PRESIDENT’S COLUMN: APPEAL FOR INTERACTION MECHANISM DRIVEN RESEARCH

Niels Kuster
October 2008

Despite substantial public and industry funding in recent decades, bioelectromagnetic research has progressed very little. A significant impediment to the progress has been the focus on health risk concerns for a majority of the conducted studies. These studies have fundamental limitations, as daily exposure cannot be represented by only a few exposure conditions. Additionally, the reasonably achievable sensitivity of biological experiments is far below the basic requirements in relation to the ubiquitousness of EMF; for example, in vivo experiments have a maximum sensitivity of 2% (insufficient when applied to 3 billion mobile users). Epidemiological studies may also be deemed misleading since disease latency cannot be adequately assessed when the technology is replaced approximately every 10 years and the typical exposure scenarios change even faster. It is also not possible to consider in a single experiment all elements of a daily life UMTS exposure that will presumably change significantly every few months due to different applications and usage patterns. Therefore, research that only investigates the effect of communication system x on biological system y is poorly invested money aimed at providing quick, unsubstantiated answers to appease public concerns. Conducting numerous phenomenological experiments of this type will also not necessarily increase the “body of evidence,” a term that is often used loosely for non-scientific purposes.

Only a radical shift in the scientific approach towards interaction mechanism driven research can provide sustainable answers to the possible health risks and to the development of future medical applications. In my opinion, the following two-step approach is the most effective way to make progress since any effects will likely be at the detection limit:

1. conduct highly sensitive experiments to detect possible “smoking guns”
2. all effects that appear reproducible must be immediately addressed in depth:
   - increase the robustness of the effect by optimizing exposure parameters (e.g., amplitude, frequency, modulation, intermittency, etc.) and/or by selecting the most sensitive biological system and methods
   - determine the interaction mechanism using this optimized EMF - biological system
   - design experiments relevant to the health risks of specific technologies or medical applications based on knowledge about specific interaction mechanisms

I appeal to all BEMS members to commit to focusing on interaction mechanism driven research when designing and proposing experiments or working in evaluation committees or drafting research programs to funding agencies. In addition, cooperation and collaboration among researchers is essential in this inherently multidisciplinary effort. The need for continued research carefully directed toward answering the salient questions is clear; however, special interests cannot prevail. Funding agencies must commit to supporting this new scientific step-by-step approach, and reject economically and politically motivated research.
“He was just so generous with ideas. His conversation was always full of original thoughts, and ‘ownership’ never came up. Of course, many of those thoughts I was not ready to absorb, to understand. I think he liked it that I didn’t pretend to.”

These words, written about Lars Onsager, by his former student, Stefan Machlup, could just as well describe Machlup himself. A friend and colleague to many BEMS members, Machlup passed away on August 16, 2008 at the age of 81. Machlup is especially well-known as co-author of a pair of the most influential papers in the thermodynamics of dissipative non-equilibrium systems.

Machlup was born in Vienna, Austria in 1927. He immigrated with his parents to the United States in the 1930s. He earned his BS at Swarthmore, PhD at Yale, and enjoyed a string of post-doctoral appointments, including positions at Cambridge, Bell Labs, the University of Illinois, Urbana, and the University of Amsterdam. For most of his career, he taught physics at what is now Case Western Reserve University from 1956 until retiring in 2000.

His dissertation, “Fluctuations and Irreversible Behavior in Thermodynamic Systems,” led to two publications with his research director, Lars Onsager, the physical chemist who would subsequently win the 1968 Nobel Prize in chemistry. This work developed the Onsager-Machlup-Laplace approximation that was an elaboration of a theory of irreversible processes developed two decades earlier by Onsager.

Their theory applies to a very wide variety of systems: nuclei with spins aligned by magnetic fields, excited atoms in a laser, molecules undergoing chemical reactions, vortices in a liquid, and ions transported through biological membranes. Machlup explored the applicability of some of these ideas to biology: “Biological clocks share with excitable membrane (nerve, muscle) the requirement that the chemical systems that underlie them have unstable steady states and hence are capable of limit-cycle oscillations…. The oscillators responsible for biological clocks are surely not mechanical mass-and-spring systems, nor are they electrical inductance-capacitance combinations. They are chemical oscillators.”

In a 1975 paper, Machlup described the common features of systems characterized by negative temperatures and negative dissipation: “If we think of absolute temperature as a measure of kinetic energy per (classical) degree of freedom, then a negative absolute temperature seems absurd. If, however, we use the (quantum-mechanical) idea of the population of energy levels and measure this population with a Boltzmann factor, then a negative T makes sense: It means higher energy levels are more populated than lower ones.” The paper concludes: “This article has attempted to make more intuitive the connection between negative temperature and negative resistance, and to suggest that a large class of nonlinear systems involves negative-temperature subsystems.” One such system, he suggests, might be current vortices in type II superconductors.

Making physics more intuitive was a lifelong passion for Machlup. Based on many years of class-room experience, he published an introductory text for pre-med physics students, “Physics” (Wiley, 1988), that emphasized biological examples of special interest to health science students. He enjoyed working with high school physics teachers and helped to develop new teaching materials.

Dr. B.S. Chandrasekhar, professor of physics at Case Western Reserve University and a colleague of Stefan Machlup, commented, “Stefan was a good and close friend since we first knew each other as post-docs at the University of Illinois in Urbana in the early fifties. A friendship of more than half a century is at an end. He was a source of good humor and cheerfulness who enlivened with his comments and contributions the often dull aftermath of a colloquium or seminar. He never walked from here to there on campus, but covered the distance with a hop, step, and jump. To some physicists physics is a job; to Stefan it was a joy. He worked hard to convey this feeling to students and colleagues. He would preform a Bach cello sonata with the same profound understanding and wonder that he would explain a concept in statistical mechanics.”


See Stefan Machlup, continued on page 8
Richard (Dick) Dean Phillips died at the age of 79 on September 7, 2008 from the complications of heart disease and diabetes. Dick is survived by his beloved wife, Betty, of 58 years. Dick was an active figure in Bioelectromagnetics from 1958 to his final retirement in 1997. Dick’s career intersected with and influenced that of many other researchers.

Dick was born in Sacramento, CA, on September 17, 1929. After his freshman year of college, Dick joined the U.S. Air Force where he was a flight photographer flying in B-36 reconnaissance aircraft during the latter part of the Korean War. Dick received his B.A. degree in physiology in 1958 from the University of California at Berkeley and, upon graduation, joined the Naval Radiological Defense Laboratory (NRDL) in San Francisco. Members of the staff there encouraged Dick to pursue graduate study, which he did, receiving his Ph.D. in physiology (emphasis on thermal regulation) from Berkeley in 1966. Dick continued his career at NRDL until it was closed in 1969.

Dick then joined the staff of Battelle Pacific Northwest Laboratories located in Richland, WA, where he (and Ed Hunt) continued work related to the exposure of various biological preparations to microwave-frequency electromagnetic fields and microwave dosimetry. Dick did important work on calorimetry during this period. This research led to the introduction of the twin-well calorimeter, the “platinum-rod” of whole-body dosimetry. It became a key technique of calorimetry allowing “wet-bench” scientists to accurately determine in average SAR values in animals exposed to RF fields. It was adopted by many research laboratories conducting RF bioeffects research.

In 1975, Dick obtained a small contract from the Electric Power Research Institute (EPRI) to investigate the feasibility of exposing miniature swine to 60-Hz electric fields. In pursuing this project, Dick enlisted the help of Bill Kaune, a physicist who had just joined Battelle’s Biology Department, Denny Hjeresen, a psychologist at Battelle, and Dick Richardson, a Battelle electrical engineer. This project was successfully completed and was followed by the awarding of large projects from EPRI and the U.S. Department of Energy (DOE) to study biological effects arising from the exposure of miniature swine and rats, respectively, to very strong power-frequency electric fields. During the next nine years, Battelle’s ELF program grew to involve many Battelle scientists and produced many research and review papers, research reports, and two books. During this period, Dick was the Manager of the Bioelectromagnetics Program at Battelle and was ultimately promoted to the grade of Senior Staff Scientist, a rare event at Battelle at that time.

Dick was very highly regarded by the staff he led at Battelle. He was very good at helping younger scientists develop their careers and insuring that they received credit for their work, both outside and within Battelle. Scientific careers in the field of Bioelectromagnetics that Dick helped develop included those of Larry Anderson and Bill Kaune.

Along with his scientific work at Battelle, Dick was heavily involved with various committee assignments and was a Topic Leader in the USA/USSR Scientific Exchange Program on the Biological Effects of Static and Low Frequency Electromagnetic Fields. He visited the USSR several times as a U.S. Delegate and hosted USSR delegates in Richland twice.

Dick played a very important role in the development of safe RF exposure standards in the US. He served as a leading biologist and the secretary of the ANSI C95 Subcommittee IV that developed the ANSI C95.1-1982 American National Standard published by the IEEE. This was the exposure standard that introduced the greatest number of changes and advancements over any other exposure standards in use up to that time. It incorporated much improved safety, reliability, applicability and acceptability based on the highly improved scientific approaches and broad database in use at the time. It included the application of many new concepts such as whole-body averaged and peak SAR, whole-body and anatomical resonance, hot spots, contact currents, different criteria for near and far field exposures, as well as many other changes too numerous to mention here. The major changes and increased complexity of the proposed standard generated a considerable increase of controversies and difficulties in forging the required consensus for acceptance of the new standard. As a contributor of data from a strong interdisciplinary scientific laboratory and based on the great respect and confidence that he enjoyed from his peers, Dick was...
REPORT FROM THE GERMAN MOBILE TELECOMMUNICATION RESEARCH PROGRAM

Dr. Cornelia Baldermann, Mr Rüdiger Matthes, and Dir. und Prof. Dr. rer. nat. Wolfgang Weiss

Bundesamt für Strahlenschutz
Fachbereich Strahlenschutz und Gesundheit
Arbeitsgruppe SG1.4
Strahlenrisiko und Strahlenschutzkonzepte unter Einschluss der Risikokommunikation
Ingolstädter Landstr. 1
85764 Oberschleißheim / Neuherberg

The German Mobile Telecommunication Research Program (DMF) was carried out between 2002 and 2008 under the leadership of the Federal Office for Radiation Protection (BfS) with financial resources of 17 million Euro. A total of 54 research projects were funded in the fields of biology, dosimetry, epidemiology and risk communication. Questions on potentially adverse health effects and the perception of high frequency electromagnetic fields in society and on risk communication were also investigated.

In dosimetry, the research focused on the development of measurement and calculation methods to determine the exposure of the public. These were expected to answer open dosimetric problems associated with the exposure of research subjects in laboratory studies, and the classification of exposure in epidemiological studies. It has been shown that everyday exposure of the public to electromagnetic fields is subject to significant temporal and spatial fluctuations. The increased use of wireless technology leads to a constant rise in exposure of the public. These results are corroborated by measuring programs in several federal states in Germany and by the Federal Network Agency. Nevertheless, the exposure of the public at the investigated mobile communication frequencies is on average well below the limit values. Exposure values approaching these limits can only be reached when using sources close to the body, such as mobile telephones.

As part of the research in the areas of biology and epidemiology, possible acute and chronic health effects from exposure to mobile communication fields were investigated. The research projects, carried out on cell cultures in order to investigate possible mechanisms, primarily aimed at the “athermic” area below the limit values. This research approach is of high importance, because through the knowledge of mechanisms, detection and in-depth study of the specific impacts caused by high frequency electromagnetic fields on the organism can be improved. Several cellular parameters were investigated, including those related to hormonal processes, the metabolism and different functions, as well as the reaction of cells to external influences. In addition, the impact of electromagnetic fields on the acoustic and visual system was explored.

Studies on cells related to the immune system showed no significant biological effects of high frequency electromagnetic fields on the scrutinized endpoints. The same applies to the retina as well as the hearing cell activity. In general, the indications of possible “athermic” effects, as discussed at the beginning of the DMF program, were not supported by the results. Changes in the gene expression in a cell culture model of the blood-brain-barrier, observed in one case, do not question the overall assessment. However, they give reason to recommend further clarification of this point.

Acute health effects were primarily analyzed by means of clinical studies. Those studies centered on the question whether high frequency electromagnetic fields affect sleep, cognitive performance, memory or the processing of visual and acoustic stimuli. Overall, this was not the case and this was confirmed by epidemiological studies, which showed no connection between the measured electromagnetic fields from mobile phone base stations and sleep disorders, headaches, general health complaints as well as mental and physical life quality.

To investigate possible impacts of a chronic exposure to high frequency electromagnetic fields, long-term studies were carried out on animals, exploring the blood-brain-barrier, the induction of tinnitus, different cancers as well as reproduction and development. These studies did not result in any indications of an “athermic” impact due to high frequency electromagnetic fields.

Studies on several generations of animals do not support the hypothesis of a particular sensitivity during early developmental stages. Nevertheless, the question whether the health risk as a result of long-term exposure is higher for children than for adults, either due to age differences or due to a longer lifetime exposure, could not be answered fully by the DMF studies. This question remains an open issue and must be clarified by further investigations.

Epidemiological studies so far have not found an increased brain cancer risk for mobile phone users. The present findings also show no increased risk to develop an uveal melanoma (malignant intraocular tumor). A study on
The Vth International Workshop “Biological Effects of EMFs” took place at the resort Città del Mare, located about 20 miles east of Palermo, from September 28 to October 2. This meeting originated in 2000 as a “Millennium Workshop on Biological Effects of EMFs” and took place at the Greek Island of Crete. Since that, every other year this Workshop took place at different island in Mediterranean Sea: Rhodes, Kos, Crete, and now Sicily.

The resort offered wonderful environment at Terrasini Bay, as well as to visit the overcrowded city of Palermo. The “Barbershop orchestra” entertained participants during the cocktail and banquet parties. It is not well know that Sicily was for long time governed by Greeks. The participants had the opportunity to visit main attractions in Palermo and exceptional churches that maintained the symbiosis of Byzantine and Arab architecture and interior. This was an excellent symbolic act of transfer the site of the Workshops from Greek Islands to an Italian island. In addition, after only one-hour drive participants were able to visit Erice, site of the International Center Ettore Majorana.

The founder of this series, Prof. Panos Kostarakis had the pleasure to be assisted by a remarkable secretary, Ketty Apostolou. The Sicily meeting went under leadership of Prof. Antonio Lo Casto from University of Palermo. For the first time, the meeting was served by a professional organization, ASC- Palermo.

The Workshop was sponsored by the Local Government of Sicily, University of Palermo and a number of Italian and International organizations. Recognizing the importance of this meeting to bring together young scientists from the Mediterranean area, East Europe and Middle East, the BEMS for the forth time have provided a sponsorship to the Workshop. A number of BEMS members took part in the meeting, including former BEMS president, Frank Prato, as well as current BEMS board members A. Pakhomov and C. Ohkubo.

The scientific program included 14 plenary lectures presented by such recognized scientists as Dr. P. Vecchia, Dr. P. Kostarakis, Dr. M. Grandolfo, Dr. C. Ohkubo, Dr. D. Miklavcic, Dr. A. Pakhomov, Dr. R. Cadossi, Dr. M. Markov, Dr. A. Colbert, Dr. M. Israel, Dr. C. Magnani, Dr. F. Prato, Dr. C. Hazlewood, Dr. T. Kalkan. The plenary lectures covered a large spectrum of topics – from ICNIRP guidelines and standard of exposure to EMFs in different countries, to clinical application, to nanoporation. I would like specially to point the very exciting lecture of Prof. Panos Kostarakis who described with photos and short videos the history of the Workshop.

The platform and poster presentations were separated in 14 sessions for platform presentations and two poster sessions. Two series of parallel session took place: Biological/medical and Engineering/dosimetry gave the podium for 59 presentations. Due to large number of posters, for the first time two afternoons were secured for viewing 63 posters and this provided much better opportunity for discussions. The participant number was 200 scientists from 32 countries, including North America, Japan, Australia. Very large group of scientists came from Europe, including Italian scientists who used the opportunity to meet colleagues from abroad and to discuss their own research. I would like specially to emphasize the attendance of 10 scientists from Iran. A very compact group from The Netherlands used the Workshop to enter the field of bioelectromagnetics research. Following the tradition of this Workshop, Prof. Lo Casto offered free accommodation to 35 young scientists from countries with low monthly income.

I believe that this Workshop series that belongs to the people, not to countries or organization. I was pleased to see young people who presented papers at previous meetings as students, and now being team leaders. This fact only is enough to prove the importance of this meeting. It provides the opportunity for a low cost of participation and friendlier atmosphere than at large international meetings.

The journal The Environmentalist, published by Springer, recognized the importance of the Workshops with special issues focusing on biological effects of EMFs published in 2004 and 2007. This journal expects to publish another special issue on this workshops presentations in 2009.

The International Advisory Committee met twice to discuss the work done so far and the future of this Workshop series. Next meeting will take place in Turkey in 2010.
As announced earlier in this newsletter (No. 202, May/June 2008, page 9), a key objective of the Bioelectromagnetics journal is to publish high-quality papers reporting studies that are conducted with scientific and technical rigor. The Board of Directors of The Bioelectromagnetics Society recently established a Best Paper Award to recognize the scientific accomplishments of our colleagues with a monetary prize and certificate, presented during the Annual Scientific Meeting of the Society. Details of the award criteria are given below.

The Eligibility Criteria for the Award:
1. High scientific quality;
2. Significance and novelty (opening new avenues or methods of research);
3. Interest across the membership of the Society;
4. Originality of the reported research (systematically performed meta-analyses reporting new results or conclusions would be included; review papers, brief communications, comment letters, and editorials are excluded)

A member of the Editorial Board or Board of Directors shall be excused from the participation of selection process, if he or she is from the same institution or listed as coauthor of a nominated paper. The selection process shall have maximum transparency, with clear documentation of each step.

The selection process will be a three-stage process. The first stage has two alternate routes:
- As part of the normal paper review, at least two reviewers and one associate editor must recommend the paper for the award by checking the appropriate box on the evaluation form. (For future years, but for this time around-2008, a letter from two editorial board members or an associate editor to the Editor-in-Chief would be sufficient to include it in the selection process.) OR
- Any member of the research community may submit nominations for the award by providing a detailed nomination statement setting out clear reasons for the nomination in a letter to the Editor-in-Chief before December 15th of the year of publication. The letter must have the endorsements from two members of the Editorial Board.

The second stage involves the evaluation of the “Paper of the Year” by the Editorial Board (at the conclusion of publication of all eight issues of the journal for a given year). The third, and final, stage is a decision by the BEMS Board of Directors based on guidance provided by journal’s Editorial Board.

BIOEM2009 STUDENT AWARDS

Editor’s note: The Awards Committee of the Bioelectromagnetics Society, in conjunction with the European Bioelectromagnetics Association, will be awarding student presentations at the upcoming joint meeting in Davos, Switzerland. The following text describes the process on which they have reached an agreement in principle. It is approved by the Awards Committee of the Bioelectromagnetics Society, and is expected to be officially approved by EBEA following their Council meeting on 6 November 2008. Sample score sheets are included as an insert between pages 6 and 7 of this newsletter.

Since 1984, The Bioelectromagnetics Society has presented awards to its student researchers who gave the top scientific presentations at the Society’s Annual Meeting. This tradition is maintained at the joint meetings of the two societies, BEMS and EBEA. The Student Awards are an essential part in defining who we are as scientific societies. Every year the awards are supported generously by donations and dues from our membership. The awards also show that the societies are committed to supporting student members.

The BEMS Student Competition Awards include:
- Curtis Carl Johnson Memorial Award (1st place)
- Memorial Award (2nd place)
- 3rd and 4th place awards

In each case, an award is presented to a student in both the oral (platform) and poster categories. In recent years, the Board of Directors of BEMS and the Scientific Council of EBEA have taken steps to ensure that the Student Awards are managed in a fair and transparent manner. That is, after revisiting the topic of the Student Awards, the BEMS Board and EBEA Council want to ensure that all students understand the rules so they know what is expected of them, and therefore have the same opportunities afforded to them as their peers.

At BIOEM 05, a scoring system was implemented that provided judges with a clear set of criteria to evaluate poster and oral presentations. Results were tallied numerically on the last day of the meeting and the winners were declared based on the ranked list of scores. This system was also used at the BEMS Annual Meeting in 2006. In 2007, to ensure that every student presentation was evalu...
WHO IAC PLANS 2009 MEETING

In May 1996, in response to growing public concern in several Member States over possible health effects from exposure to an ever-increasing number and diversity of EMF sources, the World Health Organization (WHO) launched an international project to assess the health and environmental effects of exposure to electric and magnetic fields, which became known as the International EMF Project. An International Advisory Committee (IAC), consisting of representatives of international organizations, independent scientific institutions and national governments provides oversight for this project.

The International EMF Project brings together current knowledge and available resources of key international and national agencies and scientific institutions in order to develop scientifically-sound recommendations for health risk assessments of exposure to static and time varying electric and magnetic fields in the frequency range 0-300 GHz.

This Project has been devised to provide authoritative and independent peer-review of the scientific literature. Since its inception, the objectives of the EMF Project have been to:

- review the scientific literature on biological effects of EMF exposure;
- identify gaps in knowledge requiring research that will improve health risk assessments;
- encourage a focused agenda of high quality EMF research;
- formally assess health risks of EMF exposure, encourage internationally acceptable harmonized standards;
- provide information on risk perception, risk communication, risk management;
- advise national programs and non-governmental institutions on policies for dealing with the EMF issues.

The IAC meets once a year to discuss national activities, current research programmes, legislation and public concern, and advises the International EMF Project on its activities. The next IAC annual meeting is tentatively scheduled for 10-11 June 2009 at WHO in Switzerland. The original plan, to which the program has closely adhered, anticipated that all the health risk assessment activities under the IAC’s direction would be completed and published by the end of 2008, after which the WHO will continue to monitor new developments.

NCRP RELEASES REPORT

NCRP Report No. 157, Radiation Protection in Educational Institutions is now available. It provides guidance for the safe use of ionizing- and nonionizing-radiation sources in educational institutions, including both teaching and research activities.

This Report is intended primarily for those institutions that do not need a full-time radiation safety professional because the uses and radiation levels of the sources are limited. In these instances, an individual with limited expertise in radiation safety (e.g., a professor, teacher, researcher, or general safety staff member) could assume the responsibility for implementing the radiation safety program. Usually, this individual is called the radiation safety officer (RSO). This individual may have other safety responsibilities in addition to radiation safety. Full-time RSOs may also find this Report helpful.

To assist administrators in determining whether a radiation safety program is necessary, and to assist the RSO in assuming the responsibility for the radiation safety program, this Report provides information on a variety of topics, including:

- types of ionizing radiation including alpha and beta particles, neutrons, and gamma and x rays,
- potential health effects of exposure to ionizing radiation, and the applicable radiation dose limits;
- potential hazards and the safety controls for nonionizing radiation (e.g., radiofrequency, microwave, ultraviolet, infrared and visible)

ZURICH EMC SYMPOSIUM OPENS REGISTRATION

Prof. Dr. Ruediger Vahldieck, President and General Chairman of the 20th EMC Zurich Symposium on Electromagnetic Compatibility recently announced that the registration portal for this meeting is open at

http://www.emc-zurich.ch

One may also register on that site for certain conference related events including the technical excursion to Alp Transit (the world’s longest tunnel). These events have limited availability, and will be filled on a first come, first registered basis.

The 20th EMC Zurich Symposium on electromagnetic compatibility will take place 12 - 16 January 2009 at the ETH Zurich, Switzerland.
STEFAN MACHLUP, continued from page 2

BEMS board member and former student of Machlup, Indira Chatterjee, noted that “Stefan Machlup was a passionate teacher inspiring many graduate students who helped him teach laboratory classes to non-physics majors to aspire to be great teachers like him. He thoroughly enjoyed working in the laboratory teaching his graduate assistants how to perform the experiments in the right manner before they went out in front of their class. His constant exuberance and cheerful enthusiasm never ceased to amaze me. He was a mentor and a friend and I will never forget him as one of the great teachers that inspired me to go into academics.”

In the 1980s, Machlup joined colleague T. Hoshiko of the CWRU School of Medicine’s Department of Physiology and Biophysics in a research collaboration that applied statistical mechanics to the analysis of biological phenomena such as ionic transport in frog skin cells1.

Later in life, Machlup developed an interest in the biological effects of magnetic fields. He published his most recent paper on this topic in 2007, noting that the “impossible” effects observed in cell cultures as a result of exposure to magnetic fields tuned for ion parametric resonances (IPR) could be “resolved by taking account of the coherent absorption of the ELF energy and showing how the energy of several trillion ELF photons can free a single ion from its trap on the surface of a cell of the culture.”

Remembering his interactions with Dr. Machlup, BEMS board member Carl Blackman noted, “Stefan started with his own premises regarding the mechanisms behind our experimental results and participated in many poster sessions, at the Biophysics Society, Bologna BEMS/EBEA meeting, several DOE Contractor Reviews, and the BEMS Hawaii meeting. He greatly enjoyed interacting with scientists, sharing concepts and sharpening his thoughts. He always enjoyed seeing and talking with Charles Polk when they met because of their early acquaintance in Vienna. Stefan and I would steal away to someplace where we could be alone to talk about his latest concepts and our latest data. I remember the most recent time was at the 2004 BEMS meeting in Washington, DC. We spent a grand time talking science for most of an afternoon. Stefan was always upbeat, curious and energized about his interests in EMF biological effects. Certainly, he is a role model for many scientists.”

Colleague Asher Sheppard added: “Stefan Machlup was a bundle of enthusiasm and joy, whether beaming his engaging broad smile to lure me to a poster which he saw raised an exciting or problematic idea, or to engage in conversation on one of the topics of interest to his encyclopedic mind. Although I never saw him in a classroom, it was instantly recognizable at our first meeting that this was a man who loved ideas and loved to teach. While his scientific accomplishments in thermodynamics and biophysics are the stuff of more formal remembrances, I, and no doubt others in The Bioelectromagnetics Society know our good fortune to have shared the wonder and happiness that he radiated. I fondly recall the times when his first class mind held an intellectual specimen in the beam at just the right angle so that his excitement for ideas completely overtook the moment. A moment later, with twinkling eyes he would ask a question to turn the conversation back to me. It was as if Socrates stood there.”

Stefan Machlup was also fluent in five modern languages and an accomplished cellist, participating in Cleveland-area string quartets for five decades. He is survived by his wife, Marilyn, and sons Peter and Eric, as well as the greater Bioelectromagnetics community. He was a full member of BEMS from 1997 through his retirement to an Emeritus member in 2001.

1Biochimica et Biophysica Acta 942, 186, 1988.
2Electromagnetic Biology and Medicine, 26, 3, 251, 2007.

RICHARD D. PHILLIPS, continued from page 3

very instrumental in helping both the subcommittee and parent committee to gain a strong consensus that made the new standard acceptable to a large majority of individual scientists and organizations in the public, governmental, military, industrial and academic sectors of the population.

Dick should also be recognized for his major biological contributions as a member of the NCRP Scientific Committee 53 that produced the first national two-tiered general/occupational population exposure standard published in the NCRP Report No. 86 published April 2, 1986. Dick was able to bring on a previous member (Ed Hunt) and an active member (Dr. Harvey A. Ragan) of his laboratory staff to the committee as advisory members to help provide reviews and analyses of their own work as well as others to include in the report in support of the standard. The first obligatory national standard forged and enforced by the FCC (still in effect) came from the above-mentioned standards.

See Richard D. Phillips, continued on page 9
One of the more important rationales for the USA/USSR exchange program was to seek some kind of harmonization of the USA and USSR exposure standards through mutual cooperative research. The fact that the RF exposure standards of the two countries differed by as much as 3 orders of magnitude was causing considerable public concern and controversy. Many scientists in this country felt that the sharp differences between the US and Soviet standards might well be due to antiquated research methodologies and exposure techniques that could result in artifacts in the research results resulting in erroneous conclusions. Such research artifacts plagued the work in the US when RF-bioeffects research was in its infancy. For research at ELF frequencies, Dick and his staff carefully designed the exposure sources to eliminate the known causes of undesirable artifacts. These included lack of control of temperature, noise, shocks, hair stimulation, induced body currents from contact with water and food sources and a myriad of other problems associated with exposure to high strength EMF fields. Through many blue sky meetings with members of his own interdisciplinary staff as well as help from consulting physical and life science experts from outside of his laboratory, Dick and his staff were able to develop new biological and exposure technologies that markedly reduced artifactual contamination of research results. His laboratories set many benchmarks of excellence that were carefully and thoroughly documented and made available to other laboratories throughout the country. Through Dick's interactions with the Soviets on the exchange program, the latter also enjoyed the fruits of his meticulous work. In two consecutive visits to the Institute of Industrial Hygiene and Occupational Diseases, directed by Professor Boris Savin in Moscow, the American group was very much surprised to see the marked change of a laboratory between the visits less than a year apart. In the first visit the laboratory was filled with artifact prone microwave exposure facilities of WWII vintage. On the later visit the laboratory was observed to have been converted over to an ELF research facility containing newly installed equipment that was nearly undistinguishable from that used in one of Dick's laboratories for artifact-free long term exposure of groups of rodents. Nothing better could have shown Dick's value to accomplishing the mission of the exchange program.

Dick was a founding member of the Bioelectromagnetics Society and was the first Chair of its Publicity and Public Relations Committee. Dick also served on the Board of Directors of the Society and was the second editor (1984—1989) of Bioelectromagnetics, the journal of The Bioelectromagnetics Society.

In 1984, Dick decided to leave Battelle and join the Environmental Protection Agency (EPA) Laboratories in Research Triangle Park. Dick started work at EPA in late 1984, as director of the Experimental Biology Division, which had a large EMF program and staff spread over two branches, each with two sections. In 1987, the Health Effects Research Laboratory under went a reorganization, and Dick became director of an enlarged Developmental and Cell Toxicology Division, composed of three branches, each with three sections, that included staff of his original division. During this time, as editor of the Bioelectromagnetics journal, Dick scrupulously used outside guest editors to manage submissions from EPA employees.

Dick retired from the EPA in 1990 and moved to Spokane, WA where he lived for the remainder of his life. Upon retirement Dick accepted a position with W/L Associates, Inc. (1990—1996) reviewing research projects funded by the U.S. DOE. During the period of March 20-22, 1991, in Carmel, California, Dick helped to organize and Chair an important workshop on ELF fields sponsored by EPRI to assess current knowledge on health effects and develop a set of recommendations for new research that would meet the needs of health risk assessment. The effort resulted in the publication of Supplement 1, 1992 of the Bioelectromagnetics journal. The issue contained many seminal papers and recommendations for future research on ELF health effects.

Dick was a member of The Bioelectromagnetics Society, New York Academy of Sciences, International Microwave Power Institute, International Society of Biometeorology, International Union of Radio Science, American Physiological Society, Radiation Research Society, Society for Experimental Biology and Medicine, and Sigma Xi. Dick was listed in the Who’s Who of Science.
The Bioelectromagnetics Society Newsletter September/October 2008

The Bioelectromagnetics Society Newsletter September/October 2008

Dariusz Leszczynski (BEMS) and Guglielmo D’Inzeo (EBEA) are the Co-Chairs of the Technical Program Committee (chair@bioem2009.org). In conjunction with BioEM 2009, several workshops and forums will be organized by other relevant organizations.

Original papers are solicited for presentation (in English) on the interaction of biological systems with electromagnetic energy from static fields through the visible light frequencies. Areas of interest include, but are not limited to, the following categories: clinical devices; medical applications; high-throughput screening; in vitro studies; in vivo studies; mechanisms of interaction; theoretical and practical modeling; instrumentation and methodology; dosimetry; exposure standards; occupational exposure; epidemiology; public policy.

Abstract submission deadline is February 2, 2009.

RESEARCH PROGRAM, continued from page 4

large radio and television transmitters found no indication of a connection between RF exposure and an increased risk for childhood leukemia. The question of long-term effects (a period of use for more than 10 years) remains an open issue, due to the long latency periods for cancer and the comparably short-term use of mobile communication technology by the general public.

Regarding electromagnetic hypersensitivity, scientific evidence demonstrates that there is no causal relation between exposure to electromagnetic fields and unspecific symptoms such as sleeping disorders, concentration disruptions or headaches.

Discussions on the topic of “Mobile communication and health”, carried out by the press and the public over the last few years, have been highly passionate. To some degree, this has significantly impeded the factual communication on technical and health aspects of electromagnetic fields. Several research projects looked further into the perception of mobile communication in society and identified possibilities for improving information and communication. It became clear that the mobile communication and health topic does not play a major role in public perception compared to other possible health risks. Within certain groups, however, a major concern about electromagnetic fields as well as a subjectively and strongly perceived impairment through electromagnetic fields, do exist. Information and communication offers must be tailored to the information needs of specific groups. The transfer modality needs to take into account the information behavior and information processing of each group. This is the only practical way for the addressed group to perceive the information and use it to form educated opinions.

The DMF was able to contribute significantly towards an improved risk assessment and communication with the public. The DMF findings give no reason to question the protective effect of current limit values. However, as some studies found minimal physiological reactions and indications that children could be more exposed than adults, along with the constantly open question on health risks from long-term exposure for adults and in particular for children, make it necessary to continue dealing carefully with wireless communication technologies. It is indispensable to retain the appropriate precautionary measures formulated by the BfS and the German Commission for Radiation Protection (SSK, 2006), especially with regard to children and young adults.

The principle of optimization in radiation protection should be applied when operating actual wireless communication technologies and developing new ones. The remaining uncertainties in risk assessment must be further curbed by way of purposeful research. Future information measures for the general public should provide a clear contextual knowledge and show possible scope of action for the individual. In this view, statements on scientific findings and knowledge limitations must be formulated in the simplest and the most precise language possible and elude complexity.

The results of the German Mobile Telecommunication Research Program (DMF) are summarized in a final report which includes also an evaluation of the results by BfS. The whole final report can be ordered at the Wirtschaftsverlag NW / Verlag für neue Wissenschaft GmbH, Postfach 10 11 10, Bürgermeister-Smidt-Straße 74-76, 27568 Bremerhaven (BfS-SG-08/2008, ISBN 978-3-86509-826-9).

More detailed information on the German Mobile Telecommunication Research Program and the individual research projects conducted within the Program on the Program’s internet portal are available at:

http://www.emf-forschungsprogramm.de
STUDENT AWARDS, continued from page 5
ated critically, senior members of the BEMS community from a wide variety of backgrounds were recruited as judges. This ensured that every student presentation was evaluated by a minimum of five judges. In 2008, following the recommendation of BEMS then vice-president Dr. Niels Kuster, conflict of interest rules were implemented in order to make the judging process as fair as possible for every student.

This year, under the recommendation from the BEMS Board and the EBEA Council, additional steps have been taken to ensure that all participants understand the expectations of the judges, along with how the top posters and oral presentations are chosen. In this issue of the newsletter, you will find the official score sheets that will be used by both BEMS and EBEA judges to evaluate every student presentation at BioEM 2009. It is our sincere belief that these efforts at improving transparency and objectivity will inspire every student to submit their best paper, dedicate their best efforts when presenting their work, and feel proud of their contribution at the joint meeting no matter what the outcome.

NOTE TO CONTRIBUTORS

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 $85USD.

The newsletter serves as a forum for ideas and discussion of issues related to bioelectromagnetics research. Contributions may include news items, meeting reports, short notes on research, book reviews, and relevant items of historical or other interest. All submissions must be signed. While it is understood that contributions by individual authors reflect the views of the contributor, the editors may require that contributing writers submit a statement of affiliation and/or disclosure of possible conflict of interest at the time an article is submitted for consideration. Advertisements included in the newsletter are not to be considered endorsed by the Society.

To submit items for the newsletter, please send electronic files to bemsnewsletter@gmail.com or bemsoffice@aol.com or (by surface mail) to:

The Bioelectromagnetics Society
2412 Cobblestone Way
Frederick, MD 21702-2626 USA

BEMS Newsletter Editor, Janie Page, is an independent consultant in Oakland, CA. Tel. (510) 917-2074.

For other Society business or information, contact:
Gloria Parsley, Executive Director, Tel. (301) 663-4252; FAX: (301) 694-4948, or see the BEMS Web site: www.bioelectromagnetics.org

SOCIETY HIT BY FRAUD SCAM

For unknown reasons, a fraudulent check scam is being run against The Bioelectromagnetics Society. Fortunately, as a result of quick action by our management company following a sudden influx of calls from individuals across the nation reporting high-valued Society checks arriving unexpectedly, the BEMS checking account was closed and reopened in a new bank, so the Society incurred no liability.

At the same time, the BEMS website was also compromised and had to be moved to a new host because the old host froze our account when they noticed an alarming rate of spam being sent from the old account.

The police in Frederick, Maryland, the Federal Bureau of Investigation (FBI), and Secret Service have all been notified. The FBI suspects that it is a scam being run out of Nigeria, where they have no jurisdiction to prosecute if they were ever able to identify the perpetrators. Since we have not incurred any liability, there is no active case being investigated. However, we are referring all callers to the FBI web site: IC3.gov where they will be asked to enter all the details regarding their check and any Internet activity that connected them to this scam.

IT’S TIME TO RENEW YOUR 2009 BEMS DUES!

Please visit our web site, www.bioelectromagnetics.org for a dues form, or contact our office:

Phone: (301) 663-4252 E-mail: bemsoffice@aol.com

CALENDAR

FGF Workshop - Open Questions in the Research on Biological and Health Effects of Low-Intensity RF-EMF
Date: 17-19 November 2008
Location: Stuttgart, Germany
Notes: The workshop aims to pick up open questions on health effects of radiofrequency fields. Key issues are the research on children, on possible long-term effects with the example of animal experiments as well as on mechanisms of cellular and subcellular level.

For more information contact Lutz Haberland, Forschungsgemeinschaft Funk e.V., haberland@fgf.de.

SPRBM 27th Scientific Conference
Date: January 6-9, 2009
Location: O’ahu, Hawaii
Contact: SPRBMoffice@aol.com, http://www.sprbm.org

See Calendar, continued on page 12
CAALENDAR, continued from page 11

The 20th EMC Zurich Symposium on Electromagnetic Compatibility
Date: 12 - 16 January 2009
Location: Zurich, Switzerland
For more information: http://www.emc-zurich.ch

SPIE Energy-Based Treatment of Tissue and Assessment
Date: January 24-29, 2009
Location: San Jose, CA (USA)
Notes: see March/April BEMS newsletter
Contact: http://spie.org/BiOS

PIERS 2009 (Progress in Electromagnetics Research Symposium)
Date: 23-27 March 2009
Location: Beijing, China
(see July/August 2008 BEMS newsletter for details)

Society for Thermal Medicine Annual Meeting
Date: 3 – 7 April 2009
Location: Tucson, AZ
Abstract submission deadline: 5 December 2008
Contact: http://www.thermalmedicine.org

Third International Conference of Applied Electromagnetism
CNEA 2009: “Potentialities of the electromagnetism in Medicine, Agriculture, Industry and the environment”
Date: 18-21 May 2009
Location: Santiago de Cuba, Cuba
Notes: Abstract Submission Due: December 30, 2008
Work Submission Due: January 31, 2009
Pre-Registration Due: March 31, 2009
Email: eventoscnea@yahoo.com
Conference website:

WHO IAC (International EMF Project) 2008
Date: 10-11 June 2009
Location: Switzerland
Notes: see details in this newsletter

BIOEM2009: Joint Meeting of BEMS and EBEA
Date: 14-19 June 2009
Location: Davos, Switzerland
Technical Program Co-Chairs: Dariusz Leszczynski and Guglielmo D’Inzeo
Notes: Authors wishing to present papers should submit a short summary and abstract electronically at www.bioem2009.org. For non-web submission and general information, contact the meeting project manager: Gloria Parsley, Tel: +1 301 663 4252; Fax: +1 301 694 4948; Email: bemsoffice@aol.com.
Abstract submission deadline: February 2, 2009

THE BIOELECTROMAGNETICS SOCIETY
2412 COBBLESTONE WAY
FREDERICK, MD 21702-2626 USA