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## BIOELECTROMAGNETICS PIONEER HERMAN SCHWAN PASSES AWAY AT AGE 90



*Herman Schwan in 1986*

Herman Paul Schwan, reknowned scientist and a pioneer of biomedical engineering and bioelectromagnetics, died quietly in his home in Radnor, Pennsylvania on March 17, 2005. Schwan was the first recipient of the Bioelectromagnetics Society's d'Arsonval Award, in 1985. He was born in Aachen, Germany in 1915. He obtained the German superior school certificate with distinction in Göttingen, 1934.

Schwan studied mathematics, physics and engineering in Göttingen, obtaining his PhD in biophysics at the University of Frankfurt in 1940 with distinction, his university teaching certificate, and his professional doctorate (Dr. habil) in physics and biophysics in 1946, according to his long-time colleague, Kenneth Foster of the University of Pennsylvania.

As a gymnasium and university student without much money during the rise of the National Socialist (Nazi) party in Germany, Schwan—though a brilliant student—had political difficulties remaining in school. He endured a period of forced labor after being labeled politically “immature” by the Nazis, Foster relates.

“Totally broke, depressed, and learning that he was under investigation by the Nazis for meetings with ‘foreign elements,’ Schwan temporarily shelved his plans for further studies towards a doctoral degree,” Foster writes. “In March 1937, he took a job with Telefunken in Berlin, where he was put to work testing and evaluating radio receivers. At Telefunken, Schwan met a former instructor in Frankfurt, a former assistant professor of physics. One thing led to another, and Schwan came to the attention of Boris Rajewsky (1893–1974), a famous Russian biophysicist who had recently been appointed head of the Oswalt Institute for Physics in Medicine at the University of Frankfurt (the former head having been dismissed and imprisoned by the Nazis). Rajewsky offered Schwan a job as a technician, and agreed to provide time to continue his studies and pay his tuition.”

“Schwan was put to work improving the primitive equipment then available to measure the dielectric properties of tissues, and he eventually developed a variety of impedance bridges and measurement techniques for measurements over a wide frequency range. He collected much of the data that was assembled in a volume edited by Rajewsky,” Foster notes. Working for Rajewsky, Schwan was protected from the draft and from notice by the Nazis.

“Rajewsky kept the laboratory functioning until late in the war, and its work focused on basic medical and biophysical studies. For his thesis topic, Rajewsky assigned Schwan to investigate the high frequency dielectric properties of tissue. Towards this end, Schwan developed instrumentation and measured the dielectric properties of blood, using dielectric mixture theory to interpret the results. He earned his PhD in biophysics at the University of Frankfurt in 1940 with distinction, and published several papers on the dielectric properties of tissues during the war years. Schwan obtained equipment for microwave measurements using transmission lines, developed techniques for precision dielectric permittivity and loss measurements, and conducted measurements on lossy materials. After the war, Schwan also measured the dielectric properties of tissues at Gigahertz frequencies. This work led to his second doctorate, the Dr. habil., in 1946.”

Foster's extended biography of Schwan, available at [http://repository.upenn.edu/be\\_papers/52/](http://repository.upenn.edu/be_papers/52/) contains an account of Schwan's exciting experiences late in the war, when Allied bombing threatened Rajewsky's work facilities and the fall of the city to American soldiers.

With the arrival of the Americans, as Schwan related to Foster, Rajewsky, as a former Nazi party member, had to give up his

*See Herman Schwan Continued, p2*

### IN THIS ISSUE...

<b>Pioneer Herman Schwan Passes Away .....</b>	<b>1–2</b>
<b>Louis Heynick Has Died .....</b>	<b>3</b>
<b>Stun Gun Mini-Symposium Set in Dublin .....</b>	<b>3</b>
<b>Details You Need for Dublin .....</b>	<b>4, 8</b>
<b>OPINION .....</b>	<b>5–8</b>
<b>PAVE PAWS Panel: No Evidence of Hazard .....</b>	<b>9, 11</b>
<b>Scientific History in Ireland .....</b>	<b>10</b>
<b>27 Years Ago in the Newsletter .....</b>	<b>10</b>
<b>“Early View” Available for <i>Bioelectromagnetics</i> ....</b>	<b>10</b>
<b>USAF Will Host Pre-BEMS Symposium .....</b>	<b>11</b>
<b>ICES Sets Dublin Schedule .....</b>	<b>11</b>
<b>CALENDAR .....</b>	<b>11–12</b>

## Herman Schwan, Continued

position as director of the institute. Never a member of a Nazi organization, Schwan was appointed acting director, which was soon renamed the Max Planck Institute of Biophysics. He served in this capacity until his departure for the United States in 1947.

In the US, Schwan began working at the Aeromedical Equipment Laboratory of the US Naval Base in Philadelphia. He joined the University of Pennsylvania in 1950, where he maintained an active scientific career for more than three decades on the faculty, plus more than 15 years after reaching emeritus status.

In 1972, Schwan was named Chair of the Bioengineering Department. His résumé lists more than 300 papers and nearly 400 lectures. His major scientific contributions can be divided into several broad areas: Dielectric Properties of Tissues and Biological Materials, Biophysics of Ultrasound and the Interaction of Electromagnetic Fields with Biological Systems. Foster's detailed account of the significant work accomplished or overseen by Schwan during the 30 years between 1952 and 1982 provide fascinating reading for anyone interested in the development of modern bioelectromagnetics research.

Schwan is best known, Foster relates, for many biophysical studies related to electrical properties of cells and tissues, and on nonthermal mechanisms of field interaction with biological systems. He discovered or provided important theoretical insights into phenomena such as the large low-frequency dielectric dispersion found in biological material, and electrically induced forces on cells.

Schwan was also deeply involved in the issue of possible health effects of nonionizing electromagnetic fields. His letter to the US Navy in 1953, proposing a safe limit for human exposure to microwave energy of 100 W/m<sup>2</sup> (based on thermal analysis) became the basis for exposure standards in the US and elsewhere. Among many other committee activities in this field, he chaired the committee that established the first (1965) US exposure limit for RF energy, for the American National Standards Institute. This standard evolved into the present IEEE C95.1 standard and was widely influential in the development of exposure limits around the world.

Schwan played a considerable role in the emergence of what is now known as bioelectromagnetics and in biomedical engineering. He recounted his activities in this area in several articles published at various times, including his d'Arsonval Award lecture published in *Bioelectromagnetics* in 1986. He also penned the "Early History of Bioelectromagnetics," found in *Bioelectromagnetics* 13:453–467, 1992; and "Early Organizations of Biomedical Engineering in the US," in *IEEE Engineering in Medicine and Biology Magazine*, September, p 25–29, 1993.

Briefly, not long after arriving in the United States Schwan joined the AIEE-EMB (Engineering in Medicine and Biology) Committee and then the Administrative Committee (AdCom) of the Institute for Radio Engineers (IRE) Professional Group on Medical Electronics (later named the IRE Professional Group on Engineering in Medicine and Biology).

These committees formed the Joint Executive Committee on Medicine and Biology (JCEMB) to organize the Annual Conference of Engineering in Medicine and Biology. Observing that the conferences were poorly attended, Schwan took an interest

and "expanded the scope and attractiveness of these conferences to engineers," Foster explains. For example, he recruited Otto Schmitt, inventor of the Schmitt trigger circuit, to chair the 1958 conference in Minneapolis, with the theme of computers in medicine and biology. It attracted nearly 400 participants, and similar successful meetings followed under Schwan's leadership.

In the late 1950s, as Foster relates, the AIEE and IRE merged to form the present Institute of Electrical and Electronics Engineers (IEEE), resulting in three major committees interested in engineering in medicine with overlapping constituencies and interests. This created the need for what Schwan later termed the "somewhat delicate" task of consolidating redundant committees. One of these, the IRE Professional Group on Medical Electronics (PGME) had grown to 2344 members by 1960 when Schwan became its chair.

The PGME eventually became the IEEE Committee on Engineering in Medicine and Biology, and later a full Society within the IEEE—the IEEE Society on Engineering in Medicine and Biology (IEEE EMBS). It is still the largest professional society in Bioengineering, with approximately 7500 members. Schwan was also a founding member of the Biomedical Engineering Society (BMES), chartered in 1968.

By the mid 1950s, as biomedical engineering advanced, it began to attract the interest of the US National Institutes of Health, and Schwan naturally became involved. He was a member of the National Institute of General Medical Sciences Program Project Committee to encourage large grant applications, and the first chair of a special study section on training grants in bioacoustics and biomedical engineering.

Schwan considered the early NIH programs that were specially devoted to bioengineering to be important seeds for biomedical engineering in the United States. After a difficult period of low funding at NIH, bioengineering has recently returned to the NIH as a major activity, with the recent (2001) formation of the National Institute of Biomedical Imaging and Bioengineering.

In addition to his activities in bioengineering, Schwan became a leader in biophysics. He shared Otto Schmitt's dream of a large biophysical community that encompassed biomedical engineering together with medical physics, including the emerging activities in membrane and molecular biophysics. Until the very end of his life, even into the new Millennium, Schwan continued to participate in scientific meetings in the US and Europe from his customary location at first-row-center.

Schwan was married in 1949 to Anne Marie Del Borrello of Philadelphia. In addition to his wife, Herman is survived by five children and six grandchildren. He was a mentor to all of them, first and foremost teaching them always to think for themselves and never to just follow the crowd. A man of integrity, Schwan influenced the lives of many, including his wife and children, and his many students and colleagues.

— by Kenneth R. Foster, Department of Bioengineering, University of Pennsylvania, Philadelphia, biographer of Herman P. Schwan. This article based on that biography was edited for length with permission of the author.

## LOUIS HEYNICK HAS DIED

Born in 1919 in Brooklyn, New York, Louis Heynick died on April 6 in Palo Alto, California, after a brief fight with cancer.

Lou was best known to the bioelectromagnetics community for his long, meticulous assistance to the committee setting human microwave exposure standards. He chaired the Literature Surveillance Working Group from 1978 until his death as the RF standard, C95.1, moved from one "home" to another. It was first part of the American National Standards Institute Committee C95.1, then the Institute of Electrical and Electronics Engineers (IEEE) Standards Coordinating Committee 28 Subcommittee 4, and later the International Committee on Electromagnetic Safety SC-4. Lou attended almost all subcommittee meetings for more than 26 years and was a highly valued contributor.

Lou also contributed to many critical reviews of the bioelectromagnetics scientific literature, the first for the President's Office of Telecommunications Policy in 1976. The last was three chapters in Supplement 6, 2003 of *Bioelectromagnetics*, the Special Issue commissioned by IEEE ICES SC-4. In between, Lou provided valuable input to reviews for Environmental Impact Statements for major RF-emitting systems in the USA, including four U.S. Air Force PAVE PAWS installations, the Department of Energy's Solar Satellite Power System, four Over-The-Horizon Backscatter Radar installations, the National Weather Service's Next-Generation Doppler Radar System (NEXRAD, later WSR88D), plus its Vertical Profiler, the Ground-Wave Emergency Network (GWEN), the Relocatable Over-the-Horizon Radar System (ROTHR) in Puerto Rico, and others.

The youngest of seven, Lou attended Brooklyn College on a scholarship where he majored in Physics. There he met Yetta Milstein, a History/Economics major, whom he married in July 1941. Lou was a Lieutenant in the Army Signal Corps during World War II, serving in the Pacific for two and a half years as a radar officer. After the war, he attended Columbia University and did graduate work at New York University, completing all course work towards a PhD short of the thesis. Lou worked at the Brooklyn Navy Yard before moving to Fort Monmouth, New Jersey, where he managed a program in the area of electron tubes.

Lou left government employment and moved to California in 1963 to become Director of the Physical Electronics Laboratory at Stanford Research Institute (later SRI International). He made significant contributions on field-emission devices which led to several patents, and also was editor of *IEEE Transactions on Electron Devices*. In 1974, after working 30 years on electron tube devices, Lou became a senior staff physicist in the Electromagnetic Techniques Laboratory at SRI and began another 30-year career on the



*Lou Heynick*

biological effects of microwaves, a new area of interest which did not end with his retirement from SRI in 1984.

Lou was a balanced individual with active interests ranging from music, painting, science fiction, folk dancing, languages, a monthly book club, and travel around the globe—all of which he kept up with until his death. He is survived by his wife of 63 years, Yetta, a daughter, a son and one grandchild.

— by Peter Polson, Heynick's long-time associate and friend

— photo courtesy of Sheila Johnston

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## STUN GUN MINI-SYMPOSIUM SCHEDULED IN DUBLIN

A pre-conference mini-symposium on Stun Gun Technology will be held on Sunday morning, June 19, 2005, from 9 a.m.– 12 noon in the John Henry Newman Building of the University College Dublin, Ireland.

The focus of this symposium will be the technology, physiology and potential adverse side effects of the use of electronic weapons or stun guns, which are rapidly being deployed in military and police use. There has been controversy in the popular press about this technology. The panel of scientists will address the theory and application of this technology. The symposium is to serve as forum for scientific discussion about this new biomedical application of electric fields. For further information contact Gloria Parsley by e-mail at [BEMSooffice@aol.com](mailto:BEMSooffice@aol.com) or Tel.: +1 (301) 663-4252.

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## DETAILS YOU NEED FOR DUBLIN

BioEM 2005—the joint meeting of The Bioelectromagnetics Society and the European Bioelectromagnetics Association—will be held on June 19–24, 2005, at University College Dublin (UCD), Ireland. The following information is provided to help attendees plan for their conference stay.

UCD and the three nearby conference hotels are conveniently located on the main arterial route from Dublin city centre to the southern suburbs and the south east of Ireland. All three conference hotels are within walking distance of the campus and are also on the public bus route. There is ample free parking on campus.

### Airport Transportation

Dublin International airport is 16 km north of UCD. Upon arrival, tickets can be purchased curbside for roundtrip luxury motor coach service that stops at each of the conference hotels and also at UCD. The motor coach departs the airport every 20 minutes, approximate travel time to UCD is 1 hour. By taxi, travel time is 30–50 minutes, depending on the traffic.

### By Train

Dublin's D.A.R.T. rapid rail system, Boostertown stop, is nearby. Journey time from the city center is 15 minutes.

### By Sea

The Dun Laoghaire Ferry Port lies 4 km to the south east from the hotel. Journey time from port to hotel is 10–15 minutes by taxi.

### University College Dublin

Bioelectromagnetics 2005 sessions will be held in two different buildings on campus, O'Reilly Hall and the John Henry Newman Building. The buildings are located near each other, a short 5-minute walk around the lake. The emergency contact number at UCD is +353 1 716 2827, fax +353 1 716 1114.

### O'Reilly Hall

On Monday, Tuesday and Wednesday, the morning plenary sessions and all three poster sessions will be held in O'Reilly Hall.

### John Henry Newman Building

All week the simultaneous breakout sessions will be held in the John Henry Newman building. Thursday and Friday sessions will be held in the John Henry Newman Building.

### The Weather in Ireland

June has a mean temperature of 14° C, 70 percent humidity, and 66 mm rainfall. (*Courtesy of Ireland's meteorological service, Met Éireann.*) We recommend that you pack a jacket, comfortable walking shoes and perhaps a travel umbrella.

### Dublin

Dublin is one of the most popular tourist destinations in Europe. One of Europe's oldest cities, it is steeped in history and culture and uniquely combines the vibrancy of a cosmopolitan capital with the intimacy of village life. BioEM 2005 has scheduled evening visits to three of the main attractions of Dublin city including Guinness Storehouse, Trinity College and Dublin Castle.

Boasting one of the youngest populations in this part of the world, the city centre offers lively pubs and restaurants along with some wonderful shopping on Grafton Street. BioEM 2005 attendees will have roundtrip motor coach transportation provided to the city centre for a free evening on Wednesday to enjoy their choice of night life. Cabarets, night clubs, theatres and concert halls echo Dublin's rich contemporary and cultural heritage, while museums and art galleries reflect a glorious past—including the great literary legacy of its native sons, Beckett, Joyce, Shaw and Yeats. Amid the bustle of this legendary city are areas of peace and tranquility, such as Phoenix Park on the banks of the River Liffey, the largest enclosed park of its kind in Europe. And not half an hour from the city centre are sandy beaches, quaint fishing villages, mountain walks and stately homes and gardens.

### New Smoke-Free Zones

In line with legislation enacted by the Irish Government on March 29, 2004, smoking is now prohibited in all public places (except in designated hotel bedrooms where an exemption has been granted). We respectfully request all our attendees comply with this legislation.

### Accommodations

BioEM 2005 has blocked a variety of accommodations in order to meet each individual traveler's needs. Below is a list of the four choices, with the costs and number of rooms blocked at each venue. Please note the main block of 210 sleeping rooms is in campus apartments. We also have arranged for a block of sleeping rooms at each of the three hotels near the UCD campus. Please note each hotel's location, rating and distance from UCD.

**1. Glenomena Student Residence Hall at UCD.** Tel: +353 1 716 1030 Fax: +353 1 716 1039, **65€** (includes VAT and continental breakfast). 210 rooms blocked. This upscale campus housing offers apartments that are designed to form a series of courtyards and pedestrian streets, which gives a general sense of enclosure and security while maintaining the natural woodland setting. Each sleeping room has a small private bathroom with shower, 6 bedrooms share a full kitchen and living room. Wireless Local Area Network access in all apartments (80211.b)

**2. Jurys Montrose Hotel,** Stillorgan Road, Dublin 4. Tel: +353 1269 3311 Fax: +353 1269 3376, **165€** (includes full Irish breakfast and VAT). 125 rooms blocked. 3 Star hotel, 5-minute walk to UCD. Jurys Montrose Hotel is a modern, spacious hotel adjacent to the main campus of University College Dublin.

**3. Radisson SAS St. Helen's Hotel,** Stillorgan Road, Dublin 4. Europe +353 1706 0284; USA +1 402 491 6100. Fax from Europe +353 1706 0225. Fax from USA +1 402 498 9166. **165€** (includes super breakfast buffet and VAT) 5 Star luxury accommodations (50 rooms blocked), 15-minute walk to UCD. This hotel was formerly one of Ireland's most important historic houses, with magnificent formal gardens surrounded by established woodlands, overlooking Dublin Bay. Wireless access in public areas only. Guests can purchase a card at reception desk for one hour at 10 Euro, 24 hours at 22 Euros. The hotel offers free onsite car parking.

*See Dublin Details Continued, p8*

## OPINION

The views expressed in this column are those of the contributors and do not necessarily reflect the opinions of the editorial staff or the organizations served by this newsletter. We encourage contributions which will further a discussion of important issues to the Bioelectromagnetics Society and assist in scientific progress in our area of interest. Your response to opinions expressed here are welcome. Letters on other matters are encouraged.

### **Mild, Hardell and Kundi Comment on Lönn et al. Mobile Phone Use and Risk of Intercranial Tumors**

On December 17th 2004, Stefan Lönn, trained in biomedicine, defended his medical dissertation on the use of cellular telephones and the risk of intercranial tumors (1). It contains, besides studies of brain tumor incidence trends and output power of mobile phones in different geographic areas, two articles on the issue of brain tumors and mobile phone use, one about glioma and meningioma and another on acoustic neuroma. The latter has already been published (2).

In spite of a reported overall decreased risk, an increased risk was found for tumors on the same side of the brain as the cellular phone had been used (ipsilateral exposure). These calculations yielded for glioma a relative risk (RR)=1.8, 95% confidence interval (CI)=0.8–3.9 for  $\geq 10$  year duration of regular use. The corresponding result for meningioma was RR=1.4, 95 % CI = 0.4–4.4.

The case-control study on acoustic neuroma (2) confirmed our previous result of a significantly elevated risk for acoustic neuroma associated with use of cellular telephones (3, 4).

Conceding the methodological limitations due to the investigation being part of the Interphone study planned and supervised by the International Agency for Research on Cancer (IARC), nevertheless both studies by Lönn et al. have some questionable points concerning study participants, statistical methods, and interpretation of the results that are solely the responsibility of the authors. In the following paragraphs we discuss some of these issues.

Persons aged 20–69 years living in the medical areas of the university hospitals in Umeå, Stockholm, Gothenburg and Lund in Sweden were eligible. The cases consisted of patients diagnosed with primary glioma, meningioma or acoustic neuroma during September 1, 2000 until August 31, 2002. Unmatched controls were recruited from the population registry. For reasons not disclosed cases with acoustic neuroma living in the Umeå medical region were not included. This is particularly unfortunate because use of analogue phones was more common in that part of Sweden due to better geographical coverage. Considering our previous findings (3, 4) of a significantly increased risk of acoustic neuroma it would have been of special value to include cases also in that part of Sweden.

Use of cellular telephones was mostly assessed by personal interviews in the Lönn et al. study. In contrast to our procedure, the interviewer was aware whether the study subject was a case (patient) or a control thereby potentially introducing observational bias. It is not described how personal interviews were organized, a tremendous task considering that vast parts of Swe-

den from north to south had to be covered. Especially in the sparsely populated and extended area in north Sweden personal interviews must have afforded lots of long distance traveling and must have imposed additional stress on the interviewers. Lönn et al. give no information in the articles on this methodological problem.

According to the provisions of the Interphone study the interviews were extensive and computer aided. It is likely that such an interview is a stressful situation for a patient with a recent brain tumor diagnosis and operation. These patients have, especially under pressure, often difficulties to remember past exposures, have problems to concentrate and other cognitive shortcomings. According to our experience a better option is to start with a mailed questionnaire that can be answered by the patient during a period of well-being and if necessary to complement data by telephone interviews. This procedure has the additional advantage that it can be accomplished without disclosing during data collection if a person is a case or a control.

Concerning the case-control study of glioma and meningioma by Lönn et al. some issues need further discussion.

The diagnosis of tumor type as well as grading is based on histopathology. X-ray investigation or MR alone is insufficient. Of the 371 cases with glioma histopathology examination of the tumor was available for 328 (88 %) and for 225 (82 %) of meningioma. Thus, it is possible that cases without histology confirmation of the diagnosis may have had another type of brain tumor or even brain metastases. Such misclassification does bias the result towards unity. It is remarkable that 345 glioma cases were stratified according to grade I–IV although histopathology was available only for 328 cases. In our studies on brain tumors we have histopathology verification of all of the diagnoses (3,4).

For analysis of laterality (ie. the risk of brain tumors on the same side or the opposite side the mobile phone was held during phone calls) Lönn et al. applied an interesting approach. They split the cases into two subsets: those with left and those with right side tumors. Controls were randomly allocated to one of these subsets at a 1:1 ratio. Odds ratios calculated within these subsets were then pooled to give an overall estimate. This method is in principle correct for studies with unmatched controls.

However, exposure categorization was questionable for ipsilateral but completely faulty for contralateral use of a mobile phone. Subjects were considered exposed if they used the phone on the same or on both sides. On the other hand, if they used the phone on the contralateral side or did not regularly use a mobile phone they were considered unexposed. Hence the reference category included subjects using a mobile regularly but stated to use it on the other side as the tumor was located. Although exposure to microwaves from mobile phone use is substantially lower on the contralateral side, this discrepancy is less pronounced for regions of the brain (the ventricular and subventricular space) where glioma may originate. Therefore the chosen procedure introduced exposure misclassification and could have biased results. For contralateral exposure the opposite exposure classification was used. This resulted in patients exposed on the same side as the tumor was located being part of the reference group which obviously is

*See OPINION Continued, p6*

faulty because in the case of an increased risk for ipsilateral exposure odds ratios for contralateral exposure must be less than one (as actually was the case). The same questionable method is used in the acoustic neuroma article (2).

It should be pointed out that another weakness in the glioma and meningioma study was that for 33 glioma and 8 meningioma cases information on exposure was obtained from relatives, whereas no relative of a control was interviewed. According to our experience relatives have difficulties to give information on use of cellular telephones, especially about the side of the head the phone was most frequently held during phone calls.

There are some discrepancies concerning number of cases identified by Lönn et al. and data in the Swedish Cancer Registry. We have given the Swedish Cancer Registry the same criteria as in the Lönn et al. studies for case recruitment. Comparison of these figures is shown in table 1.

Table 1. Comparison of cases obtained from Swedish Cancer Registry and cases identified by Lönn et al.

	Cancer Registry	Lönn et al
Intracranial glioma	469	499
Astrocytoma grade I-II	82	73 <sup>*)</sup>
Astrocytoma grade III-IV	370	272 <sup>*)</sup>
Meningioma	337	320
Acoustic neuroma	122	160

<sup>\*)</sup> interviewed cases

The large difference, especially for astrocytoma grade III–IV is worrying and indicates methodological problems in the Lönn et al studies. Most likely these approx. 100 cases of glioma from which no information could be obtained are predominantly among the missing 98 cases of high malignant astrocytoma. It can be assumed that many of them were severely ill or already deceased and could therefore not be interviewed. It has to be noted that our previous study (3) was criticized for leaving out terminally ill and dead cases.

All acoustic neuroma cases in the Cancer Registry have a histopathology verification of the tumor. Obviously there is a discrepancy as to the Lönn et al study in this respect (2). There are further unclear facts we will present separately (5).

Among the controls in the glioma and meningioma study 282 (29 %) refused to participate. Among some of these non-responders a short interview was made and only 34% reported regular use of a cellular telephone compared with 59% of the responders. If this discrepancy extends to the total group of non-responders the true percentage of mobile phone users in controls would be approx. 52%. Hence this figure would be lower than in glioma (58% exposed) and acoustic neuroma cases (60%). Only in meningioma with 43% exposed cases a lower percentage was reported, however, considering the sex ratio for meningioma of approx. 2:1 a lower percentage of mobile phone users has to be expected due to the lower rate of users among women.

In the discussion Lönn (1) stated: “Our Swedish study, that includes a large number of long-term mobile phone users, does not support the few previously reported positive findings, and does not indicate any risk increases neither for short-term or long-term exposures.” Considering the methodological shortcomings and that in contrast to the cited assertion of ‘a large number of

long-term users’ only 25 glioma and 12 meningioma cases with long-term use were among the study subjects this conclusion is by far going beyond what can be scientifically defended.

It should be pointed out that one of the authors (Ahlbom) already before the study started stated that an association between cellular telephones and brain tumors is “biologically bizarre” (6). The recently presented REFLEX-study indicates that there are biological mechanisms that could link exposure to development of diseased such as brain tumors (7). Could it be that the authors were a little prejudiced in favor of the zero hypothesis of no risk? The authors state that the studies were partly financed by the telecom industry. Receiving grants from industry is by the International Committee of Medical Journal Editors regarded as “the most important conflicts of interest.” In a recent review of health studies on environmental tobacco smoke the rate ratio of a paper with at least one author with industry associations reaching an industry-favorable conclusion was 3.2, 95 % CI 1.4–7.5 (8).

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#### References

1. Lönn S. Mobile phone use and risk of intracranial tumors. Medical Dissertation, Karolinska Institute, Stockholm 2004.
2. Lönn S, Ahlbom A, Hall P, Feychting M. Mobile phone use and the risk of acoustic neuroma. *Epidemiology* 2004; 15:653–659.
3. Hardell L, Hansson Mild K, Carlberg M. Further aspects on cellular and cordless telephones and brain tumours. *Int. J. Oncol.* 2003; 22:399–407.
4. Hardell L, Hansson Mild K, Carlberg M, Hallquist A, Pålsson A. Vestibular schwannoma, tinnitus and cellular telephones. *Neuroepidemiology* 2003; 22:124–129.
5. Hardell L, Hansson Mild K. Re: Mobile phone use and the risk of acoustic neuroma. *Epidemiology*, in press.
6. Adami HO, Ahlbom A, Ekblom A, Hagmar L, Ingelman-Sundberg M. Opinion— “Experts who talk rubbish.” *Bioelectromagnetics Society Newsletter* 2001; 162:4–5.
7. Risk Evaluation of Potential Environmental Hazards From Low Frequency Electromagnetic Field Exposure Using Sensitive in vitro Methods. Final Report [http://www.itis.ethz.ch/downloads/REFLEX\\_Final%20Report\\_171104.pdf](http://www.itis.ethz.ch/downloads/REFLEX_Final%20Report_171104.pdf) (January 19, 2005).
8. Garne D, Watson M, Chapman S, Byrne F. Environmental tobacco smoke research published in the journal *Indoor and Built Environment* and associations with the tobacco industry. *Lancet* 2005; 365:804–809.

#### Lönn et al. Reply

We note Hansson Mild and co-authors’ interest in our studies<sup>1,2</sup>, but we are surprised that they chose to send their letter to BEMS Newsletter. We are happy to answer any questions if they are addressed in a letter to the editor of the scientific journal in question. In fact, we have already answered questions regarding our acoustic neuroma paper<sup>1</sup> in a letter that will appear in *Epidemiology*.

See OPINION Continued, p7



## OPINION Continued

Hansson Mild and co-authors end their letter with a statement regarding industry funding. The fact is that The INTERPHONE study received funding from the European Union Fifth Framework Program and the International Union against Cancer (UICC); the Swedish study received funds also from the Swedish Research Council. The UICC received funds for this purpose from the Mobile Manufacturers' Forum and GSM Association. Provision of funds to the INTERPHONE study investigators via the UICC was governed by agreements that guaranteed INTERPHONE's complete scientific independence. These agreements are publicly available at <http://www.iarc.fr/ENG/Units/RCAd.html>. It surprises us that Hansson Mild et al. fail to mention that they have themselves received funds from the industry for their research (from TeliaSonera), as far as we know without any firewalls to protect their independence and credibility. We note in their publications that they have not declared any other industry affiliations.

Stefan Lönn  
Anders Ahlbom  
Maria Feychting  
The Karolinska Institute, Stockholm

### References

1. Lönn S, Ahlbom A, Hall P, Feychting M. Mobile phone use and the risk of acoustic neuroma. *Epidemiology* 2004;15:653–659.
2. Lönn S, Ahlbom A, Hall P, Feychting M, and the Swedish Interphone study group. Mobile phone use and the risk of brain tumors. *Am J Epidemiology* 2005;161:526–535.

## Bill Guy Responds to Allegation

Editors' Note: *The editors feel obligated to honor the request of Society members to print their opinions on matters related to bioelectromagnetics research. However, we do not wish to promote discussion of supposed conspiracies and we do not print personal attacks. We strongly believe that the newsletter should include discussion of science, the methods of science and the reasons for conducting specific research. We seek to make this newsletter a forum for honest expression of differing opinions.*

– M.S. and J.L.

In the March issue of the University of Washington (UW) *Alumni Magazine*, Henry Lai reflected on the controversy surrounding his 1994 finding that exposure to RF exposure might cause DNA strand breaks. The *UW Alumni Magazine* article is available at [www.washington.edu/alumni/columns/march05/wakeupcall01.html](http://www.washington.edu/alumni/columns/march05/wakeupcall01.html). Also in March, in *Microwave News* online, Louis Slesin pursued Lai's contention that Lai lost a possible National Institutes of Health grant for political reasons. Slesin named Bill Guy, now a UW Professor Emeritus, as allegedly quashing Lai's chance at an NIH grant with a phone call. Guy's response is below.

Louis:

I am enraged and shocked by the rude and blatant untruth you wrote about me in your March 11, 2005 Web edition of *Microwave News*. Though I vowed in the depths of my retirement from the University of Washington to no longer respond to the extreme nonsense that is circulating in the media, this piece is so bad that it forces me to respond. The statements you used to slander my name and impugn my character are absolutely untrue! I most vehemently

and unequivocally deny that I, or any body that I am aware of, made any calls to NIH or to Dr. Michael Galvin to influence in any way the activities of NIH and its peer review study section members in analyzing and approving Dr. Henry Lai's grant. I would never carry out such an abhorrent unethical communication that would violate the rules of a federal agency. At the time of the alleged call, Dr. Lai was a friend and colleague running the laboratory that had been left in his hands after my retirement a few years before. I had wished him great success in this endeavor and did nothing to interfere with his work.

I have served on and chaired many NIH Study Section meetings, have written many grant applications and have been awarded many grants from NIH over a good part of my professional career. NIH must follow the advice of the peer review study section members with priorities for funding determined by scores assigned by those members. Outside interests could not have an effect on an award. Any phone call to someone like Dr. Galvin would not affect the outcome. Further, any member of the study section from the same institute as the applicant or with any other type of conflict of interest must leave during all discussions and scoring of that application. The fact that you concocted this unbelievable story of my alleged attempt to influence the process makes it obvious that you know little about the NIH process.

At the time of the alleged call to Dr. Galvin, the Science Advisory Group that later was called WTR was in the process of defining studies to test the biological effects of simulated cell phone signals. Dr. Lai's lab was one of the potential resources for carrying out such work. Any adverse influence on Lai's work by me would be against my interest as well as WTR's interest.

It is clear that you have not taken even the first step that any responsible journalist would take to independently verify your information before publication. To clear my name, I called Henry to learn how and where his allegation could have originated. I learned that he had long suspected me of making such a call. He had not informed me of his suspicions at any time in ten years. Lai told me, as he evidently must have previously told you, that the information about this alleged incident came from Dr. Galvin. Henry said that he thought it had to be me who made a call because I was the only one who knew of his research and that I personally knew Dr. Galvin. I began to wonder whether Henry had actually heard my name or not. I became deeply concerned at how these surreptitious, outrageous allegations were being passed from one party to the next over ten years without any verification of the facts or anyone giving me the courtesy of asking for my response. With growing concern I continued the quest for clearing my name by pursuing what any responsible journalist should have done before the piece in question was written: I sent an e-mail to Dr. Galvin. He sent me the following reply:

***"I do not remember any call concerning this grant from outside interests. If there is an issue, you should contact NIEHS and have them review the grant file. If there was an investigation (which I do not remember), documentation would be in the file. My only recollection is that there may have been some issues raised in the peer review and these were addressed by the PI. I do not have a clear recollection of the grant as it has been some years."***

See OPINION Continued, p8

## OPINION, Continued

Now that I have (hopefully) responded to the phone call issue, let me go back to the real issue that started all of this which you, if on the ball, would have seen as the root cause of Henry's problem. Let me go to your last sentence in your diatribe. You state:

*"Guy's first impulse on hearing about some important new experimental finding that questioned the safety of a product that would soon be responsible for exposing more than a billion people to a constant stream of RF radiation was to blow the whistle and try to impugn Lai."*

As I mentioned earlier in this message there was no phone call from me nor was I trying to impugn Lai. The first experimental finding that Lai reported to support the beginning of his media blitz against cell phones was not new at all. It was based on an old study of the effect of microwave pulse exposures on rat behavior that he and I had published three years earlier. I had developed the exposure system and was responsible for the dosimetry. The study was designed to test the effects of high power radar exposure on the health of rats. No way did the experiment apply to cellular phone exposure.

I was startled when my former colleague Henry appeared on the local TV news in 1997, indicating he had found that cellular phone emissions can cause rats to forget. The next day I called Henry and asked him what experiment that was. When I found out it was the one with my name as co-author that was reported in the 1994 paper relating to radar research, I explained to Henry the difference between cell phone signals and radar signals and that he should do something to correct the misinformation. He did not correct the misinformation or lack of key exposure information in his later public statements regarding the 1994 paper nor his later studies on behavior or DNA damage.

As the one responsible for the dosimetry and applicability of the research results to various sources of exposure in our publications, I told Henry that if he was not going to correct his erroneous interpretations on the applicability to cell phones that I had a public duty to set the record straight. This was done several weeks after my discussion with Henry with his full knowledge of my intentions.

The key information missing from previous press stories concerning the paper was reported by Jeffrey Silva of *RCR News* on September 29, 1997:

*"Guy said the biggest difference between the 1994 experiment and their applicability to cellular phones is that testing involved whole body exposure to radar-like emissions of 500 microwave pulses per second with peak powers that were several thousand times higher than that possible from cellular phones".*

Louis, you have made very serious charges based on erroneous or unverifiable information that, if it has not already, threatens to impugn a reputation that has taken me a lifetime to build. I challenge you to retract your libelous allegations about me in your March 11, 2005 edition of *Microwave News* and post my response. I demand that you make a public apology to clear my name.

*Bill Guy, Ph.D.  
Professor Emeritus  
University of Washington*

## Dublin Details, Continued

**4. Stillorgan Park Hotel**, Stillorgan Road, Dublin 4. Tel: +353 1288 1621 Fax: +353 1283 1610, **132 €** (includes full Irish breakfast and VAT). 4 Star AA & RAC-Approved (80 rooms blocked). With air conditioning, data/fax lines, iron and board, marbled bathrooms, power showers and fluffy towels. No wireless capability but DSL lines are available by request. A car park is free to residents.

### Meals

Registrants will receive daily coffee breaks.

### Breakfast

Breakfast is included in the BioEM 2005 room rate at all three conference hotels and at UCD's campus apartments. For those staying in UCD's apartments, breakfast will be served at the main campus restaurant, not in the Glenomena apartment building.

### Lunch

BioEM 2005 is not hosting any lunches. The main campus restaurant will be open for lunch. Box lunches may be purchased in advance for the:

- EBEA Business Meeting on Tuesday 12:30–2 p.m.
- BEMS Annual Business Meeting on Wednesday, 12–1:30 p.m.

### Evening Events

Paid registration includes admission to these evening events:

#### Sunday

Welcoming reception 5–7 p.m., O'Reilly Hall

#### Monday—Load buses at 6 p.m.

Social Event at the Guinness Storehouse. Dinner and dancing. See [www.guinness-storehouse.com/home/home.asp](http://www.guinness-storehouse.com/home/home.asp) *Nametags for guest admission must be purchased in advance.*

#### Tuesday—Load buses at 6:30 p.m.

Reception at Trinity College. Dinner on your own. See [www.tcd.ie/home/visitor/visitor.htm](http://www.tcd.ie/home/visitor/visitor.htm)

#### Wednesday—Load buses at 6:30 p.m.

Transportation provided to Dublin city centre; dinner on your own. For restaurants, search Dublin Tourism on line <<http://search.atomz.com/>

#### Thursday—Load buses at 6:30 p.m.

State-sponsored reception at Dublin Castle. See [www.dublincastle.ie/history\\_intro.html](http://www.dublincastle.ie/history_intro.html)

### Buses

Buses will load and depart from UCD each evening shortly after the conclusion of the sessions. At the end of each evening, the buses will return attendees directly to their accommodations.

If you have questions about any of the above, contact the BEMS Office by phone at +1 301 663-4252 or by e-mail at [BEMSOFFICE@aol.com](mailto:BEMSOFFICE@aol.com)



# PAVE PAWS PANEL FINDS NO EVIDENCE OF HEALTH HAZARD

The U.S. National Academy of Sciences' (NAS) Committee to Assess Potential Health Risks from Exposures to PAVE PAWS Low-level Phased-array Radiofrequency Energy, chaired by a past president of BEMS, Frank Barnes of the University of Colorado, Boulder, recently summarized that, based on a literature review and other activities, there is no evidence of adverse health effects to the general public from continuing or long-term exposure to PAVE PAWS radar near a U.S. Air Force installation on Cape Cod, Massachusetts.



Frank Barnes

Barnes told the BEMS Newsletter this month that in addition to a full review of the peer-reviewed literature, a search of classified USAF research plus other activities, the NAS Committee took extra steps to address public concern about potential cancer risk among people living near the PAVE PAWS installation by conducting a statistical analysis of standardized incidence rates. In addition, they looked at premature mortality before age 75 as a useful indicator of a possible health risk, as well as duration of exposure and other indicators.

Based on these analyses, the committee concluded that "there is no increase in total cancers or cancers of the prostate, breast, lung, or colon due to exposure to the PAVE PAWS radiation," according to a NAS final report now in press.

Others who served with Barnes on the NAS panel were RF consultant Robert Hansen, vice chair, of Tarzana, Calif.; Larry Anderson of Pacific Northwest National Laboratory, Richland, Wash.; Graham Colditz of the Harvard School of Public Health; Francesca Dominici of Johns Hopkins University, Baltimore; Kenneth McLeod of State University of New York, Stony Brook; Keith Paulsen of Dartmouth College, Hanover, N.H.; Leslie Robison of the University of Minnesota, Minneapolis; Susan Santos of the UMDNJ School of Public Health and Risk Communication Center for the Study of War Related Illness, Medford, Mass.; Jan Stolwijk of Yale University, New Haven, Conn., and Gayle Woloschak of Northwestern University, Illinois.

In the report due to be published soon, Barnes and colleagues note that many studies and data support the finding of no health or biological effects from RF exposures at low levels, and evidence of a mechanism shown to change biologic processes at power levels that are associated with the PAVE PAWS radar is lacking.

The radar has been in operation since 1979. "PAVE" is an Air Force program name and "PAWS" stands for Phased Array Warning System. It detects and tracks sea-launched and intercontinental ballistic missiles, as well as earth satellites and other space objects. Even before it began operation, the NAS report notes, public concern had been expressed by some about safety and possible health impacts. In part these led to a 1979 National Research Council (NRC) report on exposure and potential biological effects.

In 2001, Massachusetts Senator Edward Kennedy asked the U.S. Air Force to fund an independent study through NAS "to exam-

ine the health effects of the PAVE PAWS system" and to prepare a follow-up report to the 1979 NRC effort. Barnes and colleagues began work in 2002. Recently collected waveform-characterization data available to the committee has helped to answer many questions, Barnes said.

Among their technical findings, the NAS Committee notes:

1. The PAVE PAWS narrow-band radiation is in fact similar to that of continuous narrow-band reflectors or so-called "dish" antennas.... Both reflectors and phased arrays have time delays, and comparable size reflector antennas also have comparable delays.
2. The large number of PAVE PAWS active elements (1,792) and their irregular spacing make the discrete beam formation almost indistinguishable from a continuous formation.
3. The existence and possible biological significance of precursors (also referred to as Brouillon precursors—additions to a signal waveform that may occur before, during, or after the signal waveform) forming would be extremely small and probably not measurable for the narrow-band PAVE PAWS system.

Also, the Committee points out that based on relevant data from animal and cell experiments with certain RF exposure conditions that contribute to an understanding of RF biological effects and to the potential for human-health effects from PAVE PAWS, there is no established risk of cancer, reproductive or developmental effects, or neurobehaviorial effects.

## Special Effort to Address Cancer Fear

In the past, investigators lacked power density data needed to explore the possibility of health effects from the PAVE PAWS. Recent waveform and power-density models and measurements have changed this situation. Briefly, spatial distribution of the PAVE PAWS RF energy is strongly influenced by site-specific local topography and intervening terrain. Measured data show that average power densities are consistently below  $0.1 \mu\text{W}/\text{cm}^2$ , and generally in the  $0.001\text{--}0.01 \mu\text{W}/\text{cm}^2$  range at locations where the public would be expected to be exposed. Measured peak levels are generally less than  $1 \mu\text{W}/\text{cm}^2$ , although values as high as  $15 \mu\text{W}/\text{cm}^2$  have been found at a few elevated locations.

In spite of recent site-specific measurements and estimates of the PAVE PAWS waveforms and power densities now available for some locations, there are still no data to determine an individual's personal exposure to RF radiation from the PAVE PAWS radar, the NAS panelists point out.

"Using information on population density, topography and direction of the PAVE PAWS radar beam, we estimated that, based on the 1990 census, 12,773 of the total resident population (11.8 percent including children) of upper Cape Cod were living in the line of sight" of the radar. The main beam is aimed above the population.... based on 2000 census data, the estimated number of population living in the area exposed to the PAVE PAWS radar-beam sidelobes was 16,403 (12.4 percent), the report adds.

"Based on our own statistical analyses, we did not identify any increase in cancer risk with exposure to the PAVE PAWS beam using peak and average power-density estimates. The analyses looked at the reported occurrences of all cancers combined on

*See PAVE PAWS continued, p11*

## SCIENTIFIC HISTORY IN IRELAND

While in Ireland to attend BioEm 2005 in June, travelers with an interest in science history have the opportunity to visit several locations associated with great scientists of past centuries.

Some miles from Dublin, the castle garden where chemist Robert Boyle was born is open to visitors, and in Dublin itself one may stand on the spot where mathematician William Rowan Hamilton is said to have had a major scientific inspiration. Ireland was also home to astronomer William Parsons and physicist Edwin Schrödinger.

Robert Boyle was the 14<sup>th</sup> child of the Earl of Cork, born into a wealthy family in 1627 at Lismore Castle, near Waterford. Robert Boyle is perhaps best known for advocating (with others, notably Robert Hooke) a mechanical philosophy of natural sciences to replace the old alchemy and the occult. In his most famous book, *The Sceptical Chymist*, Boyle asserted that matter is "divided into little particles of several sizes and shapes," and that quantitative experiments, not magical beliefs, ought to form the basis of scientific progress and knowledge. Boyle and Hooke invented the modern air pump to experiment with gases, and Boyle developed a theorem on their behavior, Boyle's Law. Also an anatomist, he introduced the use of alcohol as a preservative. Boyle spent much of his professional life in London, and was one of the scholars who formed the Royal Society. Lismore Castle is a private residence today, but its gardens are open in summer. In Dublin, a monument in St. Patrick's Cathedral includes Robert as an infant among the family statues.

In central Ireland, William Parsons, the Earl of Ross, born in 1800, arranged for the world's largest telescope of the day to be built at his estate at Birr about 80 km southwest of Dublin in 1845. Using its optically superior 6-foot mirror and 56-foot tube, he is credited as the first to describe a spiral nebula. Parsons' creation remained the largest telescope in the world for the next 75 years, and astronomers came from around the world to use it. A small museum is maintained now at his castle in Birr.

A contemporary of Parsons was William Rowan Hamilton, born in 1805, whose work in statistical mechanics is acknowledged to form the basis for future understanding of particle physics and quantum mechanics. At Trinity College in Dublin, he was appointed a professor of astronomy upon graduation and conceived his general equation of motion for assemblies of many particles at age 23. Dublin lore has it that he developed his next great contribution to science—a general mathematical function for quaternion—while walking on the tow path along the Royal Canal of the River Liffey between his office at Dunsink Observatory and Brougham Bridge. Today a plaque on the bridge marks the site where Hamilton is said to have scratched the formula into a stone. A city bus will drop the scientific traveler at the bridge on Broombridge Road to see it, or it is also accessible by walking the tow path along with Royal Canal.

In modern times, historians attribute Eamon de Valera, one of the Irish Republic's first prime ministers and a lover of mathematics and physics, with setting up an Institute for Advanced Studies to attract scientists from Europe as World War II broke

## 27 YEARS AGO IN THE NEWSLETTER

The *Bioelectromagnetics Society Newsletters* of March and April, 1979, featured biographical sketches of members **Carl Blackman** of the U.S. Environmental Protection Agency's Health Effects Research Laboratory in North Carolina, and Board member **Rochelle Medici**, an experimental psychologist from the University of Minnesota, whose work in operant reinforcement of autonomic responses was recognized as an important early study in biofeedback research.

In the March "Lab Notes" feature, **Howard Bassen** of the Bureau of Radiological Health at the U.S. FDA contributed a report on a new miniaturized implantable electric field probe developed by the Narda Microwave Corp. Its primary features were a small tip (1 mm x 2 mm including insulation) and optimized sensitivity, achieved through the use of a specially-selected Schottky diode whose parameters match those of the 1.5 mm-long dipole antenna.

Newsletter Editor **Tom Rozzell** also noted the death of **Georges R.M. Verfaillie** of the Commission of European Communities, Belgium, one of the first members of BEMS. Readers also learned that the **BEMS Board** would propose to amend the BEMS Constitution to allow mail-in balloting for Society elections in preparation for the first annual Business Meeting in June 1979 in Seattle.

The big news, however, was that the Society signed a contract with Alan R. Liss, Inc., for publication of its journal, *Bioelectromagnetics*. **Elliott Postow** of the U.S. National Naval Medical Center was named the first editor. Members of the journal's first Editorial Board were **W. Ross Adey**, USA; **Ehud Ben-Hur**, Israel; **Edward H. Grant**, UK; **Don R. Justesen**, USA; **Sol M. Michaelson**, USA; **Stanislaw Szmigielski**, Poland; **Harry M. Assenheim**, USA; **Annette Duchene**, France; **George M. Hahn**, USA; **James C. Lin**, USA; **Richard D. Philips**, USA; **Anthony R. Valentino**, USA; **Peter Wiessglass**, Sweden; **C. Andrew L. Bassett**, USA; **Om P. Gandhi**, USA; **William T. Ham**, USA; **Richard L. Lovely**, USA; **George A. Sacher**, USA, and **W. A. Geoffrey Voss**, Canada.

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## "EARLY VIEW" AVAILABLE IN BIOELECTROMAGNETICS

Subscribers to the Society's journal, *Bioelectromagnetics*, now have access to full text articles appearing in the coming issue which have not yet been mailed in hard copy. Simply visit <http://www3.interscience.wiley.com/cgi-bin/jhome/34135> and click on "Early View." This is available to current subscribers with a user name and password established for online access. Those using an institutional subscription should contact the librarian or other person who set it up.

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out in the 1930s. The Austrian physicist Schrödinger did come to Dublin to work at the Institute in 1940. Schrödinger, who had won the Nobel Prize in 1933, settled in Merrion Square. Today a plaque at #65 notes that he lectured at Trinity College and continued his studies as a Dubliner until 1956.

— based on *The Scientific Traveler*, by Charles Tanford and Jacqueline Reynolds. New York, 1992 John Wiley & Sons.

## U.S. AIR FORCE AGAIN WILL HOST A PRE-BEMS WORKSHOP

The U.S. Air Force Workshop preceding BioEM 2005 in Dublin will be held from 2–4 p.m. Sunday, June 19 in the John Henry Newman Building, University College Dublin. It will focus on the use of molecular biology to identify changes in genes and proteins that may lead to physiological, pathological, or behavioral events.

Research techniques, such as genomic and proteomic assays should be used to identify changes in gene and protein expression, but should not be construed as providing conclusive data that indicate beneficial or adverse health effects. These assays should be used to help the bioelectromagnetics community make hypotheses as to the physiology, pathology, or behavior that might be expressed. Laboratory experiments must then be conducted to determine the validity of these hypotheses. Understanding the influence of early mediators on physiology, pathology, or behavior will enhance our understanding of the bioeffects of exposure to electromagnetic fields.

Scientists interested in providing brief presentations during the Air Force Workshop should contact Dr. Patrick Mason by telephone at +1 (210) 536-2362 or by e-mail: Patrick.Mason@brooks.af.mil

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## ICES SETS DUBLIN SCHEDULE

Chairman Ron Petersen of the IEEE International Committee on Electromagnetic Safety (ICES), has announced that meetings of ICES/SCC-28 and its Subcommittees will be held on June 24 to 26, 2005, at Dublin Castle, immediately after BioEM 2005, the EBEA and BEMS joint meeting. This is not the same location at which the BioEM 2005 meetings are being held. The first of the ICES scheduled events will be a C95.6 short-course, which will be held Thursday, June 23. For more information, contact ICES SC-3 co-chairs Phillip Chadwick at phil.chadwick@mcluk.org, Thanh Dovan at tdovan@spipowernet.com.au, or visit the ICES website at <http://grouper.ieee.org/groups/scc28/SCC>.

ICES Subcommittees are tentatively scheduled to meet as follows: SC-2 on June 24, 1-5 p.m.; SC-4 on June 25, 9 a.m.–noon and 1–5 p.m.; SC-3 on June 26, 9 a.m.–noon; ICES SCC-28 on June 26, 1–5 p.m.; SCC-34 on June 27, 9 a.m.–noon and with SC-2, 1–5 p.m. Information contacts: R. C. Petersen, ICES Chairman: r.c.petersen@ieee.org or Dr. Ralf Bodemann, ICES Vice-Chairman: ralf.bodemann@siemens.com

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## PAVE PAWS, Continued

the upper Cape as well as specific cancers.” Barnes et al. note that an epidemiologic investigation is currently being conducted by the International Epidemiology Institute, but data from that study was not available to review for the NAS report.

Future studies should be undertaken, the NAS panelists recommend, and they include some quite specific suggestions. For more details, see the 8-page Executive Summary available at <http://books.nap.edu/catalog/11205.html>

## CALENDAR

**May 16–18, 2005. ElectroMed 2005.** Fourth International Symposium on Nonthermal Medical/Biological Treatments Using Electromagnetic Fields and Ionized Gases. Portland, Oregon, USA. Contact: [info@electromed2005.com](mailto:info@electromed2005.com) or see [www.electromed2005.com](http://www.electromed2005.com)

**June 15–16, 2005. WHO Meeting on Base Stations & Wireless Networks: Exposure and health consequences. Closed Working Group meeting June 17.** WHO, Geneva, SWITZERLAND. Topics will include possible health consequences from exposure to mobile phone base stations (including micro and pico cells), WiFi networks now common in airports and cafes, future technologies and public risk communication. Watch [www.who.int/peh-emf/](http://www.who.int/peh-emf/) “Events” for details, or contact: The WHO International EMF Project, [emfproject@who.int](mailto:emfproject@who.int)

**June 19–24, 2005. Bioelectromagnetics 2005. Joint meeting of the European BioElectromagnetics Association (EBEA), BEMS.** University College Dublin, IRELAND. Technical Program Co-chairs are Stefan Engström and Kjell Hansson Mild. Contact: BEMS Executive Director Gloria Parsley, 2412 Cobblestone Way, Frederick, MD 21702-2626 USA. Tel. +1 (301) 663-4252; FAX: +1 (301) 694-4948. E-mail: [bemsoffice@aol.com](mailto:bemsoffice@aol.com) See: [www.bioelectromagnetics2005.org](http://www.bioelectromagnetics2005.org)

**June 19–25, 2005. The XVIII International Symposium on Bioelectrochemistry and Bioenergetics.** Coimbra, PORTUGAL. Early registration with reduced fee deadline is May 31, 2005. For more information see: [www.bes-ise-2005.uc.pt/](http://www.bes-ise-2005.uc.pt/)

**July 1–4, 2005. CEFBIOS 2005—Coherence and Electromagnetic Fields in Biological Systems.** Prague, Czech Republic. Contact: Jiri Pokorny, Institute of Radio Engineering and Electronics, Academy of Sciences, Chaberska 57, CZ 182 51 Praha 8, CZECH REPUBLIC. Tel.: 00420 266773432; Fax: 00420 284680222. E-mail: [pokorny@ure.cas.cz](mailto:pokorny@ure.cas.cz) See: [www.ure.cas.cz/events/cefbios2005/](http://www.ure.cas.cz/events/cefbios2005/)

**July 11–13, 2005. WHO International EMF Project Workshop: Applying precautionary measures to EMF public health policy.** Ottawa, CANADA. Topics include a detailed review of the proposed WHO Precautionary Framework, and providing an opportunity for discussion on its practical application and case studies Contact: [emfproject@who.int](mailto:emfproject@who.int) or see [www.who.int/peh-emf/](http://www.who.int/peh-emf/) “Events”

**September 12–16, 2005. The 4th International Seminar on Electromagnetic Fields and Biological Effects.** The Golden Dragon Hotel, Kunming, CHINA. Official language is English. Topics to include laboratory studies, bioeffects and health, standards, modeling, dosimetry, occupational exposure, epidemiology, therapeutic applications, biophysical mechanisms and more. Lodging details at [www.dghotel.com.cn](http://www.dghotel.com.cn) Contact Organizing Committee by e-mail: [guozhengg@hotmail.com](mailto:guozhengg@hotmail.com); [dingzhao@fmmu.edu.cn](mailto:dingzhao@fmmu.edu.cn); [jingli@fmmu.edu.cn](mailto:jingli@fmmu.edu.cn) or: Prof. Guozheng Guo, Director, Department of Radiation Medicine, Fourth Military Medical University, Xian 710032, CHINA. Tel: +86-29-83374873. Fax: +86-29-83374873.

*Calendar continued on p12*

**September 19–21, 2005. ICNIRP Dosimetry Workshop.** Nuremberg, GERMANY. Watch [www.icnirp.org](http://www.icnirp.org) for details.

**September 26–30, 2005. South American Regional meeting on Health Effects of EMF Fields.** Location to be announced in BRAZIL. Topics to include review of evidence for possible health effects of RF fields, use of precaution and risk communication to the public. Watch [www.who.int/peh-emf/](http://www.who.int/peh-emf/) “Events” for details, or contact: The WHO International EMF Project, [emfproject@who.int](mailto:emfproject@who.int)

**October 1–8, 2005 [Exact dates to be determined]. Bioelectromagnetics School at Erice.** Sicily, ITALY. A new course of the EBEA school in Erice is in preparation, on the topic of genotoxicity. Watch [www.ebea.org](http://www.ebea.org) for more information.

**October 3–4, 2005. COST281 Workshop and Management Committee Meeting.** Trondheim, NORWAY. Technical topics are expected to include electromagnetic influences on pregnant women and health assessment of special communication signals such as TETRA. Watch for further details in the “Events” section at [www.cost281.org](http://www.cost281.org)

**November 14–18, 2005. WHO and the Australian Radiation Protection Society Workshop.** Melbourne, AUSTRALIA. Topics to include review of evidence for possible health effects of RF fields, use of precaution and risk communication to the public. Watch [www.who.int/peh-emf/](http://www.who.int/peh-emf/) “Events” for details, or contact: The WHO International EMF Project, [emfproject@who.int](mailto:emfproject@who.int)

**October 30–November 1, 2005. Workshop on Application of Proteomics and Transcriptomics in EMF Research.** Helsinki, FINLAND. Topics include use of the high-throughput screening techniques of proteomics and transcriptomics as an approach to determine all possible biological targets of EMF on the sub-cellular level. See: [www.who.int/peh-emf/meetings/proteomics\\_helsinki05/en/](http://www.who.int/peh-emf/meetings/proteomics_helsinki05/en/)

**April 27–29, 2006. Conference on Electromagnetic Fields, Health and Environment—EHE06.** The Savoy Madeira Resort Hotel, Madeira, PORTUGAL. Call for Papers may be downloaded in pdf format at [www.apdee.org/ehe06](http://www.apdee.org/ehe06) Contact: [ehe06-secretariado@apdee.org](mailto:ehe06-secretariado@apdee.org) or watch [www.apdee.org/ehe06](http://www.apdee.org/ehe06)

**May 15 to 19, 2006: Paris: Second European IRPA Congress.** Organised by the French Society for Radiation Protection (SFRP), the Congress is a global forum on the radiological protection field. It offers an opportunity to debate all subjects which will determine the future of the speciality, including exposure control, the evolution of radiological protection, protection against non-ionising radiation and participation of the public. See: <http://www.sfrp.asso.fr/>

**September 3–8, 2006. Bioelectrochemistry Gordon Research Conference.** Contact: Richard Nuccitelli, Center for Bioelectrics, 830 Southampton Ave., Suite 5100 Norfolk, VA 23510 USA. Tel: +1 757 683 2405. Mobile: +1 757 613 2619. Fax: +1 757 314 2397. E-mail: [rnuccite@odu.edu](mailto:rnuccite@odu.edu) OR [Justin.Teissier@ipbs.fr](mailto:Justin.Teissier@ipbs.fr) OR [a.m.rajnicek@abdn.ac.uk](mailto:a.m.rajnicek@abdn.ac.uk)

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