) to develop testable models that can help explain the biological effects of applied EM fields. Jim went on to emphasize that in silico bioelectromagnetics must build predictive models, and the physics should not go on forever but must be followed and substantiated by experimental results.

Dr. Tom Vernier of Viterbi School of Engineering, University of Southern California, followed the opening presentation with a look at his work using nanosecond megavolt electric pulses to target cells for immune clearance. There is ample evidence from this work and that of the following presentation that ultra short high voltage pulses offer a tool by which carefully targeted interventions at the cell or subcellular level are now becoming a reality. Tom’s experimental results demonstrated that, for example, a 4 ns 7 mV/nm pulse could cause externalization of phosphatidylserine (movement from inside to outside the cell membrane). His introductory remarks reviewed the use of various pulse regimes to manipulate various cell functions or response. Megavolt pulses of nanosecond duration could be and are being used for tumor therapy, selective apoptosis, gene regulation etc. while kilovolt pulses of microsecond duration can be or are being used for drug delivery, cell fusion, wound healing, and more.

See Winter Workshop, continued, p2

C-K Chou Will Receive the 2006 d’Arsenval Award

The Board of Directors of the Bioelectromagnetics Society announced this month that the 2006 d’Arsonval Award will be presented to C-K Chou in recognition of his extraordinary accomplishments in the discipline of bioelectromagnetics. The award comes with an illuminated testimonial, a silver medallion, a silver tie tack, and an honorarium. Also, Chou will present an invited lecture to open the Society’s Annual Meeting in Cancun in June, the text of which will be printed in Bioelectromagnetics.

Dr. Chou is currently Chief EME Scientist and Director of the Corporate EME Research Laboratory at Motorola Laboratories, Florida, where he is responsible for RF product safety. Chou served as a member of the BEMS Board of Directors from 1981 to 1984, and as an Associate Editor of Bioelectromagnetics from 1987 to 2003, responsible for editing papers on high-frequency RF fields.

Dr. Chung-Kwang (C-K) Chou received the B.S.E.E. degree from National Taiwan University, Taipei, in 1968, the M.S. degree from
Winter Workshop, Continued

Dr. Richard Nuccitelli of the Frank Reidy Research Center for Bioelectrics, Old Dominion University, Virginia, and BioElectroMed Corp., gave participants an exciting look at how short (nanosecond), high voltage (kilovolts) pulses are being studied as a drug-free means of inducing cancer cell apoptosis. The current model in use is a mouse with an induced melanoma. Pulse field treatment causes significant tumor regression with preliminary results of multiple treatments indicating compete regression. This is a very new research area that appears to hold great promise for using electric fields as a means of controlling certain tumors. This presentation created a lively discussion and numerous requests from the attendees for when and where the work would be published. A paper has been submitted for publication by Dr. Nuccitelli and his group and he will be speaking further about the work in his plenary presentation at the BEMS annual meeting in Cancun, Mexico on June 13, 2006.

Four presenters, Dr. Bruno Marino, Vice President for R&D and Chief Science and Technology Officer, Aegis Industries Inc.; Dr. Robert Walter of the Stroger Cook County Hospital and Rush University Medical Center, Chicago, Dr. Casey Hathcock, senior research scientist at Avocet Polymer Technologies, Inc., and James Jauchem of the Directed Energy Bio-Effects Division, U.S. Air Force Research Laboratory, San Antonio, Texas, presented a variety of aspects of how electric fields can be used as an Intermediate Force Option (IFO) to produce behavior modification. Such devices may be used by the police or military for individual behavioral modification or crowd control. Devices may be used at a distance or by direct contact with an individual. This is an area that represents a rapidly growing technology because it suggests a means of non-lethal intervention in highly dangerous situations.

However, it also carries a considerable potential for unwanted uses and side effects and these points were the focus of the discussions that surrounded these presentations. For example, Dr. Raphael Lee noted from his own work with patients who have undergone a profound electrical shock, that in most of these patients there seems to be a little-understood, long-term health effect that results from exposure to these high fields. There was a call by at least one of the speakers for research in this area by BEMS members to better understand the biological and physiological response.

The Winter Workshop was organized with the aim of focusing on the discussion and participation of the attendees as much as it was on the presentations of the speakers. There was general agreement that this goal was achieved and that it provided a valuable learning experience. It is probable that the Winter Workshop in 2007 will continue this approach and it will be in the Washington DC area.

— by Bruce McLeod and Mays Swicord. Photos courtesy of Mays Swicord and Michael Murphy

2006 d’Arsonval Award, Continued

Washington University, St. Louis, MO, in 1971, and the Ph.D. degree from the University of Washington, Seattle, in 1975. After spending a year as a National Institutes of Health Post-Doctoral Fellow in the Regional Primate Research Center and the Department of Physiology and Biophysics at the University of Washington, he served as Assistant Professor from 1977 to 1981 and Research Associate Professor from 1981 to 1985 in the Department of Rehabilitation Medicine and Center for Bioengineering of the University of Washington. During 1985–1998, he was a Research Scientist and the Director of the Department of Radiation Research at the City of Hope National Medical Center in Duarte, California. In April 1998, he joined Motorola Florida Research Labs, Fort Lauderdale, FL. His research has been on RF biological effects, RF dosimetry and exposure systems, hyperthermia and electrochemical treatment of cancer.

In 1981, Dr. Chou received the first special award for the decade (1970–1979) from the International Microwave Power Institute, in 1985, the outstanding paper award from the Journal of Microwave Power; in 1995, the Curtis Carl Johnson Memorial Award for Preceptor of Best Student Poster from the Bioelectromagnetics Society; and in 2005, the IEEE Standards Medallion Award.


Dr. Chou has published more than 180 peer-reviewed papers and book chapters. He is a Fellow of IEEE (1989) and the American Institute for Medical and Biological Engineering (1996).

Previous d’Arsonval Award winners are:

2003—James Lin, University of Illinois, Chicago
2001—Thomas Tenforde, Battelle Pacific Northwest National Laboratory, USA
1999—Nancy Wertheimer, University of Colorado
1995—Om P. Gandhi, University of Utah
1993—Carl H. Durney, University of Utah
1991—C. Andrew L. Bassett, Columbia University
1989—W. Ross Adey, Loma Linda University
1987—Arthur W. Guy, University of Washington
1985—Herman P. Schwan, University of Pennsylvania

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1987—Arthur W. Guy, University of Washington
1985—Herman P. Schwan, University of Pennsylvania
NEW EMF CALCULATION TOOL

René de Seze, President of the European BioElectromagnetics Association (EBEA) and director of the Unité Toxicologie Expérimentale at the French Research Institute INERIS, Verneuil-en-Halatte, reported recently that after many years’ preparation, he and colleagues are pleased to introduce a new software application “VALCEM,” a user-friendly tool to calculate the limit values (reference levels and basic restrictions) for exposure to electromagnetic fields.

“It took a long time to get it usable online and to correct some bugs by our computer technicians who did not originally conceive this software,” de Seze remarked. Now it is available, either through the direct address: http://toxi.ineris.fr/activites/toxicologie/norme_lectromagnetique.php or in English at the same address under the heading, “Services en ligne, Toxicologie expérimentale, Outils, Normes CEM” by clicking on the British flag. Feedback is also welcome to Dr. René de Seze, Tel: +33 3 44 55 65 94; Fax: +33 3 44 55 66 05, and email: Rene.De-Seze@ineris.fr

SPECIAL ISSUE RECALLS 2004 MEETING IN RHODES, GREECE

The December, 2005 special triple issue of The Environmentalist, published by Springer, offers more than 25 papers from the 3rd International Workshop, “Biological Effects of Electromagnetic Fields,” held in Rhodes, Greece, in 2004. Guest editors for the special issue were Panos Kostarakis of the University of Ioannina, Greece, and by BEMS member Marko Markov of Research International, Buffalo, New York, USA.

Kostarakis and Markov also contributed an editorial, “Biological Effects of Electromagnetic Fields,” to the issue, and the first paper is by Markov, “Biological Windows: A Tribute to W. Ross Adey.” Other topics include gene stability and expression, ELF-EMF effects on free radicals, nerve pulse conduction, human EEG, power absorption and SAR in the head with mobile phone use, an evaluation of EMF in schools in Cyprus, and risk perception of RF exposure by the public in Egypt.

Markov says he is proud of this Special Issue because with it, he has fulfilled a self-imposed duty to help young people. “Half of the papers have leading authors, or at least co-authors who are 30 years old or younger. For some of them it is a rare opportunity to publish in a peer-reviewed journal,” and to be professionally associated with more experienced researchers. Also, many authors are from underrepresented countries such as Egypt, Israel, Estonia, Greece, Cyprus, and Bulgaria.

To view the special issue, go to www.springer.com/ and choose “Environmentalist Sciences” from the list. Use the search engine with the term, “The Environmentalist,” and choose it from the short list of results. Finally, choose “online list available” to access the December 2005 edition, volume 25, numbers 2–4, “Special Issue: Biological Effects of Electromagnetic Fields.”

Markov has also been involved with publication of a new book, “Bioelectromagnetics Current Concepts: The Mechanisms of the Biological Effect of Extremely High Power Pulses,” volume 5 of NATO’s Security Through Science Series B, Physics and Biophysics. Markov and Sinerik N. Ayrapetyan of the UNESCO International Life Sciences Center, Yerevan, Armenia, co-edited the 445-page volume, which costs US$89. It is based on lectures and selected posters on aspects of biological effects of EMF presented at the NATO Advanced Research Workshop, “The mechanisms of biological effects of Extremely High Power Pulses (EHP),” and the UNESCO/WHO/IUPAB Seminar “Molecular and Cellular Mechanisms of Biological Effects of EMF” in March 2005 in Yerevan. The authors’ list includes several members of The Bioelectromagnetics Society, and represents research centers from 21 countries in Europe, North and South America, and Asia. For more information, see www.springer.com/

— Janet Lathrop, with Marko Markov, who is affiliated with Research International, a company conducting biological and clinical research on EMF applications. E-mail: msmarkov@aol.com

ELLEN STERN HARRIS HAS DIED

Although she was not a BEMS member, Ellen Stern Harris’s death at age 76 in early January was noted by many long-time Society members. She was the director of The Fund for the Environment in Beverly Hills, and well known in California as an environmental writer and activist on conservation issues, one of which she considered the possible health effects of exposure to power-frequency electromagnetic fields. She was a member of the Consensus Group in the 1990s, and an advisor to the state Department of Health Services’ EMF Project. She attended the 1999 BEMS Annual Meeting.

—Gabi Nindl Waite and Janet Lathrop

The Bioelectromagnetics Society newsletter is published and distributed to all members of the Society. Institutions and libraries may subscribe to the newsletter at an annual cost of $58.50 ($67.50 for overseas subscriptions). The newsletter serves the membership and subscribers in part as a forum of ideas and issues related to bioelectromagnetics research. All submission to the newsletter must be signed. It is understood that they reflect the views of individual authors and not those of the Society or the institutions with which the author may be affiliated. The editors welcome contributions to the newsletter from members and others in the scientific and engineering communities. News items as well as short research notes and book reviews are appreciated. Advertisements inserted or distributed with the newsletter are not to be considered endorsements.

To submit items for consideration, contact:

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or

Janet Lathrop, managing editor, 750 Cherry Valley Rd., Gilford, NH 03249. Tel and FAX: (603) 892-0649 USA. E-mail: jclathrop@fcgnetworks.net

For other Society business or information, contact: Gloria Parsley, executive director, The Bioelectromagnetics Society, 2412 Cobblestone Way, Frederick, MD 21702-2626 USA. Tel. (301) 663-4252; FAX: (301) 694-4948. Email: bemsoffice@aol.com or see the BEMS Web site: www.bioelectromagnetics.org
NEW DISCLOSURE POLICY BEGINS WITH THIS ISSUE

Beginning with this issue, the BEMS Newsletter is adopting a new policy to address possible conflict of interest and bias. Following the request of the BEMS Board of Directors, the Newsletter will now ask all contributing writers to submit a sentence or short statement on their affiliation and/or disclosing possible conflict of interest along with items they send to the Newsletter.

The Editor and Managing Editor’s statements are:

BEMS Newsletter Editor Mays Swicord is currently employed by Motorola, Ft. Lauderdale, Florida, USA, and is a retired employee of the U.S. Food and Drug Administration.

BEMS Newsletter Managing Editor Janet Lathrop is a science writer in New Hampshire, USA. In addition to independent science writing, she regularly contributes EMF research news to a private information service funded by industry, non-profit groups and government.

BEMS MEMORIAL COMMITTEE REPORT

The student session at the 2005 BEMS meeting in Dublin, Ireland, was held in the name of Alessandro Chiabrera. Students were on average very well prepared and stayed within their time limits. There were many positive comments on this issue. There were some critical comments on the diversity of the talks. The lack of a common theme among the student papers was the topic of considerable discussion. BEMS has already responded by omitting the separate student session in 2006.

One person commented on a problem that occurred occasionally. Non-native-English-speaking students sometimes did not understand questions. For the case of non-native speakers, the committee recommends that we consider appointing a helper who can aid in translation of questions, upon request. That helper could be a supervisor from the same lab in the case of student presenters. A list of BEMS volunteers could be compiled, and the non-native speakers could request a helper from the list.

Denise Hamblin was awarded the Memorial Award in Dr. Chiabrera’s honor. The student received a certificate and a check for $200. In addition, the laboratory at Swinburne Institute of Technology, Australia, with which she was associated, received a $500 student travel award. A student chosen by the laboratory supervisors Andrew Wood and Rodney Croft can use this money to support travel to the 2006 meeting in Cancun.

The process for choosing the award winner was similar to the process used in 2005. The Awards Committee made two recommendations and the Memorial Committee chose the winner. We want to thank the Awards Committee for their help, and we recommend continuing this process. The Memorial Committee offers its help to improve the selection guidelines.

CANCUN IS A “GO” FOR BEMS 28TH ANNUAL MEETING IN JUNE

Despite superficial damage sustained from Hurricane Wilma in October 2005, the JW Marriott Cancun Resort and Spa in Cancun, Mexico will host The Bioelectromagnetics Society’s 28th Annual Meeting on June 11–15, 2006, as planned. BEMS Executive Director Gloria Parsley was in Cancun in January for the SPRBM meeting, and was pleased to report to the BEMS Board in February that the SPRBM conference was a success.

With diligent planning, Parsley was able to reschedule the SPRBM conference to a resort that sustained no damage from Hurricane Wilma. Eight prominent keynote speakers helped SPRBM to double their attendance, as well. She toured the Marriott and witnessed the ongoing repair of hurricane flood damage. The hotel and eight adjoining restaurants estimate that they will reopen around May 1. Hurricane damage at the Marriott is superficial compared to that at some other hotels, she reports. Further, the Cancun airport, public and charter bus services, taxis and the entire downtown area are open for business.

“The entire Marriott staff is working very hard to clean up and open the hotel as soon as possible,” Parsley reports. “I was very touched by the dedication and hard work that the Mexican community is exhibiting to rebuild and reopen the damaged resorts. I am optimistic that our hotel will be freshly renovated and open in time for our conference.”

That being the case, reservations are now being accepted for the 28th Annual Meeting in June at the JW Marriott Cancun Resort & Spa. The BEMS group rate of $150 per night (plus 12% tax) is for an Ocean View room with balcony or double occupancy. Make reservations by calling (800) 813-2776 from the US or Canada and asking for the BEMS ANNUAL MEETING rate. Note that the Mexican Government offers a value-added tax benefit for foreign visitors. If you provide a copy of the migratory document you receive upon entering the country, along with a copy of your passport, the hotel can apply for an exemption of the 10% tax, reducing the total tax on your room to 2%. Upon check-in, either ask the front desk to make a copy, or check with the BEMS registration desk for help making copies. Payment must be made through a wire transfer from a foreign account to a Mexican bank or via a credit card issued abroad.

Or, reserve online at <www.jwmarriottcancun.com/>. Click on “Book a Reservation.” This will take you to the reservation page where you enter the group code BEMBEMA and the dates you want to book. These must be within the group room block dates, June 6–18. The deadline to obtain the special discounted BEMS rate (subject to availability) is May 21, 2006. If you have any special requests you may fax the JW Marriott reservation department directly at: +52 998 848 965, to the attention of Mariangela Coppola.

BEMS Members should remember that it greatly helps the Society’s Annual Meeting budget if BEMS participants book more than 350 hotel rooms at the conference facility. If we accomplish this, there is no rental charge for the meeting rooms. So all who plan to attend should register at the special BEMS rate as soon as possible.

See Memorial Committee Report, continued p10

– Janet Lathrop, with Gloria Parsley
BEMS COMMITTEE REPORTS FEWER NEW MEMBERS IN 2005

Chairman Junji Miyakoshi of the BEMS Membership Committee, with Juuka Juutilainen, Ken Joyner, Masamichi Kato, Greg Lotz, Gabi Nindl Waite, Janie Page, and Vijayalaxmi, reported that since the June 2005 Annual Meeting in Dublin, the Society has registered 59 new members, including two upgraded memberships.

2005 New Members Joining in March–November

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<th>Total</th>
<th>Full Member</th>
<th>Associate</th>
<th>Student</th>
<th>(Upgrade)</th>
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<td>2</td>
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<tr>
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<td>5</td>
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<td>4</td>
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<td>1</td>
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<tr>
<td>Total</td>
<td>59</td>
<td>28</td>
<td>16</td>
<td>15</td>
<td>(2)</td>
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New Members 2003–2005

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<th>Full</th>
<th>Associate</th>
<th>Student</th>
<th>SM</th>
<th>(Upgrade)</th>
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<td>2003</td>
<td>78</td>
<td>34</td>
<td>15</td>
<td>29</td>
<td>0</td>
<td>(6)</td>
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<td>12</td>
<td>32</td>
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<tr>
<td>2005</td>
<td>59</td>
<td>28</td>
<td>16</td>
<td>15</td>
<td>0</td>
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The total of new members (excluding “upgrade”) has decreased by 22 percent, and the ratio of “Student member” in the total new member has also dropped from 43 percent to 26 percent in 2005, the committee reports. Miyakoshi thanked all members of the Membership Committee, who worked for BEMS by reviewing many pages of curriculum vitae and making thoughtful recommendations.

– from Membership Committee Reports

JOURNAL EDITOR’S REPORT

Online Abstract Submission Starts April 1

At the BEMS Board of Directors’ Midwinter Meeting in Phoenix in February, the outgoing Editor in Chief of Bioelectromagnetics, Ben Greenebaum, reported on the current state of the journal.

Greenebaum wrote, “I wish to thank my Associate Editors and all of our assistants for their usual good support in 2005. We published the usual 8 regular issues, containing 574 pages, and one 160-page supplement. The year was unusually busy for a number of reasons, not the least of which was that the number of papers received continues to be high. We also accommodated our new Associate Editor, Damian Miklavcic, in his startup phase.”

“The number of papers received has increased markedly in the past two years, with 2005 increased over 2004. Our decision, effective in about 2003, to withdraw papers if a revision is not received within 3 months (instead of a year) only partly explains the jump. The acceptance rate will be below 54% (only if all pending papers are accepted, which is unlikely) for 2004, down from earlier years. The withdrawal/resubmission process could account for much of this. Review times, despite efforts, remained about the same; having median times below average does indicate the distribution has a long tail, however.

“Europe’s fraction of the contributions continues to creep up a bit, while North America’s crept down. A surprisingly large number of papers came from Turkey in the past year. When analyzed by frequency, papers on ELF, DC, and “Other” (which included both AC and DC) increased their proportions at the expense of HF. There were many HF dosimetry papers.

“Our Thompson/ISI “Impact Factor” dropped, compared to last year, while among our traditional comparison group, Bioelectrochemistry’s jumped. These are very volatile numbers and neither Colette Bean at Wiley & Sons nor I have good explanations. My one speculation is that these ups and downs may be influenced by publication of proceedings and supplements. We had a significant change in impact factor last year, possibly reflecting our California Supplement of 2003. This speculation would predict an increase for Bioelectromagnetics next year, due to our recent WHO Supplement. However, proceedings might not explain all.”

“In further developments, Wiley has now put the full content of all back issues, starting from Vol.1, No.1 in 1980, on their Web site. Back issues are available to subscribers right now. To access these, go to the usual journal home page and click on the link to “Bioelectromagnetics 1980–1995.”

“Finally, as of April 1, Bioelectromagnetics will have converted fully to a new On-Line Manuscript System. After this, Bioelectromagnetics will accept abstract submissions only through the Manuscript Central manuscript handling system at <http://mc.manuscriptcentral.com/bem>. There, authors can establish a free author’s account and follow instructions to submit the manuscript. They may also use these pages to track progress of their submission, read reviews when notified by email that these are posted, submit revisions, and so on. After April 1, authors who submit manuscripts by other methods will be asked to resubmit through the new online system. Authors unable to access the system should contact the Editor for advice.

– Ben Greenebaum, Editor, Bioelectromagnetics
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E-mail:greeneba@uw.edu
SWISS WORKSHOP FOCUSED ON QUALITY IN EMF RESEARCH

Niels Kuster of the IT’IS Foundation for Research on Information Technologies in Society, Zurich, a principal organizer of the conference, “EMF Health Risk Research: Lessons Learned and Recommendations for the Future,” on November 21–24, 2005, opened by paraphrasing a remark that had caught his eye: “There is good science and bad science, and the difference is not simply a matter of opinion.”

This theme—how to conduct careful, well-designed experiments with appropriate statistics, independent final evaluation, and following other principles for best quality—ran through all of the presentations over the four-day conference, the panel discussions and audience participation.

The international workshop was organized by the European EMF-NET project, the Swiss Agency for the Environment, Forests and Landscape (BUWAL), and the Swiss Federal Office of Public Health (BAG). It was also financially supported by the Swiss Federal Institute of Technology (ETHZ) and the Swiss National Science Foundation, the U.S. National Institute of Environmental Health Sciences (NIEHS), and the German Foundation for Behavior and Environment (VERUM). It was held at the Stefano Franscini Center on a hill known as Monte Verità, featuring vegetarian local specialty foods and glorious fall scenery, near the town of Ascona on Lago Maggiore in the Italian-speaking Ticino region of Switzerland.

More than 30 invited speakers discussed the proper handling of replication studies, dosimetry requirements and how to improve the quality and sharpen the focus of future research on possible health effects of EMF. Another organizer, Theo Samaras of the Aristotle University of Thessaloniki, Greece, said that bioelectromagnetics research seems to be at a crossroads now in Europe. Good quality scientific techniques and methods are needed not only for their own sake, but to show the European Commission that bioelectromagnetics research is mature enough to continue beyond Framework 6 (FP6), which ends soon. Samaras and others hope that the EC will decide to fund further EMF research in FP7. A major objective of the workshop, in the words of organizers, was how to address uncertainties in technical and biological aspects and in the evaluation of research for health risk assessment “in order to improve future research with respect to quality.”

The opening session featured talks on technical aspects of bioelectromagnetics experiments, because, as Kuster put it, “two of the major shortcomings in EMF health risk research resulting in inconclusive results on nonthermal effects are inappropriate engineering implementations and a lack of dosimetric information in many published studies.” Talks on experimental and numerical dosimetry were given by Sven Kühn of IT’IS, by Samaras, by Georgio Lovisolo of ENEA, Rome, and Ferdinando Bersani of the University of Bologna, who spoke about ELF exposure setups. The speakers stressed the need for blinded protocols, for a true sham group, a positive control group, uniform exposure of the sample and good temperature and other environmental controls. Kuster spoke on exposure setups for animal EMF studies and Gernod Schmid of ARCS Siebersdorf Research, Austria, addressed engineering aspects of exposure setups for human laboratory studies. General discussion followed, on the topics of sample size and advantages of the repeated measures study design.

Among other things, EMF RF dosimetry experts said that studies should not use actual or modified mobile phones for human subjects research, because only generic and optimized exposure systems provide sufficiently small dependence of the locally induced tissue specific fields on anatomical differences.

The speakers were asked to identify key limitations of the existing studies, and as each session ended, Kuster and Samaras proposed a list of “Requirements”—quality assurance points that followed from issues raised in each topic area. Perhaps three White Papers will come out of this conference, drafted by scientific advisors of EMF-NET as part of their work for the European Commission. In part, these may help to set the agenda for future EMF study in Europe, according to Samaras and EMF NET Director Paolo Ravazzani of the Institute of Biomedical Engineering, CNR, Milan.

In the weeks since the workshop ended, Kuster and Samaras, with Sonja Negovetic of the University of Zurich, have prepared an overview, an executive summary, of the four-day workshop. They list the points on which consensus was reached in four topic areas: Technical Aspects (dosimetry, engineering, etc.), Biological Requirements, Research Programs and Selected Endpoints.

The list is too long to be reproduced here, but the authors recommend that EMF investigators pay close attention to proper selection, characterization and calibration of the instruments for their specific use. The biggest emphasis in the planning of any EMF study should be placed on full characterization of the distribution of induced E and H fields, as well as temperature, and should include a full uncertainty and variation analysis of each reported quantity.

In later talks on the first day, Joe Wiart of the French National Research project, Adonis, and France Telecom and Georg Neubauer of ARCS, Siebersdorf, Austria, discussed strengths and limitations of the two new exposimeters now available for expo-

See Swiss Workshop, continued on p7
Swiss Workshop, Continued

Sure assessment in epidemiology studies, the Antennessa and the Maschek meter. In their draft workshop report, Negovetic, Samaras and Kuster list 14 related consensus points. The first three are:

- “Since effects are expected to be small, the likelihood of evoking effects should be maximized, i.e., maximum exposure levels close to the thermal threshold, minimal noise level, optimized modulation, etc., should be adopted.
- “The setup must be designed in such a way as to enable the intended experiments according to standard protocol, meeting all dosimetric needs and avoiding any EMI/EMC issues. Since protocols differ from endpoint to endpoint, setups cannot be standardized.”
- “Blinding of the exposure is a plus for any setup but mandatory for human provocation studies. Regarding in vitro and in vivo experiments at least evaluation should be blinded.”

The goal of the second day was to identify basic guidelines on quality assurance with respect to statistical analyses and biological aspects of the different fields including animal, in vitro, human provocation and epidemiologic studies. “A significant conclusion was that experiments should not be standardized, as their design and operation specifications depend on the biological endpoints to be examined,” organizers noted. They also recommend that because RF EMF health effects research is in the early stages, this area should be a focus of new research, specifically with respect to chronic exposure. Also, health risk should be assessed in a broad context taking into account the evidence from epidemiologic, mechanistic and toxicologic studies.

One invited expert in biostatistical techniques was Christopher Portier, director of the U.S. National Toxicology Program (NTP) at NIEHS in Research Triangle Park, N. Carolina. He began with the provocative statement that EMF researchers should avoid performing simple replication studies because these do not advance science. Portier said that simple replication may fail to repeat the finding of the original study, leaving those who must weigh the evidence for health risk assessment with one positive and one negative result and no guidance on the overall meaning. To avoid this, Portier recommended that “challenge studies” should be performed. A refined kind of replication, they improve on the original design and challenge the implications of the results, he said. In his opinion, the same or new investigators should analyze the original design and make every improvement possible in sample size and precision of exposure categorization, for example, to challenge the implications of the first study.

Ravazzani said he is not sure whether Portier’s advice on replication is useful in bioelectromagnetics research because there we lack a biological mechanism. Portier conceded the point, but repeated that the best solution is to improve on the original study wherever possible. “You may want to replicate the result in your own lab before publishing,” he suggested. “The challenge has to be to go beyond the original essay, to get better.” Later in a wide-ranging discussion with the audience, Portier surprised some by stating that so-called “fishing expeditions” or exploratory studies can be of value in some cases.

In the rest of his talk, Portier reviewed the design of his agency’s lifetime bioassay of RF exposure starting in utero in two rodent species. He said that NTP decided to double the group size for this two-year assay because with RF it is impossible to give animals a near-toxic threshold exposure. During the discussion, Samaras asked Portier what, as a reviewer, is the first thing he evaluates in a review paper. Portier replied that he checks sample size first, to see whether the study had statistical power to detect a difference between groups if one existed.

In the wrap-up session, the audience, invited speakers, Samaras and Kuster agreed on several statistical points, including that sample size is crucially important and that appropriate statistical analysis should be chosen a priori. Other speakers on Day 2 included Martin Röösli of the University of Bern, who spoke on types and goals of epidemiology studies. The afternoon speakers were Dariusz Leszczynski of Finland’s Radiation Protection Authority, and Meike Mevissen of the University of Bern on in vitro EMF studies. Clemens Dasenbrock, Boehringer Ingelheim Pharma GmbH & Co. KG, Germany, and Larry Anderson of the U.S. Pacific Northwest Laboratory, spoke on animal toxicology studies; while Peter Aehermann of the University of Zurich and Maila Hietanen of the Finnish Institute of Occupational Health addressed methods and design of human provocation studies. They also tried to critically assess the literature of their respective fields and summarize the main problems encountered when conducting experiments, as well as pointing out the general weaknesses from which many studies suffer. This greatly contributed to the formulation of requirements for quality assurance, in the organizers’ view.

For each subject area, there was general discussion on these guidelines. The executive summary by Kuster, Samaras and Negovetic lists five consensus statements for in vitro work, three for human provocation studies and three for epidemiology.

One of the debates on the second day took place between Portier and Leszczynski. Once again provocatively, Portier suggested that statistically, if a researcher does not specify a pathway of interest before starting genomics screening, he or she has a 100 percent chance of identifying a random set of gene expressions that are not part of a meaningful pattern, because each screen is statistically a single sample, with multiple comparisons evaluated within it. He added that without evidence-based guidance on where to look for combinations of up and down-regulated genes related to a valid pathway, it is nearly impossible to overcome the statistical problem of making 20,000 comparisons, Portier added.

See Swiss Workshop continued, p8
Swiss Workshop, Continued

Leszczynski strongly objected to this characterization of genomics. Whereas he agreed that you should not attempt to use high-throughput screening techniques if not having enough resources for proper replication, he argued that they save time and can be repeated more easily than animal bioassays and toxicology studies. Further, it is still cheaper and faster to use genomics research to generate data from which hypotheses can be developed, he said. Genomic techniques can produce new endpoints for further study of possible health-related effects, Leszczynski added.

Portier agreed that genomic techniques offer a powerful research tool, but believes researchers will always get more information from studying 10,000 samples on one endpoint than from 10,000 comparisons from a single sample. In his opinion, high throughput screening has no clear use for public health decisions. Leszczynski agreed that genomic screening must be followed by target validation on the protein level and or example in an animal model, to look for evidence from the genomic target in tissue.

Public Meeting Was Part of the Program

On the evening of the second workshop day, following a tradition of the Centro Stefano Franscini conference center on Monte Verità, people from local towns were invited to a public forum on “Mobile Phones and Health.” The event was popular, with standing-room-only in a hall that seated 100. The Franscini Center’s director said that Monte Verità had a rather notorious past from 1900–1930 because guests of the baron who owned the estate embraced health food, nudism and free love. To counteract the elitist and rather scandalous past image, the baron who owned the estate embraced health food, nudism and free love. To counteract the elitist and rather scandalous past image, the center now regularly opens its doors to the public.

Organizers assembled a panel of speakers and offered translation to Italian. Speakers included Jürg Baumann of the Swiss Agency for the Environment, Forests, and Landscape; Kuster; Portier; Ravazzani; Kjell Hansson Mild of Sweden’s Institute for Working Life; Chiyoji Ohkubo, formerly director of Japan’s National Institute of Environmental Science and now with the World Health Organization’s International EMF Project; Lawrie Challis, Director of the UK Mobile Telecommunications and Health Research (MTHR) Program, and Claude George of Swiscom Mobile AG.

The panel was moderated by a local journalist who spoke Italian and English. He translated questions from the audience to the panellists, most of whom could not understand the question. Portier later said he was impressed with how well-informed the audience appeared to be and with the quality of the questions. He felt the tone was similar to what he would have heard in the USA. Ravazzani agreed that the public seemed to be fairly well-educated about EMF health-effects issues. Several scientists attending the workshop said they were pleasantly surprised that the meeting did not become extremely emotional.

Research Agenda, Evaluation

On the third day of the workshop, the focus was on the EMF research agenda, on research evaluation, on various quality control methods used by national research programs in Europe, the U.S. and Japan, and on the role of EMF-NET and the World Health Organization’s International EMF Project in coordinating them and helping to set future goals.

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Franz Adlikofer of Verum, Munich, coordinator of the REFLEX Program, summarized the ELF REFLEX experiments, which he said provide evidence that intermittent (5 min. on, 10 min. off, ramped) exposure to a 1-milliTesla 50-Hz magnetic field for up to 24 hours causes DNA single- and double-strand breaks in human fibroblasts.

The next speaker, Maria Rosaria Scarfi of the Interuniversity Center for Interaction between Electromagnetic Fields and Biosystem Studies (ICEmB) at University of Genoa, Italy, reported that she and colleagues were not able to confirm the DNA strand breaks. They repeated Rüdiger et al.’s experiments as closely as possible four times using the same modified comet assays, but...
saw no increase in any of the parameters tested, Scarfi said. She suggested that when one laboratory fails to replicate the original finding, a confounding factor may be present at both labs, or a subtle but undetected difference in procedure or methods could be present. Primo Schär of the University of Basel said he and colleagues recently repeated an experiment by Rüdiger et al. at the University of Vienna for the REFLEX Program, confirming the DNA strand breaks in human cells intermittently exposed to ELF EMF.

Schär reviewed his laboratory’s replications, first reminding the audience that in the normal course of life, cells in the human body may see tens of thousands of DNA single strand breaks each day during routine cell division. The vast majority of these breaks, however, are fixed by routine DNA repair processes. DNA double-strand breaks are more serious and more unusual, he added. Using the same exposure system as the Vienna group and the same human fibroblasts, he and colleagues got similar results as Rüdiger—no ELF effect with continuous wave exposure, but an increase in DNA strand breaks after 15 hours of intermittent exposure, Schär said.

He cautioned that the genotoxic effects detectable by the comet assay are small, although statistically significant. Also, this early, single experiment in Basel has brought up more questions than it has answered, Schär said, and he is convinced of the need to investigate further. The functional meaning of the result, if any, also is not clear, in his opinion. He outlined plans to carry out further tests that would allow pinpointing the origin of the DNA damage observed at a molecular level.

Schär said a problem with this preliminary work is that he and colleagues have been unable to add an optimal positive control group to the experimental design to improve study quality. Genetic toxicologist Vijayalaxmi of the University of Texas Health Science Center, San Antonio, also expressed concern that cell cycle effects have not been taken into account in the original REFLEX Program, confirming the DNA strand breaks in human cells intermittently exposed to ELF EMF. She and Scarfi, with James McNamee of Health Canada, have a letter to the editor in a recent issue of Mutation Research listing their concerns. A reply by Rüdiger et al. is included.

In the last session of the workshop, Peter Achermann of the University of Zurich summarized his results from various controlled human sleep studies showing an effect on the sleep EEG in response to pulse modulated RF EMF. He also presented preliminary data from an investigation on a possible dose-response relationship by applying pulse-modulated RF EMF at two intensities (0.2 and 5 W/kg), revealing a dose dependent increase of power in the spindle frequency range in the non-REM sleep EEG. Sarah Loughran of the Swinburne University of Technology, Australia, who was preceding his talk, confirmed the findings of the Zurich group regarding the observed changes in the sleep EEG, and also reported an effect on sleep architecture showing a reduction of REM sleep latency. She stressed the importance to carry on with investigations regarding the effects of RF EMF on brain and sleep physiology for their potential to become a crucial issue in health risk assessment.

Organizers of the scientifically stimulating four days in Ticino have published a summary of the Monte Verità Workshop on EMF Health Risk Research that is now available at www.itis.ethz.ch/mv Click on “Results” to read this or to download many of the talks presented. They may also be contacted at: ITIS Foundation, Zeughausstrasse 43, 8004 Zurich, Switzerland. Tel:+41 24 596 96; Fax:+41 24 596 969. E-mail: mv@itis.ethz.ch

– Janet Lathrop, with thanks to Sonya Negovetic, a research assistant at the University of Zurich, and Theo Samaras of the Aristotle University of Thessaloniki.

**EMF NET EVIDENCE EVALUATIONS PUBLISHED**

Paolo Ravazzani of the Istituto di Ingegneria Biomedica, Milan, Italy, the director of EMF-NET, the European Commission’s four-year project intended to provide “policy-relevant interpretation and advice” on EMF scientific issues to health, environment and regulatory authorities, recently released three reports on the strength of evidence from recent laboratory studies for selected biological effects of exposure to extremely low frequency (ELF), intermediate frequency (IF) and radio frequency (RF) EMF. The EMF NET scientific advisors who formed Working Groups to produce these reports used the International Agency for Research on Cancer’s (IARC) 4-level scale for classifying the strength of evidence to evaluate the in vitro and in vivo evidence for various endpoints. Ravazzani said that the three reports should be available soon in pdf format at <http://emf-net.isib.cnr.it/>.

**FGF PAPERS AVAILABLE**

Forschungsgemeinschaft Funk e.V. (FGF), The Research Association for Radio Applications in Germany, recently announced that three rapporteurs reports of its workshop held in Stuttgart on November 21–23, 2005, “Subtle Thermal Effects of RF-fields in vitro and in vivo,” are available for download at www.cost281.org/documents.php?node=121&dir_session= Also, a summary report by Prof. Roland Glaser will be published in the next FGF Newsletter at www.fgf.de/fup/publikat/newsletter.html in the coming months.

Finally, a new issue of FGF’s “Edition Wissenschaft” (Science Edition) No. 21, by Roland Glaser, has been published on the topic of the workshop: “Are thermoreceptors responsible for ‘non-thermal’ effects of RF fields?” It is available at www.fgf.de/english/fup/fgfpub/edition.html
PIERS 2006 TO OFFER RF BIOEFFECTS SHORT COURSE

BEMS Members Sakari Lang and James Weaver will co-chair a short course on “Recent Advances in Bioelectromagnetics Research on Mobile Telephony and Health” on the afternoon of March 27 during the Progress in Electromagnetics Research Symposium (PIERS) 2006 conference scheduled for March 26–29 in Cambridge, Massachusetts, USA. Speakers are expected to include Asher Sheppard of Loma Linda University, California, USA, on “Interactions with Biological Molecules and Processes: Quantifying Thermal and Non-thermal Mechanisms,” and Martin Meltz of the University of Texas Health Science Center at San Antonio, USA, offering an Overview of RF Genotoxicity Research.

Other speakers will include James Weaver and colleagues discussing “An Initial Approach to in Silico Bioelectromagnetics for RF Exposures,” and a research team including J. Vrba from the Czech Republic and P. Peschke of the German Cancer Institute speaking on “Research of Interactions of EM Field and Biological Systems.” Also, Larry Anderson, retired, and his colleagues at Pacific Northwest Laboratory, USA, will summarize an “Investigation of 900-MHz Electromagnetic Radiation for Effects on Permeability of the Blood Brain Barrier.”

R. Findlay and Peter Dimbylow of the UK Health Protection Agency (formerly National Radiological Protection Board) will discuss “FDTD Calculations of Specific Energy Absorption Rate in a Seated Voxel Model of the Human Body,” and Jafar Keshvari and Lang of the Nokia Research Centre, Helsinki, will present a talk on “Use of Anatomically Correct Head Models and Higher Dielectric Values to Study SAR Difference between Children and Adult’s Head and Eye Tissues.”

Joseph Elder of Motorola Florida Research Labs will present, “Does Long-term Radiofrequency (RF) Exposure of Laboratory Animals Affect Cancer, Survival and General Health?” and epidemiologist Anssi Auvinen of Finland’s Radiation and Nuclear Safety Authority (STUK), will discuss, “Epidemiologic Assessment of Cancer Risk from Mobile Phone Use: Where are We Are.”

R. Paulraj of Jawaharlal Nehru University, India, is expected to summarize “Enzymatic Alteration of Rat Brain Chronically Exposed to Low Level Microwave Radiation,” and Lena Hillert of the Stockholm Center for Public Health or colleagues from a large Swedish study, “Mobile Phone Use and Health. Self-rated Health, Neurocognitive Function, Neurophysiological Effects Using 900MHz Wireless Communication Signals. A laboratory-based Exposure Study,” will describe the investigation.


Progress in Electromagnetics Research Symposium (PIERS) provides an international forum for reporting progress and recent advances in the modern development of electromagnetic theory and its new and exciting applications.

– from PIERS sources, Janet Lathrop

Memorial Committee Report, Continued

Since 2003, BEMS has honored deceased BEMS members by naming the BEMS student session after him or her. Mary Ellen O’Connor, Charles Polk and Alessandro Chiabrera have been honored in this way. The committee recommends honoring Ross Adey in 2006, Herbert Schwan in 2007, and Andrew Bassett in 2008. The committee is considering John Ryaby for 2009.

Since the BEMS Board has decided that there won’t be a separate student session in 2006, the Memorial Committee recommends a special introduction of the competition by the BEMS president, at the beginning of the meeting. Memorial Committee members will prepare PowerPoint slides that could be used as a continuous presentation throughout the meeting at coffee breaks.

John R. Ryaby passed away in 2004. A eulogy was published in the September/October 2005 BEMS newsletter by his son Jim Ryaby, and friends Ken McLeod and Marko Markov. At the BEMS 2006 Annual Business Meeting, a eulogy is planned.

It has been an honor to serve on the memorial committee for the past years, but since my term as board member is coming to an end, I will also end my term as chair of this committee in June 2006. It has been a pleasure to work with the committee, with the board of directors and with many BEMS members that helped honoring the memory of deceased colleagues and friends.

Respectfully submitted,
Gabi Nindl Waite, Chair

Current Memorial Committee members are Igor Y. Belyaev, Carl F. Blackman, Deborah M. Ciombor, Robert Cleveland, Guglielmo d’Inzeo, Marko Markov, Arthur A. Pilla and Betty Sisken, Myrill Simko, and Gabi Nindl Waite (chair).

BIOELECTROMAGNETICS DROPS VOLUNTARY PAGE CHARGES

Editor Ben Greenebaum announced this month that Bioelectromagnetics has stopped asking authors’ institutions to honor the voluntary page charge that had been in effect since the journal was founded in 1980. The Bioelectromagnetics Society Board of Directors voted to drop the page charge at its meeting on February 4, 2006. This strictly voluntary charge, which had not been mentioned to authors until a paper was accepted and a proof sent, had no influence on review or acceptance of manuscripts. The Society had paid to send 100 reprints to authors honoring the charge. However, Board members noted that the charge, despite its voluntary nature, discouraged or confused some authors; only a small number accepted the charges, and although the charges were intended to help the Society’s budget with the costs of editing the journal, the cost of reprints was becoming approximately equal to the page charges received. It will continue to be true that, as before, authors may purchase reprints from the journal’s publisher, using order forms sent with the proof.

– Ben Greenebaum, Editor, Bioelectromagnetics
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**ICNIRP WILL HOLD PUBLIC MEETING ON EMF STANDARDS**

The World Health Organization’s (WHO) International EMF Project and the International Commission on Nonionizing Radiation Protection (ICNIRP) have announced a public workshop to be held in Berlin, Germany, from March 20 to 22, 2006.

The workshop will cover the whole frequency range from static fields to terahertz frequency. Invited experts will present lectures on those topics and discuss the relevance of recent research findings with regard to exposure limits for workers and the general public.

Some of the key issues to be discussed include the scientific basis of safety factors for the general public and for specific subgroups (children, elderly persons, pregnant women, etc.), the dosimetric and biophysical comparison of different basic quantities, the questions associated with inhomogeneous or partial body exposure, the concepts for assessing exposure from different sources with the same or different frequencies, considerations on different exposure characteristics (non-sinusoidal, pulsed or intermittent), and the issues of temporal and spatial averaging. Existing standards will be compared and biological effects and epidemiological evidence relevant to developing guidelines will be summarized.

The main goal of the workshop will be to provide a forum for experts to discuss, in detail, the above mentioned key topics. Furthermore, the overview will serve as an input to ICNIRP when the Commission re-evaluates its exposure guidelines.

More details about this workshop are available at [www.icnirp.org/dosimetry.htm](http://www.icnirp.org/dosimetry.htm) Also information on other upcoming EMF meetings can be found on the WHO International EMF Project’s web site, [www.who.int/peh-emf/meetings/en/](http://www.who.int/peh-emf/meetings/en/)

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**U.S. NATIONAL SCIENCE FOUNDATION OPPORTUNITY**

The Engineering Directorate of the National Science Foundation just released an announcement for a senior executive to lead the Engineering Education and Centers (EEC) Division. The two-year assignment could be as an Intergovernmental Personnel Act (IPA), or “rotator” appointee. Applications from qualified women, minorities and the disabled are of particular interest.

This is an excellent opportunity for a senior faculty member to contribute significantly of the future of engineering education in the US, and to determine the direction of the 3rd Generation Engineering Research Centers. The EEC Division Director serves as a member of the Engineering Directorate’s leadership team and as the Foundation’s primary spokesperson in the area of engineering education, with responsibility for funding research and education that supports interdisciplinary teams of faculty and students. Additional details about the position can be obtained at [http://www.nsf.gov/pubs/2006/s20060044/s20060044ipa.txt](http://www.nsf.gov/pubs/2006/s20060044/s20060044ipa.txt) or by contacting Dr. Adnan Akay, Chair of the EEC Division Director Search Committee, at aakay@nsf.gov.

The closing deadline for receipt of applications is March 15, 2006.

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**CANADIAN RADIO SCIENCES CONFERENCE ANNOUNCED**

Seminar speakers at the 12th International Symposium on Antenna Technology and Applied Electromagnetics (ANTEM) and the Canadian Radio Sciences (URSI/CNC) Conference to be held on July 16–19, 2006 at the Marriott Montréal Chateau Champlain Hotel, Québec, Canada are expected to include Peter H. Siegel, on “Terahertz Technology in Outer and Inner Space,” James C. Rautio on “The Life of James Clerk Maxwell,” and Hans Schantz with “An Introduction to UWB Antennas.” For more information, see [http://antem.ee.umanitoba.ca/](http://antem.ee.umanitoba.ca/)

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**CALENDAR**


April 20–21, 2006. Technical University, Graz, AUSTRIA. COST281 Workshop, "Emerging EMF Technologies and Potentially Sensitive Groups." The focus will be on children, developing fetuses and people with chronic diseases, according to Norbert Leitgeb, Chair of COST281. See [www.kht.tugraz.at/conference2006.html](http://www.kht.tugraz.at/conference2006.html)

April 27–29, 2006. Conference on Electromagnetic Fields, Health and Environment—EHE06. The Savoy Madeira Resort Hotel, Madeira, PORTUGAL. See: [http://www.apdee.org/ehe06](http://www.apdee.org/ehe06) or Contact by e-mail: ehe06-secretariado@apdee.org


Calendar continued on p12
Calendar, Continued

June 11–15, 2006. The Bioelectromagnetics Society 28th Annual Meeting. JW Marriott Cancun Resort and Spa, Blvd. Kukulcan, Km 14.5, Lote, 40-A, Zona Hotelera Cancun, Quintana Roo 77500 MEXICO. US$150 (single/double) +52 998 848 9600 or toll free in U.S. and Canada +1 (888) 813-2776. For BEMS program information, see <http://bioelectromagnetics.org/bems2006/> For lodging information, see http://marriott.com/property/propertypage/CUNJW


September 3–8, 2006. Bioelectrochemistry Gordon Research Conference. Contact: Richard Nuccitelli, Center for Bioelectrics, Norfolk, Virginia, USA. Tel: +1 757 683 2405. Mobile: +1 757 613 2619. Fax: +1 757 314 2397. E-mail: rnuccite@odu.edu or justin.teissie@IPBS.FR or a.m.rajnicek@abdn.ac.uk

October 16–20, 2006. 4th Workshop on Biological Effects of Electromagnetic Fields. The Conference Center of the Creta Maris Hotel, Limenas Hersonisou, Iraklion, Crete, GREECE. An international workshop covering all areas of EMF. See: http://imm.demokritos.gr/bioeffects or www.telecomlab.gr/bioeffects or contact Ms Ketty Apostolou, Tel: +30 210 650 3129. Fax: +30 210 6532910. E-mail: conf2006@imm.demokritos.gr