

# Nuclear & Plasma Sciences

Number 1 • March 2008

SOCIETY NEWS

## CONFERENCES

### The 35th IEEE International Conference on Plasma Science ICOPS 2008 Karlsruhe, Germany, 15-19 June 2008 [www.fzk.de/icops2008](http://www.fzk.de/icops2008)

We cordially invite you to attend the 35th IEEE International Conference on Plasma Science, sponsored by the Plasma Science and Applications Committee of the IEEE Nuclear and Plasma Sciences Society. ICOPS 2008 will be held in Karlsruhe, Germany from June 15 through 19, 2008. The conference venue is the Congress Center Karlsruhe located near the Baroque Palace in the center of Karlsruhe.

ICOPS 2008 will feature an exciting technical program with reports from around the globe about new and innovative developments in the fields of plasma science and engineering. Leading researchers will gather to explore basic plasma physics, high-energy-density plasmas, inertial-confinement fusion, magnetic fusion, plasma diagnostics, pulsed-power plasmas, microwave generation, lighting, micro- and nano-applications, medical applications and plasma processing.

Conference Topics will be organized under the following categories:

- Basic Processes in Fully and Partially Ionized Plasmas

- Microwave Generation and Plasma Interactions
- Charged Particle Beams and Sources
- High Energy Density Plasmas Applications
- Industrial, Commercial and Medical Plasma Applications
- Plasma Diagnostics
- Pulsed Power and Other Plasma Applications

The conference will include seven plenary talks relevant to the plasma physics community given by recognized leaders in their fields as well as oral and poster sessions. In addition, a special minicourse featuring Microwave Processing of Materials will be held as part of the conference on the 19th and 20th June.

We intend to ensure that the Technical Program of ICOPS 2008 and your stay in the Karlsruhe area will be rewarding and enjoyable. We look forward to welcoming you at the Congress Center Karlsruhe, Germany, June 15-19, 2008.

Manfred Thumm Chair, ICOPS 2008

Hansjoachim Bluhm Co-Chair, ICOPS 2008

*continued on page 3*



**Manfred Thumm**  
Chair



**Hansjoachim Bluhm**  
Co-Chair



**Georg Müller**  
Finance Chair



**Gabriela Bertsch**



**Martina Huber**  
Conference Coordinators

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Publicity releases for forthcoming meetings, items of interest from local chapters, committee reports, announcements, awards, or other materials requiring society publicity or relevant to NPSS should be submitted to the Newsletter Editor by March 10, 2008 for publication in the June 2008 Newsletter.

### CONTRIBUTED ARTICLES

News articles are actively solicited from contributing editors, particularly related to important R&D activities, significant industrial applications, early reports on technical breakthroughs, accomplishments at the big laboratories and similar subjects.

The various Transactions, of course, deal with formal treatment in depth of technical subjects. News articles should have an element of general interest or contribute to a general understanding of technical problems or fields of technical interest or could be assessments of important ongoing technical endeavors.

Advice on possible authors or offers of such articles are invited by the editor.

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For more information contact [icops2008@fzk.de](mailto:icops2008@fzk.de) or visit our website at [www.fzk.de/icops2008](http://www.fzk.de/icops2008).

### CONFERENCE LOCATION

The conference site, the Congress Center Karlsruhe, is located near the Baroque Palace in the center of Karlsruhe, Germany. Karlsruhe is a hospitable city, in the State of Baden-Württemberg, beautifully located in the upper Rhine valley between the wooded mountains of the Black Forest, the vineyards of the Palatinate (Pfalz), and the Vosges in France with a mild climate. Heinrich Hertz conceived and performed his brilliant fundamental experiments confirming Maxwell's theory at the University of Karlsruhe (1886-1888). The University of Karlsruhe has close scientific and academic relations to the Research Center Karlsruhe (Forschungszentrum Karlsruhe) with the aim of founding the Karlsruhe Institute of Technology (KIT).

Karlsruhe has approximately 300,000 inhabitants, and 200,000 of them only came to the city during the last century. The city was founded when Margrave Karl Wilhelm built his palace here in 1715. His tomb on the market square is roofed with a large vaulted stone pyramid which is now Karlsruhe's emblem. From the palace, the streets of the inner city fan out with the palace tower – which can be climbed – as their focal point. It was the intention of its founding father that the palace should be visible from any point in the city.

Karlsruhe has plenty to offer: – from its Elite University (TH) to the Research Center with the Karlsruhe Institute of Technology, the ZKM or the Art Gallery: Architecture, art, universities and colleges, future technologies, music, restaurants and a delight in just being alive all combine to make an impressive whole. Karlsruhe is blessed by the sun which you can enjoy in the palace gardens or in one of the innumerable beer gardens.

Karlsruhe is an inviting place to visit. The city with its radial layout features an interesting and unique connection of technology, art, education and culture. Enjoy the extensive cultural and gastronomic offerings in the second warmest city of Germany.

### ICOPS 2008 TECHNICAL PROGRAM

- **Basic Processes in Fully and Partially Ionized Plasmas**
  - Basic Phenomena
  - Computational Plasma Physics

- Space Plasmas
- Partially Ionized Plasmas
- Dusty Plasmas

- **Microwave Generation and Plasma Interactions**

- Intense Beam Microwave Generation
- Fast-Wave Devices
- Slow-Wave Devices
- Vacuum Microelectronics
- Codes and Modelling
- Non-Fusion Microwave Systems
- Microwave Plasma Interaction

- **Charged Particle Beams and Sources**

- Plasma, Ion and Electron Sources
- Intense Electron and Ion Beams

- **High Energy Density Plasma Applications**
  - Fusion (Inertial, Magnetic and Alternate Concepts)

- Particle Acceleration with Laser and Beams
- Radiation Physics
- High Energy Density Matter
- Laser Produced Plasmas
- Fast Z-Pinches, X-Ray Lasers

- **Industrial, Commercial and Medical Plasma Applications**

- Nonequilibrium Plasma Applications
- High-pressure and Thermal Plasma Processing
- Plasma Thrusters
- Plasmas for Lighting
- Flat-Panel Displays
- Medical, Biological and Environmental Applications

- **Plasma Diagnostics**

- Optical and X-Ray Diagnostics
- Microwave and FIR Diagnostics
- Particle Diagnostics

- **Pulsed Power and Other Plasma Applications**

- Insulation and Dielectric Breakdown
- Switching
- Plasma Lasers
- Compact Pulsed Power and Applications

### MINICOURSE

Microwave Processing of Materials: Industrial microwave systems, Waveguides and transmission devices, Avionic and automotive applications, Microwave Chemistry, Sintering of Materials, Plasma and Nanomaterials Applications, Dielectric Measurements, Electromagnetic Modelling and Simulation.

A special two-day minicourse will be offered on Thursday and Friday, 19 and 20 June, at

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## Take my word

It is better to debate a question without settling it than to settle it without debate.

*Joseph Joubert*

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## Survival of what?

It is true that we are weak and sick and ugly and quarrelsome but if that is all we ever were, we would millenniums ago have disappeared from the face of the Earth.

*John Steinbeck*

## Don't cloud the issue

A fanatic is one who can't change his mind and won't change the subject.

Winston Churchill

the end of the ICOPS 2008 conference at the Congress Center Karlsruhe. The course will tackle issues relevant in modern industry and research in the field of Microwave Processing of Materials. The instructors are highly accomplished microwave research experts from industry, national laboratories, and universities who will relate their knowledge in the areas of high performance materials used in automotive, aerospace, electronic and medical applications, chemical industry, and environmental technologies.

Industrial process engineers, graduate students and scientists researching the area of Microwave Processing or anyone wishing to augment their knowledge in these areas is encouraged to attend.

### **SOCIAL EVENTS AND COMPANION ACTIVITIES**

There will be a welcome reception on Sunday evening, 15 June in the Congress Center

Karlsruhe. On Monday evening, 16 June there will be a reception by the mayor at the City Hall in Karlsruhe and the Conference Banquet will be held Wednesday evening, 18 June.

In addition, a Wine Tasting Evening will be organized on the evening of Tuesday, 17 June.

Tours for companions: an historical walk in Karlsruhe, sightseeing in Speyer and a Heidelberg tour will be organized.

### **GENERAL INFORMATION**

Information related to abstract submission, conference registration, hotel reservation and minicourse registration can all be found on the ICOPS 2008 website [www.fzk.de/icops2008](http://www.fzk.de/icops2008)

*Questions regarding the technical program should be addressed to Manfred Thumm ([manfred.thumm@ihm.fzk.de](mailto:manfred.thumm@ihm.fzk.de)). Any other questions should be emailed to [icops2008@fzk.de](mailto:icops2008@fzk.de).*

## NUCLEAR AND SPACE RADIATION EFFECTS

JULY 14 – 18, 2008

Tucson, Arizona



**Teresa Farris**  
Radiation Effects  
Publicity Chair

### **2008 IEEE NSREC WILL VISIT TUCSON**

The 2008 IEEE Nuclear and Space Radiation Effects Conference will be held July 14-18, 2008 at the JW Marriott Starr Pass Resort & Spa in Tucson, Arizona. The conference features a technical program consisting of nine sessions of contributed papers (both oral and poster) that describe the latest observations and research results in radiation effects, an up-to-date short course offered on July 14, a radiation effects data workshop, and an industrial exhibit.

The newly built Starr Pass Resort enjoys an amazing location amidst the saguaro cactus forest of Tucson Mountain Park. Conference chairman Paul Dodd of Sandia National Laboratories and his conference committee are planning a full technical and social program to maximize opportunities for information exchange and networking in the area of radiation effects on microelectronic and photonic devices, circuits, and systems.

Supporters of the conference include the Defense Threat Reduction Agency, Air Force Research Laboratory, Sandia National Laboratories, the NASA Electronic Parts and

Packaging Program, Jet Propulsion Laboratory, Micro-RDC, BAE Systems, Northrop Grumman, and Aeroflex Colorado Springs.

### **TECHNICAL PROGRAM**

Nick van Vonno, consultant with Intersil, is serving as the Technical Program Chairman, and with the support of the technical committee is assembling an outstanding technical program. The session chairs for 2008 include both highly experienced members of the radiation effects community, as well as emerging technical leaders. Three exciting invited presentations of interest to attendees and their companions have been arranged.

The technical committee will meet in the spring of 2008 for final paper selection. The oral presentations and posters will be selected based on a peer-review process in order to present the very latest and best information on radiation effects findings. Although the deadline for submitting summaries has passed (February 2008), a few late-news papers describing new, unpublished results will be accepted and will be presented in the poster session. The deadline for submission of late-



news papers is June 1, 2008. Please submit late-news summaries, using the 4-page summary and 35-word abstract format described at [www.nsrec.com](http://www.nsrec.com).

The technical committee is composed of the conference technical session chairs and the chairs for the Poster Session and the Radiation Effects Data Workshop. Jeff Titus, NAVSEA/Crane, is the chair of the Poster Session, and Jim Felix of Sandia National Laboratories is the chair for the Radiation Effects Data Workshop. The Technical Session chairs are:

#### **Basic Mechanisms of Radiation Effects**

Robert Weller

#### **SEE - Mechanisms and Modeling**

Dale McMorow

#### **SEE - Devices and ICs**

Philippe Paillet

#### **Radiation Environments**

Janet Barth

#### **Hardness Assurance**

Andrew Chugg

#### **Dosimetry and Facilities**

Henry Clark

#### **Hardness By Design**

Nathan Nowlin

#### **Radiation Effects in Devices and ICs**

Ray Ladbury

#### **Photonics**

Scott Messenger

#### **RADIATION EFFECTS DATA WORKSHOP**

The Radiation Effects Data Workshop is a forum for the presentation of radiation effects data on electronic devices and systems. Workshop papers are intended to provide radiation response data to scientists and engineers who use electronic devices in a radiation environment, and for designers of radiation-hardened or radiation-tolerant systems. Papers describing new simulation facilities are also welcomed.

#### **SHORT COURSE**

Attendees will have the opportunity to participate in a one-day Short Course on Monday, July 14. The theme for the 2008 short course is: "Soft Errors: From the Ground Up" and is being organized by Jeff Black of Vanderbilt University. Planned topics include: "Basic Mechanisms for Soft Errors" by Robert Reed, "Ground-Based Evaluation of Soft Errors" by Craig Hafer, "Soft Error Results Analysis and Error Rate Prediction" by Ed Petersen, and case studies on "Soft Errors in Memory

Devices in Space Environments" by Joe Benedetto and "Soft Errors in a Medical Device" by Jeff Wilkinson. The course will be of interest both to radiation effects specialists and newcomers to the field.

#### **SOCIAL PROGRAM**

Bill Heidergott of General Dynamics, Local Arrangements Chairman, is planning an exciting social program to enhance the informal exchange of ideas and the networking among attendees, and provide engaging events for companions and family members not attending the technical sessions. The companion events will capitalize on the rich cultural and historical diversity of the Tucson area. On Wednesday evening, the main conference social is planned for the unique Pima Air and Space Museum.

#### **INDUSTRIAL EXHIBIT**

An Industrial Exhibit, coordinated by John Jewell of Sandia National Laboratories, will be included as an integral part of the conference. The exhibit, held on Tuesday and Wednesday, will include exhibits from 35-40 exhibitors that represent companies or agencies involved in manufacturing electronic devices or systems for applications in space or nuclear environments, modeling and analysis of radiation effects at the device and system level, and radiation testing. If you wish to exhibit please visit [www.nsrec.com](http://www.nsrec.com) to obtain exhibitor information.

#### **2008 HOTEL INFORMATION**

The NSREC 2008 Conference Hotel "Block of Rooms" is open at the JW Marriott Starr Pass Resort & Spa for the July 14-18 conference. The "Room Block" extends from the nights of July 12 through July 19. Corporate and government rooms are available at special conference rates. Government rate reservations will require authorized travel orders or equivalent documentation to be presented at the time of check-in.

The conference-negotiated room rates will be available until June 19, 2008 or the block is sold out (whichever comes first). Please visit the [www.nsrec.com](http://www.nsrec.com) to obtain all the information for booking your NSREC reservation.

#### **CONFERENCE COMMITTEE**

*General Chair*

Paul E. Dodd

Sandia National Laboratories

505-844-1447

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## Who would have thought?

Ours is the age which is proud of machines that think, and suspicious of men who try to.

*Howard Mumford Jones*

---

## Free trade

They wanted something for nothing. I gave them nothing for something.

*J.R. "Yellow Kid" Weil*

## All in the family

Intellectuals are like the Mafia. They only kill their own.

## Woody Allen

### Technical Program

Nick van Vonno  
Consultant/Intersil  
321-255-2791

### Local Arrangements

Bill Heidergott  
General Dynamics  
480-441-4598

### Short Course

Jeff Black  
Vanderbilt/ISDE  
615-322-3758

### Publicity

Teresa Farris  
Aeroflex Colorado Springs  
719-594-8035

### Finance

Gary Lum  
Lockheed Martin  
408-756-0129

### Awards

Mike Xapsos  
NASA/GSFC  
301-286-2263

### Industrial Exhibits

John Jewell  
Sandia National Laboratories  
505-797-8846

### Poster Chair

Jeff Titus  
NAVSEA/Crane  
812-854-1617

### Data Workshop Chair

Jim Felix  
Sandia National Laboratories  
505-844-6132

Contact Teresa Farris for additional information at the phone number above, or by E-mail at [teresa.farris@aeroflex.com](mailto:teresa.farris@aeroflex.com)

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# 2008 IEEE NUCLEAR SCIENCE SYMPOSIUM and MEDICAL IMAGING CONFERENCE and

16th International Workshop on Room Temperature  
Semiconductor X-Ray and Gamma-Ray Detectors  
Dresden, Germany  
19-25 October 2008

**DEADLINE FOR ABSTRACT SUBMISSION: 9 May 2008**  
Conference web site: [www.nss-mic.org/2008](http://www.nss-mic.org/2008)  
Conference email: [nssmic2008@fzd.de](mailto:nssmic2008@fzd.de)



**Uwe Bratzler**  
General Chair,  
NSS/MIC 2008

After the very successful 2007 IEEE NSS/MIC in Honolulu, Hawaii, the organization of the 2008 IEEE Nuclear Science Symposium (NSS) and Medical Imaging Conference (MIC) and 16th international workshop on Room Temperature Semiconductor X-Ray and Gamma-Ray Detectors (RTSD) - to be held in Dresden, Germany, 19-25 October 2008 - is in full swing. In addition to the events in Dresden, there will be two satellite workshops held else-

where in Germany; one (NSS topic) will be held at DESY in Hamburg before the conference (16-17 October) and the second (MIC topic) at Research Center Jülich (Forschungszentrum Jülich, FZJ) after the conference (27-28 October). Both satellite workshops have NPSS technical cosponsorship and all conference participants are welcomed and encouraged to participate in these events. Please see our website for more information.

An outstanding Conference Companion

Program has been planned to visit many of the famous and more interesting sites in Dresden and its beautiful surroundings.

The venue of the conference will be the International Congress Center Dresden (ICCD) and the adjacent Maritim Hotel. The ICCD is located at the banks of the Elbe river and is within easy walking distance of Dresden's main attractions in the beautiful and historic city center, with numerous restaurants and tourist attractions. A number of additional hotels are under contract, offering a variety of accommodations in a wide price range. Dresden has an excellent public transportation system. However, many hotels are an easy walk to the ICCD. We encourage you to register early and to reserve your hotel.

This is the third time the NSS/MIC will be held in Europe, each time with increasing

attendance. We expect 2000 scientists and engineers in Dresden.

There will be both an extensive short-course program and workshops. A commercial exhibit, accompanied by Industrial Seminars, featuring state-of-the-art products and services from a wide range of vendors will take place during the main part of the meeting.

The organizing committee, our local hosts at the Forschungszentrum Dresden-Rossendorf and I welcome you warmly to participate in this major event of our Society. We look forward to welcoming you to Germany and to Dresden in October this year.

*For further information contact the General Chair: Uwe Bratzler, CERN and TMU Physics Department, 1211 Geneva 23, Switzerland; E-mail: uwe.bratzler@cern.ch; Phone: +41 22 767 1309; Fax: +41 22 766. 8618*

**Do as I say...**

To be good is noble; to teach others to be good is nobler, and no trouble.

*Mark Twain*

## NPSS GENERAL BUSINESS

### PRESIDENT'S REPORT

With the New Year come changes at NPSS. We welcome our newly elected AdCom members whose brief biographies can be found in this issue. We also welcome a couple of Technical Committee Chairs: Edl Schamilaglu and Charles Watson. Unfortunately, we also say "au revoir" to an equal number of what are now old friends. I heartily thank Steven Gold, Allan Johnston, Charles Neumeyer, Gerry Cooperstein and Tom Llewellyn for their exceptional service to our community. You may have noticed that the number of incoming is larger than the number of outgoing by the number one. This is because my term as an elected AdCom member has now expired.

I am reminded of how little I knew about the structure and organization of NPSS when I went to my first AdCom meeting in 2004. AdCom is comprised of Officers, elected AdCom members, Technical Committee Chairs and Functional and Appointive Committee Chairs. There are both voting and nonvoting members of AdCom.

NPSS represents eight technical communities, referred to as Technical Committees (TCs), of which you, as a member, are part of at least one. Each TC is represented by its Chair and its elected members. Only elected members are eligible to run for President. The

distribution of elected members is based on the size of the technical community and each TC organizes at least one conference. The Technical Committee reports, as well as contact information for the Chairs who have submitted reports, can be found in this issue. A full list appears on the back cover.

To help run the Society, the NPSS has officers, some of whom are elected by AdCom such as the President, Vice-President and Past President. The duties of the President are to preside over AdCom as well as represent the Society to the IEEE Technical Activities Board (TAB). TAB is comprised of 39 different societies and its own governing board. This year's NPSS Vice President (and next year's President!) is Craig Woody. The Past President is, of course, Bill Moses. The appointive Officer positions are Secretary and Treasurer. NPSS is fortunate to have extraordinarily capable and long-serving officers in Albe Larsen, Ed Lampo and Tony Lavieties, who among other duties, serves as NPSS Conferences Treasurer. It is also noteworthy that of the six NPSS Officers, five Technical Committees are represented.

The real "business" of NPSS is handled by the Functional and Appointive Committees. Two of these are "ex-officio" and filled by the two most recent Past Presidents. Others are appointed committees of various sizes to meet specific needs such



**Jane Lehr**  
NPSS President

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## Where parents come in

Being young is not having any money; being young is not minding not having any money.

*Katharine Whitehorn*

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## Off-limits

Gentlemen, you can't fight here - this is the war room.

*Dr. Strangelove*

as Finance, Fellow Evaluation, Conference Policy, Communications, Nominations and Standards. Other Functional Committees are Membership and the newly formed Committee on Chapters, Local Activities and Distinguished Lecturers. Many of these committees also act as Liaisons to the IEEE TAB counterpart committees or coordinate numerous related activities. For instance, the Publications Committee Chair represents each of our publications to TAB including the fully sponsored publications *Transactions on Nuclear Science*, *Transactions on Plasma Science* and the *Newsletter*, as well as the publications we co-sponsor with other IEEE Societies, the *IEEE Transactions on Medical Imaging* and the *IEEE Sensor Journal*.

The other type of appointed position is "liaison" which represents NPSS to various entities, not all of which are related to IEEE, but in which we have a stake. An example is our relationship with the Coalition on Plasma Sciences ([www.plasmacoalition.org](http://www.plasmacoalition.org)), an independent organization whose mission is to increase awareness and understanding of the plasma sciences and their many applications and benefits for society. Another example is the RADECS conference, a radiation effects conference traditionally held in Europe, with which NPSS has no formal relationship, but has formed an alliance of shared interest. Not all of our liaison positions encompass technical interests. For instance, we have very active liaisons to the IEEE USA R&D Policy Committee as well as to the Social Implications of Technology Society, neither of which are specific to NPSS, but which cut across all areas of IEEE activity.

Hopefully, the last bit of mystique regarding NPSS is the variety of our technical committees. When I first came to AdCom, I couldn't fathom what they had in common and made some inquiries. Kris Kristiansen, from Texas Tech University, told me how some researchers in the plasma sciences field were interested in forming a group within the IEEE and the Nuclear Sciences Group suggested they join together since both groups were relatively small and had so much in common.

That same year, 1972, the combined groups became the IEEE Nuclear and Plasma Sciences Society. With my current vantage point, I see not only all that we have in common, but that the interests of our technical committees truly form a spectrum and that spectrum is reflected throughout the NPSS leadership.

Many of these positions are filled by Past Presidents of NPSS, a fact that continues to truly impress me. Ron Jaszczak is an elected AdCom representative from Medical Imaging and one of our representatives to the *Transactions on Medical Imaging* editorial board. Peter Winokur chairs the Awards Committee and the Fellow Evaluation Committee. Bill Moses is the Nominations Chair and Peter Clout works tirelessly as the on the Communications Committee. Ray Larsen is in charge of Meetings, Policies and Procedures, liaison to the Social Implications of Society and has just accepted another role as to represent NPSS in the Humanitarian Technology Challenge, a newly initiated collaboration between IEEE and the United Nations. Another Past President, Hal Flescher, is the 2008 IEEE Vice-President Elect for Technical Activities, as well as our Finance Committee Chair.

I am very lucky to have such a cadre of talented, dedicated (and good-looking!) volunteers to run NPSS. It must be hard to get away though. I am "on the hook" for another 7 years. Even our departing elected AdCom members are not going far: Steve Gold has accepted the position of Chair of the Chapter and Distinguished Lecturer Program, Allan Johnston will remain as the NPSS liaison to the IEEE Women in Engineering Affinity Group and Charles Neumeyer will continue as Liaison the IEEE USA Energy Policy Committee and will be the General Chairman of the 2011 Symposium on Fusion Engineering.

*Jane Lebr, IEEE NPSS President, can be reached at Sandia National Laboratories, MS1152, PO Box 5800, Albuquerque, NM 87185-1193; Phone: +1 505 844 8554; E-mail: [jmlebr@sandia.gov](mailto:jmlebr@sandia.gov).*



## SECRETARY'S REPORT

The IEEE NPSS Administrative Committee (AdCom) held its annual meeting on November 3, 2007 at the Hilton Hawaiian Village, Honolulu, in conjunction with the NSS/MIC conference. NPSS continues to do well financially and is one of the most fiscally stable of IEEE societies. Closing conference budgets in a timely way remains an issue, and to any conference treasurer reading this, I urge you to talk with Ed Lampo or Tony Lavietes (e.lampo@ieee.org; lavietes1@llnl.gov) about closing your books even when the very last bills have not been paid. IEEE HQ can do this for you and we can avoid penalties and the wrath of the IEEE auditing accountants. New software is also in the works that should make conference budget preparation and tracking easier, and that should make reporting to IEEE much simpler. Stay tuned!

President Jane Lehr reported that TAB approved the formation of a Biometrics Council. At this time we are taking a watch what develops attitude. TAB is also starting to look outward after many years of having to deal with internal issues. There is also word that there may be a new terahertz journal as this is a growing field of activity.

Are you a member of IEEE who is eligible to become a senior member? If so, contact Rick Van Berg or Christoph Ilgner to advance your status (rick@hep.upenn.edu; christoph.ilgner@cern.ch). To become an IEEE Fellow it is necessary to be a senior member. There is also some thought of how to support conference chairs who have very big jobs. This may well be discussed at our retreat. There may also be discussion of further student scholarships and of an NPSS-related field award. That is being investigated.

### NEWS FROM TECHNICAL COMMITTEES

Most of the TC news has been reported in this or the September issue of the Newsletter and I won't repeat it here.

**CANPS:** The Executive Committee has added six members, two members have retired and a further six have been asked to resign or to resume activity. Of the 30 total, 14 are from North America, 12 from Europe, and 4 from Asia. It has been confirmed that the 2009 meeting will be held in Beijing, with an Asian

oversight committee. Portugal has been selected for the 2011 meeting. An annual ATCA workshop, to be held in conjunction with RT has been proposed and is being investigated. There is broad support from several communities.

**Fusion:** The Standing Committee has discussed inviting the fusion award winners to be plenary speakers at the conference following the award. There were five finalists for the student paper award, with four of the five from overseas. The 23rd and 24th SOFE conferences will collocate with ICOPS, in San Diego, June 1-4, 2009 and in Chicago, June 35-30 in 2011.

**Nuclear Medical and Imaging Science and Radiation Instrumentation** are the joint sponsors of NSS/MIC at which the Annual Meeting of AdCom is held. This 2007 meeting was highly successful with a large number of attendees rivaling Rome for the highest and with the highest abstract submittal ever, and with many more Asian attendees (21%) than usual – the goal of meeting in Hawaii. There were also many student travel grants, 116 for MIC and 147 for NSS. There is always a question of how student travel awards should be paid, governed at least in part by government agency regulations. Ed Lampo and Tony Lavietes will review these and develop a standard procedure for student travel awards. Some innovations included the very well received refresher courses and the increase in both the NSS and MIC programs. The 2008 meeting, in Dresden, is described above. The committee for 2009 in Orlando has been formed and is starting to plan for that meeting. The 2010 conference will be held in Knoxville, TN. Charles Watson is the new NMIS chair.

**Particle Accelerator Science and Technology:** The 2007 meeting was reported on in the September 2007 Newsletter. At that meeting, 245 individuals became IEEE members! The committee is introducing bylaws for the PAC OC and a constitution and bylaws for the PAST TC. PAC 2009 will be held in Vancouver in May and PAC 2011 will be in New York City in March. There will be a PAC



**Albe Dawson  
Larsen**  
*NPSS Secretary and  
Newsletter Editor*

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### Antacid, please

To expect others  
to help me think  
seems to me  
about like  
expecting them  
to help me digest  
my food.

*Eric Hoffer*

---

## Real-fi?

It is always science fiction up until the point when it happens.

*Robert Streffer*

in North America every 18 months to comply with the Europe/Asia/North America rotation that the international particle accelerator community requested. Every second PAC will be an IPAC. To control meeting proliferation, APS DPB will drop some of its meetings.

**Plasma Science and Applications:** The 2007 conference was reported in detail in the September Newsletter. As mentioned above, 2009 and 2011 will be held jointly with SOFE. In 2012 there will be the first ICOPs held in the UK, with the site to be decided. Candidates to date are Birmingham, Edinburgh and York.

**Pulsed Power:** The Pulsed Power conference for 2007 was held jointly with ICOPS as PPPS (see Sept. 2007 Newsletter). The 2009 Pulsed Power conference will be held in Washington, DC. In 2011 they will collocate in Chicago with ICOPS and SFE. The PPST TC has four new members, and three members have retired. Edl Schamiloglu is the new TC chair (see below for bio).

**Radiation Effects:** Although it was a tight deadline, the NSREC report appeared in the September Newsletter. Your Newsletter editor heartily recommends that every Technical Committee find a clone of Teresa Farris, the outstanding Radiation Effects publicity czarina, who always reports, and reports in a timely way! The 2008 meeting will be in July at the new J.W. Marriott Star Pass Resort in Tucson, AZ, the 2009 meeting in Quebec City at the Hilton, 2010 at the Adams Mark in Denver and 2011 will be at a site yet to be determined on the western side of North America. The RADECS meeting was held in Deauville, France with over 100 papers presented and over 300 attendees. Papers appear in TNS.

### **NEWS FROM FUNCTIONAL COMMITTEES AND LIAISONS**

The **Conference Policy Committee** met in Honolulu prior to the AdCom meeting. The Conference Policy Manual is meant to be a help to conference chairs and organizers. As IEEE is producing a new conference policy manual, the NPSS document will be brought in line with IEEE's manual. Both will reflect the internationalization of meetings. The new IEEE manual can be found at <http://www.ieee.org/web/conferences/mom/index.html>. All conference officers and committee chairs should read the appropriate

chapters. Many other useful documents are referenced and hyperlinked from this manual's on-line pages.

The **Awards Committee** has moved the deadline for Society Award nominations back to January 31, as noted in September. The goal is to make award decisions earlier so that awards can be presented in the year they are awarded, rather than in the following year. This reflects the change from presenting all Society awards at the NSS/MIC to allowing the recipients to receive awards in the community to which they belong. The TAB Awards and Recognition manual has been modified and has gone to TABARC for approval. The new manual can be found at [http://www.ieee.org/portal/cms\\_docs\\_iportals/iportals/volunteers/tab/TAB\\_Awards\\_and\\_Recognition\\_Manual.pdf](http://www.ieee.org/portal/cms_docs_iportals/iportals/volunteers/tab/TAB_Awards_and_Recognition_Manual.pdf). Our Society Award information has been brought up-to-date in the revision. The Awards committee is also looking at the dollar limits on awards and may propose some restructuring to bring us into alignment with professional societies such as APS and SPIE.

The **Membership Committee** has had good support and good results at the 2007 conferences, but the issue of member retention remains an important one. This will be examined this spring.

The **Chapters and Distinguished Lecturers Committee** supports 10 active Chapters. Chas Neumeyer has done heroic work in the revitalization of these activities. Sadly, he is stepping down and Steve Gold will take over and continue that work. There have been a number of Distinguished Lecturers giving presentations at Chapter meetings, but there remains ample room for growth. There are also rumors that several other chapters are in the formative state. Chas has been working on a guide for NPSS Chapter chairs to be a companion to the IEEE guide available on line.

A 2008 Class of Distinguished Lecturers is needed. These are appointments with no term limit but must be reappointed yearly.

The **Communication Committee** notes again the problems with shipping materials to conferences. Often brochures and leaflets sent for inclusion in conference briefcases are not included because of a communications gap between the chair and the staff doing work, or the delivery is misplaced. This is wasteful and expensive. Our web master also notes that our web site needs a face lift, and each technical

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## Believe me!

When bigotry is the dominant view, it sounds like self-evident truth.

*Harriet McBryde Johnson*

and functional committee should bring its content up to date to make the site more relevant and useful.

The **Fellow Candidate Evaluation Committee** reviewed 14 applications in 2007. The new Fellows are presented below, where their short biographies and the citations for their work appear. We are honored to have had six (43%) of our applicants elevated to Fellow. This speaks highly of the outstanding care our committee gives to its reviews and rankings. As is noted below, it isn't too early to start to think of the 2009 pool of Fellow candidates! Applications are due by March 1 and require considerable thought in preparation.

The **Nominations Committee** announced the newly elected AdCom Class of 2011: David Abe (PSA); Janet Barth (Radiation Effects); Hutch Nielson (Fusion); Dillon McDaniel (Pulsed Power); and Stefan Ritt (CANPS) completing a term ending in 2009 and eligible to stand for a full four-year term. Meet them in the articles below.

In 2008 we seek candidates from the NMIS, PSA and Transnational communities to fill seats that will be vacated at year's end.

The **Publications Committee** reports that TNS is in its third year of the new paradigm – editor-in-chief, senior editors and editors. There are two new associate editors for NSS, two for MIC and one for RT. The June 2008 issue will contain SCINT papers. Chuck Melcher is the editor. There is still pressure to get the Radiation Effects papers reviewed, edited and published in a more timely fashion. TPS will not accept papers presented in a conference record without significant paper revision. This is also an IEEE concern – that Conference record and reviewed papers published in Transactions should be recognizably different. There is a time problem with both authors and reviewers not returning papers in a timely way. IEEE has set guidelines and our journals meet them relatively well for regular issues, but less well for special issues. There is a constant demand for competent and on-time reviewers. Reviewing papers in your field is a great way to start getting active in the society!

The **Standards Committee** is making progress with new figures for the germanium standard, which is to be reissued. The committee needs more individuals willing to review standards. Contact Ron Keyser if you are interested.

The **Transnational Conference Liaison** is tracking our international conferences, their growth, their committee structure. They are also concerned with a new section of the NPSS Conference Policy document that provides guidance for hosting international conferences.

The **Transnational Committee** has extensive membership representing all regions and meets by teleconference. They did have an in-person meeting during the NSS/MIC and a meeting in Prague at the beginning of October to encourage eastern European attendance in Dresden and at our other conferences. For example, ICOPS will meet in Karlsruhe this year. They have a web master who works to keep their information up-to-date.

The liaison to the **Society for Social Implications of Technology** reports that the On-line Ethics Center started at Case Western Reserve has been absorbed by the NAE. IEEE's own ethics activities were absorbed by the Member Conduct Committee some years ago and there is little IEEE effort to support or uphold its excellent Code of Ethics. IEEE members do lend support to the NAE activities.

Engineers Without Borders is an organization that helps in countries in need with small engineering programs. See their web site <http://www.ewb-international.org/>. They are headquartered in the US with regional offices in Denmark, Egypt and India. Check out their web site and see where you can participate.

The **Energy Policy Committee** liaisons report that their committee's focus has shifted to electric power regulation and billing and topics such as fusion energy have been shoved aside.

The **RADECS** liaison reports that both the conferences and workshops, held alternate years are very successful and it is possible that they will switch to an annual meeting format.

The **Medical Sciences** liaison position has been taken on by Randy Brill. There is a lot of activity of interest to NPSS. The challenge is to filter it, and to crack the code of how to become involved in the teleconferences and other discussions.

The **Women in Engineering** liaison reports that only eight societies have liaisons thus far. They try to meet by conference call and may change the conference call schedule to a quarterly meeting. They support WIE activities at conferences and try to encourage

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## Two many?

The trouble with many travellers is that they take themselves along.

*Joseph Prescott*

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## And ever-present

The problem is that in politics, hypocrisy is essential.

*Margaret Wentz*

## Dream away

Ideas in the absence of power are just hobbies.

David Frum

women members and encourage students to become members. They now have a monthly newsletter.

### AdCom Actions:

- It was moved, seconded and passed unanimously that we become technical cosponsors of SORMA, the 2008 Symposium on Radiation Measurements and Applications to be held in Berkeley, CA in June 2008.
- It was moved, seconded and passed that the Phelps Grants total be increased to \$8000 and that early career investigators in the first 5 years of their careers be included as eligible.
- The Particle Accelerator Science and Technology Awards may be increased to

\$4,000 for the principal award and \$2000 for the PAST student award pending TAB approval. Other award levels will be addressed if TAB approves award increases.

- It was moved, seconded and passed that TPS move from bimonthly to monthly publication beginning in 2009.
- It was moved, seconded and passed that AdCom agrees to Technical Cosponsorship of the Workshop on Hybrid Imaging with MR-PET to be held at FZJ October 27-28, 2008.

*Albe Larsen can be reached at the Stanford Linear Accelerator Center, 2575 Sand Hill Road, Menlo Park, CA 94025 USA; Phone: +1 650 926 2748; Fax: +1 650 926 5124; E-mail: amlarsen@slac.stanford.edu*

## NEW AdCom MEMBERS

### Class of 2011

In this first issue of 2008 we especially welcome the newly elected AdCom members and new Technical Committee Chairs. Their brief biographies follow.

### Elected AdCom Members

#### David K. Abe



**David K. Abe**  
Elected member,  
Plasma Sciences

**D**AVID K. ABE is the head of the Devices and Design Section of the Vacuum Electronics Branch at the U.S. Naval Research Laboratory where he directs experimental and theoretical research in electron beam physics and the development of vacuum electronic devices for the generation of coherent electromagnetic radiation. He received a BS in engineering from Harvey Mudd College (1981), an MS in electrical engineering from the University of California, Davis (1988), and a PhD in electrophysics from the University of Maryland (1992). His research interests include the development of linear beam, slow-wave devices and components for applications ranging from the microwave to submillimeter-wave frequency regimes, multiple-beam devices, and the electromagnetic properties of materials. Prior to

NRL, Dr. Abe worked on interdisciplinary projects in pulsed power, high power microwave generation, and electromagnetic effects at the Lawrence Livermore National Laboratory, Berkeley Research Associates, and the U.S. Army Research Laboratory.

Dr. Abe has been an active member of the IEEE community for the past 19 years, serving in various capacities as a session organizer and on the technical program committees of numerous conferences, as a guest editor and a reviewer for various journals, and as an elected member of the Plasma Science and Applications Committee ExCom.

*David Abe can be reached at the Naval Research Laboratory, Code 6841, 4555 Overlook Ave. SW, Washington, DC 20375; Phone +1 202 767-0033; Fax: +1 202 767-1280; E-mail: david.abe@ieee.org*

#### Janet L. Barth



**Janet L. Barth**  
Elected Member,  
Radiation Effects

**J**anet Barth (M'89-SM'99) is the Head of the Flight Data Systems and Radiation Effects Branch at NASA's Goddard Space Flight Center. She began her technical career as an analyst in Goddard's Radiation Physics Office, then as a senior radiation effects engineer. She has spent the last 29 years focusing on

radiation effects on humans in space, hardness assurance for space electronics systems, and radiation environment modeling. Currently, her branch is responsible for flight hardware deliverables to several NASA programs, including the Solar Dynamics Observatory, the Lunar Reconnaissance Orbiter, and the James Webb



Space Telescope. Janet is a member of the Goddard Senior Fellows Council that advises the Center Director. She has been active in NPSS through the Nuclear Space and Radiation Effects Conference since 1985, serving on the Radiation Effects Steering Committee as Member at Large and as a Short Course Presenter, Guest Editor of the December Issue of the TNS, Technical

Program Chair of the 2001 NSREC, Liaison to RADECS, and General Chair of the 2006 NSREC. She holds a BS in Biological Science, a BS in Mathematics, and has completed graduate work in Computer Science.

*Janet Barth can be reached at the NASA Goddard Space Flight Center, Code 561, Greenbelt, MD 20771-0001; Phone: +1 301 286-5966; E-mail:janet.l.barth@nasa.gov.*

## Dillon McDaniel

Dillon McDaniel is the newly elected AdCom member representing the Pulsed Power com-

munity. He did not submit a bio or photo for publication.

## George H. Neilson, Jr.

**G**eorge H. "Hutch" Neilson is Project Integration Manager for the National Compact Stellarator Experiment (NCSX) at PPPL, a new facility being constructed to study the physics of compact stellarators. Dr. Neilson led the project from 1998 until 2007, during which time it advanced through a series of design stages and fabrication of the major components. His current focus is long-term planning for the transition to operation in 2012 and integration into the world stellarator research effort. The NCSX project is being carried out as a partnership between PPPL and Oak Ridge National Laboratory (ORNL).

Dr. Neilson came to PPPL in 1989 as a visitor and joined the staff in 1996 as a Principal Research Physicist and Deputy Head of the Advanced Projects Department. At PPPL, he led national physics design activities for a series of fusion experiment design projects, including the Burning Plasma Experiment (BPX), the Tokamak Physics Experiment (TPX), design studies for the International Thermonuclear Experimental Reactor (ITER), and the design of the Korea Superconducting Tokamak Advanced Research (KSTAR) project in collab-

oration with Korea.

From 1974 to 1996, Neilson was an experimental physicist and manager in the ORNL Fusion Energy Division. At ORNL, he worked on a series of tokamak and stellarator fusion confinement experiments, including ORMAK, ISX, and the Advanced Toroidal Facility (ATF). He led the ATF First Plasma task force in 1988.

Neilson earned his Ph.D. in Physics from the University of Tennessee, Knoxville, in 1979. He earned his B.S. and M.S. in Electrical Engineering from the Massachusetts Institute of Technology in 1973. Neilson's research interests are design and construction of magnetic confinement experiments, plasma magnetics, and magnetic diagnostics. He has authored numerous papers on fusion plasma physics and design, served on several committees within the fusion program, and is a Fellow of the American Physical Society.

*Hutch Neilson can be reached at the Princeton Plasma Physics Laboratory, PO Box 451, Princeton, NJ 08543-0451 USA; Phone: +1 609 243 2726; Fax: +1 609 243 3315; E-mail: hneilson@pppl.gov.*

## Stefan Ritt

**S**tefan Ritt received his Ph.D. in physics from the University of Karlsruhe, Germany, in 1993. He is currently technical coordinator of the MEG experiment at PSI, Switzerland, where he is responsible for the readout electronics, the DAQ hardware and software and the slow control system. He is primary author of the MIDAS DAQ system and the ELOG electronic logbook software, which are used today in many experiments worldwide.

He has been regular participant in the IEEE NPSS Real Time conference since 1997. He has served on the scientific advisory committee for this conference since Montreal 2003, where he also was Short Course Instructor. He is an editor of the *IEEE Transactions on Nuclear Science* and regular reviewer for other IEEE scientific journals. He has been Ph.D. advisor for seven students and has served on the PSI computing committee since 1999. His interests



**Hutch Neilson**  
*Elected Member,  
Fusion Technology*



**Stefan Ritt**  
*Computer Applications  
in Nuclear and Plasma  
Sciences*

have shifted from mainly DAQ software to a broader coverage of all DAQ aspects in particle physics experiments, including slow control, computer clusters, electronics develop-

ment and chip design.

*Stefan Ritt can be reached at PSI, Olga 102, Villigen 5232 SWITZERLAND; Phone: +41 563 103728; E-mail: stefan.ritt@psi.ch*

## Technical Committee Chairs

### Edl Schamiloglu



**Edl Schamiloglu**  
*Chair, Pulsed Power  
Technical Committee*

**E**dl Schamiloglu was born in the Bronx, NY in 1959. He received the B.S. and M.S. degrees from the School of Engineering and Applied Science, Columbia University, New York, in 1979 and 1981, respectively, and the Ph.D. degree in applied physics (minor in mathematics) from Cornell University, Ithaca, NY, in 1988. He was appointed Assistant Professor of Electrical and Computer Engineering at the University of New Mexico (UNM) in 1988. He is currently Professor of Electrical and Computer Engineering and directs the Pulsed Power, Beams, and Microwaves Laboratory at UNM. He lectured at the U.S. Particle Accelerator School, Harvard University, in 1990 and at MIT in 1997. He coedited **Advances in High Power Microwave Sources and Technologies** (Piscataway, NJ: IEEE, 2001) (with R.J. Barker) and he has coauthored **High Power Microwaves**, 2nd Ed. (Taylor & Francis, New York, NY, 2007) (with J. Benford and J. Swegle). He coedited the *July 2004 Special Issue of the Proceedings of the IEEE on Pulsed Power Technology and Applications*. He has authored or coauthored over 65 refereed journal papers, 120 reviewed conference papers, and four patents. His research interests are in the physics and technology of charged particle beam generation and propagation, high-power microwave sources, plasma physics and diagnostics, electromagnetic wave propagation, pulsed power, and complex systems and infra-

structure surety.

Dr. Schamiloglu has received the Sandia National Laboratories Research Excellence Award as part of the Delphi/Minerva team in 1991, the UNM School of Engineering Research Excellence Award twice (junior faculty in 1992 and senior faculty in 2001), the titles of UNM Regents' Lecturer (1996) and Gardner-Zemke Professor (2000), and the Lawton-Ellis Award in 2004. He is a Fellow of the IEEE, an EMP Fellow (sponsored by the Summa Foundation), a Senior Editor of the *IEEE Transactions on Plasma Science*, and has served on a National Academies Panel on Directed Energy Testing (2003-2004). He had previously served one tour of duty on AdCom as an elected representative for the Pulsed Power Science and Technology Standing Technical Committee. He was the Technical Program Chair of the 2005 IEEE International Pulsed Power Conference, and he was the General Chair of the IEEE PPPS-2007 Conference – the combined 2007 IEEE International Pulsed Power Conference and 2007 IEEE International Conference on Plasma Science - in Albuquerque, NM in June 2007.

*Edl Schamiloglu can be reached at the Department of Electrical and Computer Engineering, University of New Mexico, MSc01 1100, Albuquerque, NM 87131-0001 USA; Phone: +1 505 2774423; Fax: +1 505 277 1439; E-mail: edl@ece.unm.ed*

### Charles C. Watson



**Charles C. Watson**  
*Chair, Nuclear Medical  
and Imaging Technical  
Committee*

**C**harles Watson (M'87, SM'03) is a Scientific Advisor for PET Science and Technology at Siemens Medical Solutions Molecular Imaging in Knoxville. A native of Tennessee, he received his BA degree from the University of Tennessee, and his MS and PhD (1980) degrees in physics from Yale University. Following a post-doctoral fellowship in physics and planetary science at the California

Institute of Technology, he joined the Nuclear Science Department of Schlumberger-Doll Research in 1982, where he engaged in Monte Carlo simulation of gamma ray and neutron transport, developing a novel algorithm for the direct calculation of differential sensitivity functions. He eventually became Program Leader for Nuclear Modeling and Signal Analysis at SDR. In 1993 Charles joined CTI PET Systems where

he focused on issues related to PET tomograph performance and data corrections. He is the primary author of a widely used algorithm for scatter correction in clinical 3D PET. He also served as the Project Leader for the development of CPS's first commercial PET/CT scanner. In 2005 he joined Siemens following its acquisition of CTI. He continues to work on the development of new PET technology and is the lead author on numerous patents and peer-reviewed research articles in medical imaging sci-

ence. He belongs to the SNM and AAAS in addition to the IEEE, and serves as a referee for a number of journals in the field. He has been a member of the Nuclear Medical and Imaging Sciences Council of the NPSS since 2005, and currently serves as its Chair.

*Charles Watson can be reached at Siemens Medical Solutions USA, Inc., Molecular Imaging, 810 Innovation Dr., Knoxville, TN 37932-2562; Phone: +1 865.218.2419; Fax: +1 865.218.3000; E-mail: charles.c.watson@siemens.com*

## TECHNICAL COMMITTEES

### Nuclear Medical and Imaging Sciences

It's an honor to assume my duties as your new NMIS Council Chair. Let me begin by gratefully acknowledging the debt we owe to Tom Lewellen, the outgoing Chair, not only for his service as Chair, but also for the various leadership roles he has undertaken for us over the years, especially with regard to the organization and management of the annual Medical Imaging Conference. Fortunately, Tom will remain active in this role, as incoming Chair of the NSS/MIC oversight (site selection) subcommittee. Let me also mention that Tom has recently been named a Fellow of the IEEE, a tremendous and well-deserved honor. Tom urges you to consider sponsoring other NMIS individuals for election to Fellow – it helps strengthen our community as a whole. (You can find information on the nomination process at the NPSS web site: <http://ewh.ieee.org/soc/nps/>.) Tom – please accept our sincere thanks and congratulations!

A little about me: I'm a physicist who has worked in PET for over 14 years, first with CTI PET Systems and now with Siemens Molecular Imaging, based in Knoxville. I've served on the NMIS Council for the past three years. (The Council is the governing body of the NMIS Technical Committee.) My term as Chair is for two years. We also have a new vice-Chair, Robert Miyaoka. Robert will take over as Chair in 2010. Another important person you should know about is Steve Meikle, who is NMISC Secretary and Chair of the Nominations Subcommittee.

Every year 5 new members-at-large are elected to the NMISC. I'd like to urge you to consider standing for election to the Council. One of its primary functions is to provide over-

sight of the process that leads to the MIC each year, but we engage in other efforts to promote the NMISC community as well. Our business is conducted via discussions and votes on motions at our annual meeting, held in conjunction with the MIC, and through participation in various subcommittees. I give a summary below of our 2007 meeting in Honolulu, so you can get a flavor of it. If you'd like to influence the organization of the MIC or other aspects of our technical communications, this is a good place to start. You are eligible if you are a member of the IEEE NPSS with an interest in the MIC, i.e., a member of the NMISTC. If you're interested, please send Steve an email at [smeikle@fhs.usyd.edu.au](mailto:smeikle@fhs.usyd.edu.au) before July 1. You can find more information on the NMIS Technical Committee and Council, including current Council membership and a copy of our constitution and bylaws, at our web site: <http://ewh.ieee.org/soc/nps/nmisc/>.

The Council needs your help in another matter – nominations for the two IEEE awards specific to and awarded by the NMISTC: The Edward J Hoffman Medical Imaging Scientist Award, and the IEEE Young Investigator Medical Imaging Science Award. Information on these and other NPSS awards can be found at the NMISC web site. Aside from the personal honor they bestow, these awards are important as a means for establishing the standards of excellence in research, innovation, and education that the rest of us in our community should aspire to. Please give this some thought, and if you would like to make a nomination, contact Paul Kinahan, Chair of the NMISC Awards/Fellows SubCommittee at

## Then, what is it?

If something fits with common-sense, it almost certainly isn't science.

*Lewis Wolpert*



**Charles C. Watson**  
*Chair, Nuclear Medical and Imaging Sciences*

## Mutual dependence

Science without religion is lame, religion without science is blind.

*Albert Einstein*



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## Goalless

They do not know what they seek, only the chase and the quarry.

*Blaise Pascal*

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## My Rx needs renewing

... it is much more profitable for pharmaceutical companies to develop drugs that keep patients alive but uncured, rather than curing the disease, which loses the customer.

*Guy Brown*

kinahan@u.washington.edu. The deadline is July 15.

Our annual NMIS Council meeting was held November 2, 2007 in Honolulu, during the MIC. Following are some of the highlights.

- We received a final report on the 2006 MIC meeting in San Diego from its Program Chair, John Aarsvold. Thanks to John and his deputy Chair Bruce Hasegawa for a very successful, well-run meeting.
- Eric Frey, the Program Chair of the 2007 MIC summarized the status of the meeting for us. Details will be provided in a future newsletter, so I won't repeat them here, but I would like to mention the very successful introduction of refresher courses – 50 minute lectures each morning on topics of current interest by experts in the field. This was a great innovation. Thanks to Eric, Magnus Dahlbom, the Deputy Program Chair, and the nine assistant chairs for all their hard work on the 2007 MIC program.
- We had a long discussion (as usual) on how to deal with the rapid growth of the MIC, one of our greatest challenges. Because of the long lead times needed for planning these meetings, unrestricted growth is difficult to accommodate. There is a range of opinions on this including: increasing the rejection rate for papers (about 14% in 2007); using more parallel sessions (as was done this year); or even expanding the length of the meeting. We do not currently have a formal policy on this, and it is left to the discretion of the General and Program Chairs. If you have an opinion on this subject I would be very interested in hearing from you.
- Tom also requested feedback on the issue of how frequently the NSS/MIC should be held outside North America. The current target is every 3-4 years.
- As you know, next year's NSS/MIC will be held on the river Elbe in historic Dresden, Germany. Uwe Bratzler is the General Chair. Wolfgang Enghardt and Sibylle Ziegler will be the Program and Deputy Program Chairs of the MIC, respectively. Look for details elsewhere in this newsletter, and remember that the abstract submission deadline is May 9. Also, be aware that a two-day satellite workshop on Hybrid Imaging with MR-PET is being organized by Hans Herzog, Uwe Pietrzyk, and Karl Ziemons immediately following the MIC. It will be held at the Forschungszentrum Jülich

(located near Cologne).

- The 2009 NSS/MIC will be in Orlando, Florida, in the Hilton near Downtown Disney. Richard Lanza is the General Chair and Ramsey Badawi is the MIC Program Chair.
- The Council voted to approve Knoxville, Tennessee, as the site of the 2010 NSS/MIC. Ron Keyser will be the General Chair and David Townsend will serve as the MIC Program Chair. The issue of whether it is better to take the meeting to a resort location (like Orlando or Puerto Rico) or a less expensive location such as Knoxville is a perennial topic of discussion. I admit to a personal bias on this, being a native of Knoxville, but I think you will find late October in the Appalachians very pleasant.
- The 2011 and 2012 meeting venues are not yet finalized, but it appears very likely that it will go to Spain for one of these years, and to the west coast of the US for the other. If you wonder how these site selection decisions get made, it's the responsibility of a joint subcommittee of the RITC and NMISTC, currently chaired by Craig Woody. For a potential site to be considered, some individual or group must develop a proposal detailing the capabilities and advantages of their preferred site, and present it to the subcommittee. The best proposal wins. It takes a lot of work and time both to prepare good proposals, and to evaluate them. We greatly appreciate the effort Craig and his team put into this job.
- We conducted an election for Vice-chair of the Council and Robert Miyaoka emerged victorious – congratulations Robert!
- A draft proposal to AdCom (governing body of the NPSS) concerning modifications to the Paul Phelps Continuing Education Grant, awarded annually to support participation in NPSS sponsored Short Courses, was approved. The proposed changes would open the award to Post-Doctoral Fellows and Research Associates with less than five years post-degree experience, and would double the total award to all recipients to \$8k per year.
- Paul Kinahan, Chair of the Awards Subcommittee, discussed the methodology of the NMISTC awards process, and announced this year's winners: Paul Segars of Duke received the IEEE Young Investigator Medical Imaging Science Award, and Ron Huesman of LBNL received the Edward J Hoffman Medical



Imaging Scientist Award. Congratulations to Ron and Paul on this well-deserved recognition!

- Ron Huesman agreed to continue as Chair of the Communications (Web) Subcommittee and requested that any suggestions for updates or improvements be forwarded to him. He can be reached at RHHuesman@lbl.gov.
- Ron Jaszczak, one of our two AdCom representatives (the other being Eric Frey) brought to our attention that the IEEE Engineering in Medicine and Biology Society has recently formed a Special Interest Group on Biological and Health Sciences, and solicited comments on NMISTC participation in it.
- Finally, we discussed at some length the role

of the 15 Council members-at-large in prosecuting its business. Several members expressed the feeling that the work, and decision-making, of the Council needed to be distributed more uniformly among its members. I agree with this view and will try to achieve a wider distribution of responsibilities across the Council during my term as Chair.

The annual NMISC meeting is open to all NMISTC members, and we would welcome you there, although I can't promise you a free lunch!

*Charles Watson can be reached at Siemens Molecular Imaging, 810 Innovation Drive, Knoxville, TN, 37932-2562 USA; Phone: +1 865-218-2419; Fax: +1 865-218-3000; E-mail: charles.c.watson@siemens.com.*

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## RADIATION EFFECTS

### OUTSTANDING PAPERS AT THE 2007 NUCLEAR AND SPACE RADIATION EFFECTS CONFERENCE

#### Outstanding Conference Paper:

"Impact of Heavy Ion Energy and Nuclear Interactions on Single-Event Upset and Latchup in Integrated Circuits," by P.E. Dodd, J.R.Schwank, M.R.Shaneyfelt, J. A. Felix, P. Paillet, V. Ferlet-Cavrois, J. Baggio, R.A. Reed, G.L. Hash, S.M. Dalton, K. Hirose, and H. Saito

#### Outstanding Student Paper:

"Mechanisms of Enhanced Radiation-Induced Degradation due to Excess Molecular Hydrogen in Bipolar Oxides," X.J. Chen, H.J. Barnaby, B. Vermeire, K.Holbert, D. Wright, R.L. Pease, G. Dunham, D.G. Platteter, J.Seiler, S. McClure, and P. Adell

#### Outstanding Workshop Paper:

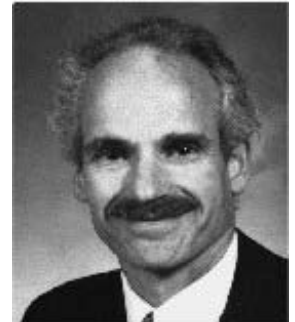
"Compendium of Current Single Event Effects Results for Candidate Spacecraft Electronics for NASA," by M. V. O'Brian, C. Poivey, J. W. Howard, K. A. LaBel, R. . Ladbury, S. P. Buchner, T. R. Oldham

### MEMBER-AT-LARGE ELECTED

**Philippe Paillet** (M'97-SM'04) received his Master's degree in Electrical Engineering from the Université Aix-Marseille I, France, in 1989 and his PhD degree in Electrical Engineering from the Université Montpellier II, France, in

1995. He joined the Commissariat à l'Energie Atomique in Bruyères-Le-Châtel, France, in 1995 and is a senior member of the technical staff. Philippe has been involved in numerous programs developing radiation-hardened technologies, characterizing the physical mechanisms responsible for radiation response of components and ICs, modeling the effects of radiation in MOS technologies and the creation of radiation-induced defects, and developing hardness assurance approaches. Philippe has served the radiation effects community as reviewer and Session Chairman for the IEEE Nuclear and Space Radiation Effects Conference (NSREC) and the Radiation Effects in Components and Systems (RADECS) European conference. He served as Guest Editor from 2004 to 2007, in charge of the publication in *IEEE Transactions on Nuclear Science* of the papers presented at NSREC and RADECS conferences. He has authored or co-authored more than 50 publications, articles, short courses and book chapters, including one Best Paper at RADECS, two Meritorious Paper and two Outstanding Paper Awards at NSREC. Philippe is a Senior Member of the IEEE and a Member of the NPSS.

*Tim Oldham, Chair of the Radiation Effects TC can be reached at Code 561.4, Bldg 22 Room 048, NASA Goddard Space Flight Center, Greenbelt, MD 20771-0001; Phone: +1 301 286 5489; Fax: +1 301 286 4699*



**Tim Oldham**  
Chair, Radiation Effects Technical Committee



**Teresa Farris**  
Radiation Effects Publicity Chair



**Philippe Paillet**  
Radiation Effects Member-at-Large

## FUNCTIONAL COMMITTEES

# LOOKING FOR A FEW GOOD APPLICATION ENGINEER/PRACTITIONER FELLOW NOMINATIONS



**Peter Winokur**  
Chair, Fellow  
Candidates  
Committee

By the time you receive this Newsletter, the March 1 deadline for this year's Fellow nominations will likely have passed. I'll be writing articles in the summer and fall Newsletters encouraging the submission of applications for the 2010 cycle and reviewing the Fellow nomination process. Three years ago, the IEEE Board of Directors approved changes to the Fellow process *to increase the number of nominations received for members from industry and to make the process more receptive to nominations received for application engineers or engineering practitioners who have made contributions of unusual distinction to the profession.* Specifically the changes established a new nomination "category"

called "Application Engineer/Practitioner." The article below, which appeared in a recent issue of the IEEE Institute, points out that few nominations are being received by IEEE in this category. The article suggests that members may be "unsure about the type of work that qualifies someone for this category." Please take a moment to read this article and help identify worthy members of NPSS who may qualify for Fellow grade as an "Application Engineer/Practitioner."

*Peter S. Winokur, Chair, NPSS Fellow Evaluation Committee, can be reached at the Defense Nuclear Facilities Safety Board, Washington, DC; Phone: +1 202 694-7090; E-mail: p.winokur@ieee.org.*

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## Clearing Up Confusion in Fellows Categories

BY KATHY KOWALENKO

(From *The Institute* print edition)

### Experience pays

The young break rules for fun. The old for profit.

Mason Cooley

Even though it's been nearly three years since nominations were first accepted for the newest Fellows category, Application Engineer/Practitioner, few have been nominated. Out of the 268 Fellows named in 2007, 15 were from the practitioner group compared to the 17 in the 271-member Class of 2006.

One reason might be because people are still unsure about the type of work that qualifies someone for this category, says 2003 IEEE President Michael Adler and chair of the IEEE Board-appointed 2007 Fellow Ad Hoc Committee, which reviews the Fellows process.

"Many nominators are checking off the Research Engineer/Scientist box on the nomination forms when perhaps they should be marking the Application Engineer/Practitioner category," he says. "The position of some nominees is identified to be that of a research scientist or engineer, but the work for which they are being cited could be considered that of a practitioner," Adler explains.

There were 213 Fellows from the research engineer/scientist group in the 2007 class.

To help clear up any confusion and help boost the number of Fellows from industry, here is a primer of the type of work that qualifies for the application engineer/practitioner category.

The person has to be an IEEE senior member in good standing with five years of service in any grade of membership excluding affiliates, and who has made significant contributions in any of these areas: product development, systems, applications or operations, project management or construction, process development, manufacturing innovations, or codes or standards development.

Adler notes that it could be someone who develops a process to produce a product that may have been designed by others, and that has had a major impact.

For example, among the 2007 class of Fellows in the Application Engineer/Practitioner category, were members who invented and standardized elements of optical

transmission systems, developed applications for satellite data and airborne LIDAR (light detection and ranging) imagery, researched signal processing for acoustics and sound reproduction, and provided technical leadership of a project that turned novel concepts for computer archi-

ture into commercial processors.

Nominations for the class of 2009 are now being accepted. The deadline is 1 March 2008. Nomination instructions, forms and additional information are available on the Fellows web site at <http://www.ieee.org/fellows>.

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## NOMINATIONS

### Candidates Sought for Elected AdCom Positions

**A**re you interested in helping run the NPSS? The NPSS AdCom (Administrative Committee) is the body that “runs” the NPSS, which includes setting the policies for all of the conferences and publications that the NPSS sponsors. Each year we hold elections for approximately one quarter of the sixteen elected AdCom positions. This summer we will be holding elections for AdCom members elected from three NPSS communities: Plasma Science (the community that puts on ICOPS), Nuclear Medical and Imaging Sciences (the community that puts on MIC), and Transnational (a geographically-based rather than technically-based community). These are four-year terms that begin on January 1, 2009. In general, the requirements are that you are a

member of both the IEEE and the NPSS (which basically includes everybody who receives this Newsletter) and that you have an interest in one of those three technical areas. If you are interested in running for one of these positions, you must let me know ([wwmoses@lbl.gov](mailto:wwmoses@lbl.gov)) by June 1 of this year. You will be asked to submit a 200-word biography plus a 200-word position statement. Please feel free to contact me if you have any questions or need more information.

*Bill Moses, Nominations Committee Chair, can be reached at Lawrence Berkeley National Laboratory, MS55-12, One Cyclotron Road, Berkeley, CA 94720 USA; Phone: +1 510 486-4432; Fax: +1 510 486 4768; E-mail: [wwmoses@lbl.gov](mailto:wwmoses@lbl.gov).*



**Bill Moses**  
Nominations  
Committee Chair

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## AWARDS

*The IEEE offers Institute Awards, and most societies and Society Technical Committees also offer awards. Elevation to IEEE Fellow is a prestigious honor awarded each year to no more than 0.1% of the full IEEE membership by the Institute Board of Directors. Nominations are made from among Senior Members and nominees must be supported by at least six Fellows. After being reviewed and ranked by the appropriate IEEE Society, the nominations are forwarded to the Institute's Fellow Committee who then recommend a list of candidates to the IEEE Board of Directors for their consideration. The Nuclear and Plasma Sciences Society is justifiably proud of its Fellows. We present here the Class of 2007 Fellows, and wish them each our heartfelt congratulations.*

## 2007 NPSS FELLOWS

### John H. Booske

**J**ohn H. Booske received the Ph.D. degree in nuclear engineering from the University of Michigan, Ann Arbor in 1985, studying under Professor Ronald Gilgenbach, and co-advised by Professor Ward Getty. He was a Research Scientist at the University of Maryland, College Park, from 1985 – 1989. In 1990 he joined the University of Wisconsin faculty, where he is currently the Duane H. and Dorothy M. Bluemke Professor of Electrical and Computer Engineering.

Ever since the invention of the magnetron, there has been an unrelenting demand for more powerful and efficient microwave sources. Since the mid 1950's it was recognized that vacuum devices designed with thin sheet or “ribbon” electron beams would be especially effective. In their “thin” dimension, these beams easily fit in small, high frequency electromagnetic structures, while their large other dimension accommodates large currents (for high power) without exceeding the maxi-



**John H. Booske**

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## Career path

Make crime pay,  
become a  
lawyer.

Will Rogers

imum current densities that can be practically focused by magnetic fields. Unfortunately, it was also discovered in the mid-1950's that these sheet electron beams are unstable in the uniform, axial magnetic fields commonly used with many microwave vacuum tubes up through the 1970's and 80's. Hence, they were abandoned as a potential solution for high power millimeter-wave coherent radiation sources.

In the 1980s and 1990s, at the Universities of Maryland and Wisconsin, respectively, John conducted, collaborated on, and directed research showing that periodic magnetic fields will stably confine sheet electron beams. This work is recognized as the enabling foundation for numerous current projects developing high power, millimeter-wave coherent radiation sources, for important applications in communications, defense, and homeland security. Such projects include active development programs at the Los Alamos National Laboratory, the Naval Research Laboratory, and the Stanford Linear Accelerator Center.

Meanwhile, since the 1960s researchers studying the use of microwave heating in materials processing occasionally reported observations of anomalously-enhanced reaction rates in comparison to conventional furnace heating. Lacking a credible theoretical explanation, these results were generally dismissed as artifacts of inaccurate measurements. In the 1990s, John directed research that experimentally confirmed the existence of a previously-unknown effect, termed the ponderomotive force, by which strong microwave fields can accelerate solid state reaction rates. Working with students and colleagues at the University of Wisconsin and the Institute for Applied Physics in Nizhny Novgorod (Russia), computer simulations and theoretical analyses showed how the mechanism can be understood in terms of solid state ionic transport using solid state plasma concepts. This work has placed the discussion of microwave-enhanced solid state reaction rates on a firm scientific basis, and enlightened the consideration of microwaves for industrial processing of materials. These fundamental insights, along with studies of microwave absorption in ceramics and semiconductors are regarded as key contributions to understanding how microwave radiation energy couples to and is absorbed by materials during microwave heating.

Currently, John is working with colleagues and students to pioneer the application of

microfabrication technologies for production of high-power millimeter-wave and submillimeter-wave vacuum electronic radiation sources. Through other collaborations, John has produced detailed, fundamental descriptions of how phase distortion occurs in traveling wave tube amplifiers.

John has also contributed as a leader and an educator. He coedited and coauthored a leading reference book on vacuum electronics, **Modern Microwave and Millimeter Wave Power Electronics** (Wiley-IEEE Press, 2005). He was a Guest Editor of a Special Issue of *IEEE Transactions on Plasma Science* (2000). He served as Director of the UW-Madison's Materials Science Program from 2001 to 2005, leading a thorough restructuring of the Program's curriculum while building and diversifying the Program's faculty. He has established a reputation for training graduate and undergraduate students who are highly coveted in the vacuum electronics industry and graduate research groups around the country. He led a national collaboration researching innovations in microwave vacuum electronics as Co-Director of a five-university, DoD-funded, Multi-University Research Initiative (MURI) consortium (1999-2004). He is currently Director of a second, five-year, five-university MURI consortium researching the nanoscale physics of field emission cathodes and vacuum window breakdown effects in high power microwave sources. He has been recognized for his research creativity and pedagogical skills through numerous awards, including the National Science Foundation's Presidential Young Investigator award, the University of Wisconsin Chancellor's Distinguished Teaching award, the University of Wisconsin's Vilas Research Associates faculty award, and the Bluemke Professorship. In addition to the fields of vacuum electronics and microwave materials processing, John has an active research interest in bioelectromagnetics, collaborating on studies of microwave imaging of breast cancer tumors and the use of pulsed electric fields to facilitate trans-membrane molecular transport in biological cells. In 2007, John was elected to Fellow grade in the IEEE.

**Citation:** *for contributions to vacuum electronics and microwave processing of materials.*

*John Booske can be reached at the University of Wisconsin-Madison, Dept Electrical & Computer Eng, 1415 Engineering Dr, Madison, WI 53706-1607; Phone: +1 608 262 8548; Fax: +1 608 262 1267; E-mail:booske@engr.wisc.edu*

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## Dress code

A good intention  
clothes itself  
with power.

Ralph Waldo  
Emerson



## Simon R. Cherry

Simon R. Cherry, Ph.D. received his B.Sc.(Hons) in Physics with Astronomy from University College London in 1986 and a Ph.D. in Medical Physics from the Institute of Cancer Research, University of London in 1989. After a postdoctoral fellowship with Dr. Edward Hoffman at UCLA, he joined the faculty in the Department of Molecular and Medical Pharmacology at UCLA in 1993. From 1998-2001 he was Associate Director of the UCLA Crump Institute for Molecular Imaging. In 2001, Dr. Cherry joined UC Davis as a Professor in the Department of Biomedical Engineering and Director of the Center for Molecular and Genomic Imaging. In 2007, Dr. Cherry became Chair of the Department of Biomedical Engineering at UC Davis.

Dr. Cherry's research interests center around in vivo molecular imaging systems. A focus of his research is the development of very high resolution positron emission tomography (PET) systems for preclinical imaging, in particular the development of the microPET scanner that was subsequently widely adopted in academia and industry. Additional interests

include multimodality imaging, especially the integration of PET with CT and MRI, and 3-D fluorescence tomography. Dr. Cherry is a founding member of the Society of Molecular Imaging. He serves on the Editorial Board of the journals *Physics in Medicine and Biology*, *Molecular Imaging and Biology*, and *Molecular Imaging*. In 2006, Dr. Cherry was invited to give the Henry Wagner Distinguished Lectureship at the Society of Nuclear Medicine annual meeting and in 2007, Dr. Cherry received the Academy of Molecular Imaging Distinguished Basic Scientist Award. Dr. Cherry is the author of more than 150 peer-reviewed journal articles or book chapters in the field of biomedical imaging. He is also coauthor of the 3rd edition of the textbook **Physics in Nuclear Medicine**.

**Citation:** *For contributions to molecular imaging.*

*Simon Cherry can be reached at the Dept of Biomedical Eng, Univ of California, 1 Shields Ave, Davis, CA 95616-8500; Phone: +1 530 754 9419; Fax: +1 530 754 5739; E-mail: srcherry@ucdavis.edu*



**Simon R. Cherry**

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## Avraham Gover

Avi Gover holds the Ludwig Jokel Electronics chair and is professor in the Physical Electronics Department of Tel-Aviv University and head of the FEL Knowledge Center for Radiation Sources in Ariel.

He is one of the pioneers in the field of Free Electron Lasers (FEL) on which he has worked since 1977, when he started the theoretical modeling of this class of lasers with Amnon Yariv at Caltech. His expertise is in both theory and experiment. He participated in the design of a number of FEL experiments with different kinds of accelerator technologies in the US, and constructed an experimental FEL facility based on an electrostatic accelerator in Israel.

Professor Gover has contributed to the development of numerous innovative theoretical and experimental concepts related to free electron lasers. These include the identification and study of the general FEL dispersion relation (analogous to Pierce equation), the fundamental relations of spontaneous and stimu-

lated emission in FEL, Smith-Purcell FEL, and Electrostatic Accelerator FEL. His theoretical and experimental work on schemes and concepts of prebunched beam FEL revealed the connection of "coherent emission" from bunched electron beams to Dicke's superradiance of atomic medium. Based on this work he developed the concepts and theory of superradiant and stimulated-superradiance FELs.

In recognition for his outstanding contribution to FEL science and technology he was awarded in 2005 the annual International FEL prize. In Nov. 2007 he was awarded fellowship in the American Physical Society for outstanding scientific achievements and leadership in international cooperation in the area of Free Electron Lasers. Concurrently he was awarded Fellowship in the IEEE .

**Citation:** *for contributions to free electron lasers and superradiant bunched e-beam radiators.*

*Avi Gover can be reached by E-mail: gover@eng.tau.ac.il; Phone: +972-3-6408149*



**Avraham (Avi) Gover**

## Yue Ying Lau



Y.Y. Lau

Y.Y. Lau received his SB, SM, and PhD degrees in Electrical Engineering from the Massachusetts Institute of Technology in 1968, 1970, and 1973, respectively. From 1973 to 1979, he was an Instructor and then an Assistant Professor in applied mathematics at MIT. He was with Science Applications Inc., McLean, VA, from 1980 to 1983, and with the Naval Research Laboratory, Washington, DC, from 1983 to 1992, as a Research Physicist at each. In 1992, he joined the University of Michigan, Ann Arbor as a Professor in the Department of Nuclear Engineering and Radiological Sciences, and in the Applied Physics Program. He has worked on electron beams, coherent radiation sources, plasmas and discharges. His contributions include: wideband and low magnetic field operation of gyrotron amplifiers, multipactor discharge, accelerator stability, diode physics (higher dimensional and

quantum), low noise magnetron, high power microwave sources, Thomson X-ray sources, and heating phenomenology. He has nine patents and over 170 refereed publications. He served three terms (1994-2005) as an Associate Editor of the *Physics of Plasmas*, and was a Guest Editor of the *IEEE Transactions on Plasma Science Special Issue on High Power Microwave Generation* (June, 1998). He was elected Fellow of the American Physical Society in 1986. He received the 1989 Sigma-Xi Scientific Society Applied Science Award, and the 1999 IEEE Plasma Science and Applications Award.

**Citation:** *for contributions to electron beam devices, coherent radiation sources, and discharge physics.*

*Y. Y. Lau can be reached at University of Michigan, Cooley Bldg, Ann Arbor, MI 48109-2104; Phone: +1 734 764-5122; Fax: +1 734 763-4540; E-mail: yylau@umich.edu.*

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## Jane M. Lehr



Jane M. Lehr

Jane Lehr received the Ph.D. degree in Electro-Physics from Polytechnic University- New York and a Bachelor's of Engineering from Stevens Institute of Technology. After several years in industry, she joined the Air Force Research Laboratory, Directed Energy Directorate in 1997. There, she continued earlier work on the physics of electrical breakdown and switching. She made key contributions toward advancing the state of the art of high peak power, ultra-wideband radiating systems, including the compact and fully transportable system known as JOLT, where she led the pulsed power segment. She, along with several colleagues, was awarded a patent for the high efficiency transformer design used in the JOLT system.

In 2002, Dr. Lehr joined Sandia National Laboratories, Pulsed Power Sciences Center. During the Z Refurbishment project, she per-

formed component evaluation and development and led the system assessment test program and component development. Presently, she is again focusing on the physics of electrical breakdown and high power switching.

Dr. Lehr has been an active IEEE volunteer. She has been a Guest Editor for the *IEEE Transactions on Plasma Science*, an Associate Editor for the *IEEE Transactions on Dielectrics and Electrical Insulation*, Student Activity Chair for Region 6 and Albuquerque Chapter Chair. She currently serves as President of the Nuclear and Plasma Sciences Society.

**Citation:** *For contributions to high power switches and the generation of high power electromagnetic radiation.*

*Jane Lehr can be reached at Sandia National Laboratories, MS 1193, PO Box 5800, Albuquerque, NM 87185-1193; Phone: +1 505 844 8554; E-mail: jane.lehr@ieee.org*

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## Tom K. Lewellen



Tom Lewellen

Tom K. Lewellen is a Professor of Radiology and Electrical Engineering at the University of Washington. He received a B.A. in Physics from Occidental College in 1967 and a Ph.D. in Experimental

Nuclear Physics in 1972. After a postdoctoral fellowship designing beam optics for neutron therapy applications, he joined the Division of Nuclear Medicine at the University of Washington (UW) in 1974. Dr. Lewellen is cur-

rently the director of the Physics group in the Division of Nuclear Medicine (the group has 5 faculty, 6 scientific staff, and several graduate students and postdoctoral fellows). His major research interests are positron emission tomography (PET) system development and improving methods for quantitative imaging (both in PET and single photon emission tomography). The UW group is currently working on design and construction of new high resolution animal PET scanners and MRI inserts, improved quantitative data corrections for 3D PET systems, faster Monte Carlo simulation software for emission tomographs, and new data analysis

techniques for a wide variety of Nuclear Medicine studies. Past services for IEEE include being the chair for the 1997 IEEE NSS/MIC, local arrangements chair for the 1999 IEEE NSS/MIC, 2005 IEEE NSS/MIC general chair, and NMISC chair from 2005 – 2007.

**Citation:** *For contributions to nuclear medicine and positron emission tomography imaging systems.*

*Tom Lewellen can be reached at Radiation, Nuclear Medicine, NW-0040, University of Washington Medical Center, PO Box 357897, Seattle, Washington, USA; Phone: +1 206 543-2365; E-mail: tkldog@u.washington.edu.*

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## Visionary?

Keep your eyes wide open before marriage, half shut afterwards.

Benjamin Franklin

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## Ilan Ben Zvi Awarded the 2007 Free Electron Laser Prize

Ilan Ben-Zvi, a physicist at the U.S. Department of Energy's Brookhaven National Laboratory, a Senior Member of the IEEE and chair of the NPSS Particle Accelerator Science and Technology Technical Committee, has won the 2007 Free Electron Laser (FEL) Prize along with James Rosenzweig of the University of California-Los Angeles. Sponsored by the International Free Electron Laser Conference, which was held this year in Novosibirsk, Russia, the prize consists of an award citation, a plaque, and monetary award.

Ben-Zvi was recognized for "his outstanding contributions to FEL science and technology." Ben-Zvi and Rosenzweig collaborated on some subjects and were acknowledged for similar contributions to the field.

Ben-Zvi's work leading to the FEL Prize included two facets of FEL technology. First, he developed laser-photocathode radiofrequency guns that provide record brightness to laser beams. Also, Ben-Zvi performed proof-of-principle experiments on x-ray single-pass

FELs at Brookhaven's Accelerator Test Facility. Both aspects of Ben-Zvi's research were done in collaboration with numerous national laboratories and universities.

*I am proud to receive this award, the highest honor in the free electron laser community," Ben-Zvi said. "Research on free electron lasers and many types of advanced accelerators is ongoing at Brookhaven Lab, where two of my colleagues - Vladimir Litvinenko and Li Hua Yu - have also been honored with the FEL Prize within the last four years."*

A Free-Electron Laser (FEL) is a laser which uses synchrotron radiation from an electron beam as the emission mechanism. Thus it combines the sharp focusing and pure color of radiation from the laser and the high power and short wavelength of synchrotron light source. In order to reach high power and short wavelength, the FEL requires a high-brightness electron beam. A high-brightness electron beam is similarly defined as a beam that can be sharply focused and has a high purity of energy. These properties are defining the "coherence" of the radiation. High brightness electron beams enable the FEL to operate at a very short wavelength, down to hard X-rays.

The most successful high-brightness electron source is the laser-photocathode RF gun. As the name implies, in this device electrons are being produced by illuminating a spot in the gun by a laser beam, and using the photoelectric effect to extract short bursts of electrons, highly concentrated in space and time. To keep this tight concentration, the electrons



Ilan Ben Zvi Receives 2007 FEL Prize

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## My punishment

The sole cause of all human misery is the inability of people to sit quietly in their rooms.

Blaise Pascal



So, I'm problem free

Never work on a problem for which you do not have an unfair advantage.

Hans Bethe

have to be accelerated rapidly to near the speed of light. For this one uses the very high electric fields that can be generated by radio frequency (RF) fields in a resonant copper (or superconducting niobium) cavity. Thus the name “laser-photocathode RF gun”.

Since X-ray mirrors do not have the reflectivity of optical mirrors, X-ray FELs cannot use many passes through the laser proper to build up the powerful radiation as normal lasers do. The solution to that has been found in “single-pass” FELs, in which the radiation builds up so fast that a single pass through the FEL is sufficient to produce the full output. Single pass FELs come in a few varieties, such as Self-Amplified Spontaneous Emission (SASE), or High-Gain Harmonic-Generation (HGHG). In a SASE FEL the spontaneous emission of the electrons in the beginning of the device, which is the basis of synchrotron light sources, is amplified by the same device to get the laser power and coherency. In a HGHG FEL, an external conventional laser is used to trigger the FEL on a harmonic related shorter wavelength. The short pulse capability of the FEL and short wavelength are important features for studying materials on the atomic scale, including light-induced structural changes on time scales of a quadrillionth of a second. This will allow scientists a glimpse on a time scale never before possible and open untold opportunities for understanding catalysis, chemical processes, and molecular assembly.

“X-ray free electron lasers have excellent imaging capabilities, enabling biologists to resolve the structure of proteins, material scientists to study nanomaterials, and much more,” Ben-Zvi explained. “An x-ray FEL

source with laser power and brightness opens up new areas of science. Several of these facilities are now being built around the world.”

After earning a Ph.D. in physics from the Weizmann Institute of Science, Israel, in 1970, Ben-Zvi went to Stanford University, where he helped develop the earliest stages of superconducting linear accelerators. In 1975, he returned to Weizmann, where he founded a cryogenic technology laboratory. From 1980-1982, Ben-Zvi was a visiting associate professor of physics at Stony Brook University, where he helped to establish an accelerator at the school, inventing and developing accelerator systems now used throughout the world.

Ben-Zvi joined Brookhaven Lab as a visiting physicist in 1988 and rose through the ranks to receive tenure, and then become a senior physicist in 1997. He served as head of Brookhaven's Accelerator Test Facility for 15 years, and he is currently the associate chair for superconducting accelerator R&D at Brookhaven as well as an adjunct professor of physics at Stony Brook University. A Fellow of the American Physical Society, Ben-Zvi, a senior member of the Institute of IEEE is also the recipient of the 1999 IEEE/NPSS Accelerator Science and Technology Award. He also received Brookhaven Lab's Science and Technology Award in 2001. He has served in leading roles in many scientific meetings and panels, including the FEL '95 and FEL'01 international meetings. He is the author or coauthor of over 280 publications.

*Ilan Ben-Zvi can be reached at Brookhaven National Lab, PO Box 5000, Upton, NY 11973-5000; Phone: +1 631 344 5143; Fax: +1 631 344 5954; E-mail: benzvi@bnl.gov*

## SOCIETY AWARDS

### RADIATION INSTRUMENTATION OUTSTANDING ACHIEVEMENT AWARD

#### GLENN KNOLL

by Sara Pozzi

RISC Honors and Awards Committee Chair



Glenn Knoll

On October 29, 2007 I had the honor and pleasure of presenting, at the IEEE/NPSS Nuclear Science Symposium luncheon in Hawaii, the most prestigious and selective award of the Radiation Instrumentation Steering Committee (RISC): the Radiation Instrumentation Outstanding

Achievement Award. The award was established in 2001 to recognize outstanding contributions to the fields of radiation instrumentation and measurement techniques for ionizing radiation, and was awarded every odd-numbered year since that date. The award is intended to honor a lifetime dedicated to the pursuit



of excellence in the area of radiation detection.

The principal criteria for the award are the originality and impact of the contributions to the field, the cumulative research contributions over a career, and the influence on the field through education.

The honors and awards committee of the RISC elected Professor Glenn Knoll as this year's recipient. He is a Professor Emeritus of Nuclear Engineering and Radiological Sciences at The University of Michigan, where he is active on a part-time research appointment. Following his undergraduate education at Case Institute of Technology, he earned a Master's degree from Stanford University and a doctorate in Nuclear Engineering from the University of Michigan. He joined the Michigan faculty in 1962, and served as Chairman of the Department of Nuclear Engineering and as Interim Dean of the College of Engineering. His research interests have centered on radiation measurements, nuclear instrumentation, and radiation imaging. He is author or co-author of over 200 technical publications, 7 patents, and 2 textbooks. In the course of his tenure at the University of Michigan he was advisor to 26 Ph. D. students pursuing degrees in nuclear engineering. Many of these graduates then proceeded to build careers in the area of radiation instrumentation.

Professor Knoll has been elected a Fellow of the American Nuclear Society, the IEEE, and the American Institute for Medical and Biological Engineering. In the course of his

career he received several awards from professional societies, including the Glenn Murphy Award of the American Society for Engineering Education, the ANS Arthur Holly Compton Award, and the Annual Merit Award of the Nuclear and Plasma Sciences Society (NPSS) of IEEE.

Professor Knoll served for many years as receiving editor for the journal Nuclear Instruments and Methods in Physics Research, Part A, and is a current member of its Editorial Advisory Board. He has also served on the editorial boards for several other scientific journals. In 2000 he received the highest faculty award from the College of Engineering of the University of Michigan, the Stephen E. Attwood Award. In 1999, he was inducted to membership in the National Academy of Engineering. His textbook, titled "Radiation Detection and Measurement", now in its third edition, is widely regarded as the standard in its field, and is in use at many universities and institutions worldwide. Many of us have been inspired by his legacy and important contributions to the field.

The citation on the award reads '*For contributions to the education of a generation of nuclear scientists and advancement of the science of radiation detection.*'

The award comes with a plaque and certificate, and a \$2,000 check, which Professor Knoll has elected to donate to the recently established John King Scholarship Fund at the University of Michigan.

Submitted

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Now I understand

Patriotism is the last refuge of the scoundrel.

Samuel Johnson

## AWARD SOLICITATIONS

### RADIATION EFFECTS AWARDS: Nominations Requested

#### **RADIATION EFFECTS AWARD**

Nominations are currently being accepted for the 2008 IEEE Nuclear and Plasma Sciences Society (NPSS) Radiation Effects Award. The purpose of the award is to recognize individuals who have had a sustained history of outstanding and innovative technical and/or leadership contributions to the radiation effects community. The \$2000 cash award and plaque will be presented at the 2008 IEEE NSREC held in **Tucson, Arizona** July 14-18, 2008.

Nomination forms are available electronically at <http://www.nsrec.com/nominate.htm>. Nominations must be submitted by March 15,

2008. Additional information can be obtained from Wayne Abare, Senior Member-at-Large for the Radiation Effects Steering Group. Wayne can be reached at 321-729-7224 or at [wabare@harris.com](mailto:wabare@harris.com)

#### **PAUL PHELPS CONTINUING EDUCATION GRANT**

Nominations are currently being accepted for the Paul Phelps Continuing Education Grant. The purpose of this grant is to promote continuing education and encourage membership in NPSS. University professors may nominate outstanding student members of NPSS for this grant. In addition, unemployed Members of

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The other way round too

... and politics, at least in the United States, is all about turning power into money.

Celia Farber

NPSS who need assistance in changing career direction are also eligible for this grant. The grant is for \$500 to attend the 2008 NSREC Short Course in Tucson, Arizona, in July 2008. Nomination forms are available electronical-

ly at [www.nsrec.com/steeringcommittee](http://www.nsrec.com/steeringcommittee). The completed forms must be submitted to the RESG Member-at-Large, Marty Shaneyfelt, at [shaneymr@sandia.gov](mailto:shaneymr@sandia.gov) by March 15, 2008. Marty can be contacted at 505-844-6137.

## ARTICLES

# RADIOLOGICAL IMAGING TO THE THIRD DEGREE

by Esam Hussein

University of New Brunswick, Fredericton, Canada  
(<http://www.unb.ca/ME/faculty/hussein.html>)



**Esam Hussein**

The common methods of radiological imaging (radiography, computed tomography and emission tomography) have always struck me as not being natural means for imaging. A visual image is formed by the reflection of light from the viewed object to the eye, i.e., the radiation source (light) and the detector (eyes) are on the same side of the object. On the other hand, radiographic and tomographic images are generated by transmitted-through radiation, with the source and detector placed at opposite sides of the object. In emission imaging, radiation can be detected at one side of the object, but then the radiation source is embedded within the interrogated medium; an intrusive process, unlike the passive form of natural vision.

Penetration of radiation, needed to image internal details, can also be realized by the scattering of radiation. This imaging process resembles natural vision, and can be accomplished with the source and detector placed on the same side of the object (i.e., by backscattering). One can then see through matter with radiation “eyes”, and examine large and extended structures, such as solid walls and floors, where radiation cannot penetrate from one side to the opposite side, and without the need for internal sources. Why do not we then commonly see scatterographs? The answer is simple: because scatter imaging is a third-degree interrogation process! Let me elaborate.

When a radiation beam passes through matter, its intensity is attenuated by scattering and absorption. In the transmission imaging of radiography and computed tomography (CT), the intensity of radiation that survives this attenuation process is recorded. Therefore, a

transmission measurement is a first-degree measurement, because it monitors only one factor: the attenuation of radiation as it traverses through the object from the source to the detector, as schematically shown in Figure 1. The challenge is then to keep transmission measurements from being contaminated by the higher order effects of scattering and secondary emissions (resulting from radiation absorption). These are non-localized effects that interfere with the extraction of image information along the path of the monitored radiation.

In emission imaging, such as SPECT and PET, the source of radiation is present within the interrogated object, as schematically shown in Figure 1. As such, emission measurements are second-degree measurements, because each measurement depends on two parameters: the intensity of the internal source (the parameter which formulates the image), and the attenuation of radiation from the source to the detector (an intruding parameter that needs to be corrected for). However, emission imaging can be approximated to a first-degree imaging process, by ignoring attenuation. Even then, the emission signal has to be protected from the higher contaminating effects of scattering and secondary emissions.

In scatter imaging, as schematically shown in Figure 1, each measurement is affected by three parameters: attenuation before scattering, the macroscopic scattering cross-section at the scattering point, and attenuation after scattering. The higher order contaminating effects are then the subsequent multiple scattering of radiation and secondary emissions. This is a three-parameter interrogation

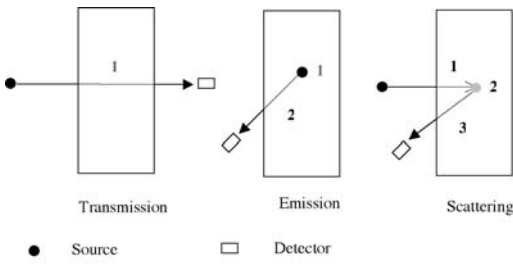


Figure 1: Schematics showing the passage of one source-ray in various imaging modalities.

process, as it can provide images of the two attenuation coefficients (total cross-sections) of the incident and scattered radiation (called here  $\mu_t$  and  $\mu'_t$ , respectively), and the scattering cross-section,  $\mu_s$ . With scatter imaging, one has then in effect a dual-energy tomograph, with  $\mu_t$  giving an image at the incident energy, and  $\mu'_t$  providing another image at the scattering energy. In addition, one also has a scatter image through  $\mu_s$ . The images for  $\mu_t$  and  $\mu'_t$  are like those of transmission, because they have to be reconstructed from integrated signals, formed by radiation travel from the source to the scattering point, and away from it. On the other hand, the  $\mu_s$  image is differential in nature, owing to its reliance on scattering at segregated points in the investigated object. In terms of spatial resolution and material contrast, the transmission-like and scatter images complement each other; the information concealed by the integral nature of transmission is revealed by the differential nature of scattering, and vice versa.

The triplex nature of scatter imaging makes it able to reveal more than one physical attribute at each voxel in the image. To demonstrate this, let us consider imaging with the photons within an energy range where photoelectric absorption and Compton scattering are the dominant interactions, as it is the case for photons emitted from most x-ray machines or radioisotopes. Then the reconstructed cross-sections can be expressed as:

$$\mu_t = (\sigma_s + \sigma_a) \frac{\rho}{Au} = (Z\sigma_e + aZ^m) \frac{\rho}{Au} \quad (1)$$

$$\mu_s = \sigma_s \frac{\rho}{Au} = Z\sigma_e \frac{\rho}{Au} \quad (2)$$

$$\mu'_t = (\sigma'_s + \sigma'_a) \frac{\rho}{Au} = (Z\sigma'_e + dZ^m) \frac{\rho}{Au} \quad (3)$$

where  $\sigma_s$  and  $\sigma'_s$  are the scattering (Compton) microscopic cross sections at the incident and scattered photon energy, respectively,  $\sigma_e$  and  $\sigma'_e$  are the corresponding values per electron,  $\sigma_a$  and  $\sigma'_a$  are absorption microscopic cross-sections at the two energies, respectively, which are related to the atomic number  $Z$  by the proportionality constants  $a$  and  $a'$ , respectively, and by the indices  $m$  and  $m'$ ,  $\rho$  is the mass density,  $A$  is the mass number, and  $u$  is atomic mass unit.

In conventional transmission tomography,  $\mu_t$  is reconstructed, while in dual energy CT both  $\mu_t$  and  $\mu'_t$  are obtained, and their ratio is used as a composition (by  $Z$ ) indicator. Scatter imaging indications can be used similarly, or by combining the attenuation-in indication of Eq. (1) with the scattering indication of Eq. (2) to obtain  $Z$ . Since for most materials,  $\frac{Z}{A} \simeq \frac{1}{2}$ , Eq. (3) can be used to independently estimate the mass density,  $\rho$ . This estimated value of  $\rho$  should then match those evaluated using Eqs. (1) and (2), and if not, a new estimate for  $\rho$  that best provides this matching can be obtained, leading to a new estimate for  $\rho$  from Eq. (3). The process is repeated until consistent values are obtained for  $\rho$  and  $A$ . That is, with scatter imaging, one can obtain at each voxel, the mass density and the equivalent mass and atomic numbers of the material within the voxel, which are more affirmative composition indicators than those obtained by dual-energy transmission tomography.

Other obvious advantages of scatter imaging, compared to transmission imaging, are the flexibility in locating the source and the detector, which do not have to be on opposite sides, the ability to use more than one detector for the same radiation source beam, and the three-dimensional nature of the scattering process which makes it amenable to multi-planar imaging. In spite of all the above attractive features of scatter imaging, it faces considerable physical and mathematical hurdles [1]. Deciphering information by visually observing raw scatter radiographs, or a set of measurements, is not directly possible, due the convoluted nature of scatter indications. The problem is caused by the non-localized diffused nature of scattering; although we examined the use of the coded-aperture technique to detect localized anomalies with backscatter imaging [2].

The diffusivity of scattering can be over-

A little knowledge is ....

It is impossible for a man to begin to learn what he thinks he knows.

Epictetus

Closed mind

If you shut your door to all errors, truth will be shut out.

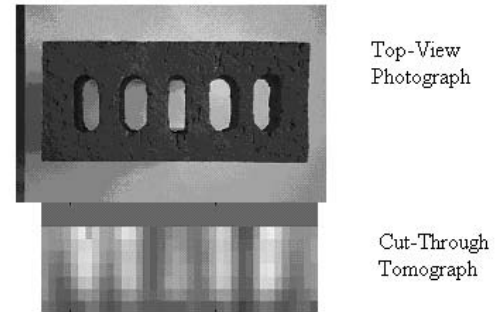
Rabindranath Tagore

come by monitoring only single-scatter events, via radiation collimation or by making use of the unique energy-angle relationship of the kinematics of corpuscular collisions. Even then, single collisions can take place at many locations and mathematical inversion becomes necessary to construct an intelligible image from measurements. The mathematical problem is nonlinear, because the intensity of the scattering signal increases with density and decreases with attenuation. As a result, each recorded scattering measurement corresponds to two possible states: one at low density where scattering is dominant and the other at high density when attenuation prevails.

It is possible, however, to limit the solution to the domain of scatter dominance by restricting the size of the interrogated object to a volume equivalent to that formed by a mean-free-path of the incident radiation. One then assures uniqueness of solution, and the nonlinearity of the problem can be overcome iteratively, as we have done for neutron [3] and gamma-ray imaging [4]. The one mean-free-path restriction limits the use of scatter imaging to a depth of about 150 mm of water-equivalent thickness for 1.25 MeV ( $^{60}\text{Co}$ ) photons and 100 mm for 14 MeV neutrons; two energies at the high end of common radiation sources.

In effort to extend the imaging depth of scatter imaging while removing the duality of solution, we considered eliminating the effect of scattering and of one of the associated attenuation terms. This was done by taking the ratio of two measurements, in which either the paths of incident radiation overlap [5], or the paths of detected radiation coincide [6]. Then the image reconstruction problem becomes equivalent to that of transmission, where a solution for attenuation factors is obtained. However, once this factor is determined, solution for the other attenuation factor and the scattering cross-section becomes possible. An alternative approach is to use attenuation coefficients readily available from transmission tomography to obtain a unique solution for the scattering cross-section [7]. We have also developed a scheme to bias the solution to the domain of attenuation dominance to image pallet-size cargo shipments [8].

Figure 2 shows a recently acquired image with backscattering using the method of [6], for  $5 \times 10$  mm<sup>2</sup> pixels. The results of image reconstruction are not as crisp and fine as those observed in CT medical imaging. However, scatter imaging, even at the current state-of-the-art, can be useful in



*Figure 2: An electron-density reconstructed tomograph of the middle cross-section of a hollow clay brick (top view shown in a photograph). Measurements were acquired by scanning the object from its front (solid) side with a  $^{137}\text{Cs}$  source and detecting backscattered photons at 876 positions and orientations. The image was reconstructed over  $12 \times 8$  pixels ( $5 \times 10$  mm<sup>2</sup> each) using the method of [5], which requires the material at the back of the imaged object to be assigned some known density (methods to remove this restriction are currently under development). This brick was chosen to emulate deteriorated refractory lining (Courtesy of Inversa Systems Ltd., [www.inversasystems.com](http://www.inversasystems.com)).*

one-side bulk-defect imaging, particularly when only one-side access is available or the object is too thick to allow transmission-through imaging. Examples include: the detection of coke build-up in large diameter pipes, finding holes in refractory liners within tanks and vessels, and examining guide trays and supports inside tanks

It is obvious that the potential of scatter imaging and its powerful features are not fully exploited. I summarized in the above the merits and obstacles of scatter imaging in the hope of encouraging more research in this last frontier of imaging with radiation. Addressing this problem will also benefit the other third-degree imaging process: imaging with induced emission (e.g., by neutron activation), which has three associated parameters -- attenuation of incident radiation, that of emitted radiation, and the activation cross-section (with its elemental discrimination ability).

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Need some-  
where to go

Consistency  
is the last  
refuge of the  
unimaginative.

Oscar Wilde



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Professor Hussein's intrigue with radiation interactions has led him to writing a textbook: **Radiation Mechanics: Principles & Practice** Esam Hussein, University of New Brunswick, Fredericton, NB Canada Elsevier Science, Oxford, 2007. (ISBN-13: 978-0-08-045053-7, ISBN-10: 0-08-045053-9)

The publisher's link to the book is: [http://www.elsevier.com/wps/find/bookdescription.cws\\_home/712864/description#description](http://www.elsevier.com/wps/find/bookdescription.cws_home/712864/description#description)

A short description and a detailed table of contents is on <http://www.unb.ca/ME/research/>

LTMD/RadMech\_Outline.html

This book presents a systematic and comprehensive analysis for the radiation interaction mechanisms, their kinematics and probabilities (cross sections), as well as their collective movement (transport). The more than 30 ways via which radiation can interact with the constituents of matter, and its fields, are discussed, in accordance with the nature of interaction mechanism.

Interaction kinematics are analyzed, supported with calculation algorithms, using relativistic (Einsteinian) and classical (Newtonian) mechanics, as well as the powerful concept of invariants. The quantum mechanical and electrodynamics foundations of the interaction cross-sections are examined in a straightforward manner that enables understanding of their behavior, without being immersed in detailed and complex manipulations. The radiation transport process and its associated computational methods are covered in a manner that emphasizes the important features of each approach.

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*Ed. note: The following is taken from a series of slides related to the Humanitarian Technology Challenge (HTC), a new partnership between IEEE and the United Nations Foundation to identify relevant technological challenges that humanitarian aid workers face in the field and then tap into the innovation and solution-building capacity of IEEE's members to provide focused solutions to all or some of the challenges. The HTC Kick-Off Conference scheduled for 2008 will bring together representatives from Non-Governmental Organizations (NGOs), IEEE Members and Volunteers, Corporations, Philanthropic Foundations and User Gateway NGOs (organizations that can help implement the solutions) to set the challenges and the approaches to solving the challenges. This is only a sampling of the slides presented to our society presidents, but will give you an introduction and some insight into this important activity*

*Many of the activities planned also relate to the very important work of the broader organization, Engineers Without Borders, the engineering analog to Doctors Without Borders, the recipients of the 1999 Nobel Peace prize. You can read more about both their US and international activities at <http://www.ewb-usa.org/> or <http://www.ewb-international.org/>, respectively, or contact Prof. Bernard Amadei, EWB-I Executive Director, E-mail: [amadei@colorado.edu](mailto:amadei@colorado.edu), Tel:1-303-929-8167. The NPSS liaison to the IEEE-UN Humanitarian Technology challenge is Ray Larsen, [larsen@slac.stanford.edu](mailto:larsen@slac.stanford.edu) or +1 650 926-4907.*

## Humanitarian Technology Challenge

### A collaboration between the IEEE and the UN Foundation

November 2007

Russ Lefevre, Chair, TAB New Technology Directions Committee

Mary Ward-Callan, Managing Director, Technical Activities

An unprecedented opportunity for a focused collaboration to develop technology-based solutions to some of the most intractable problems facing the world – particularly in

## The selfish gene

When we are planning for posterity, we ought to remember that virtue is not hereditary.

Thomas Paine

## Closer to home

Instead of loving your enemies, treat your friends a little better.

Ed Howe

## The devil is in the details

Amid the pressures of great events, a general principle gives no help.

Georg Wilhelm Friedrich Hegel

- developing regions
- Led by the UN Foundation and IEEE
  - Participants should include:
    - Non Governmental Organizations (NGOs)
    - User Gateway NGOs, e.g. WHO, Red Cross, UN
    - Governments of developing countries
    - Corporations
    - IEEE Societies and Councils
      - Including Individuals from industry and academia
    - IEEE Sections

### HTC PROJECT GOAL

- Bring together humanitarian organizations, first responders, technical experts (practicing technologists, professionals, and academi-

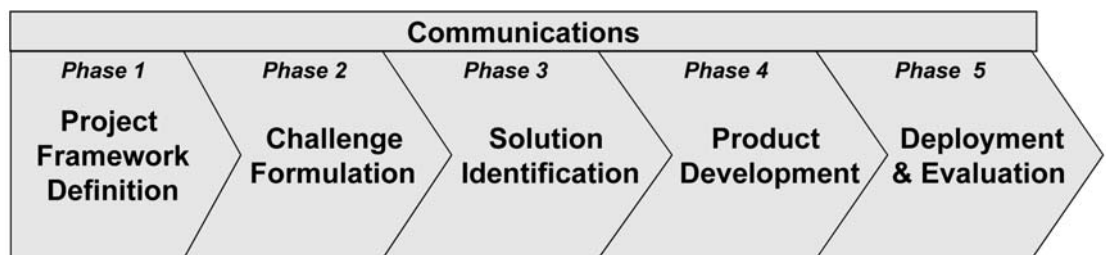
cians), companies, philanthropic groups to address some critical humanitarian-based world problems

- Initial emphasis:
  - Public Health (healthcare)
  - Disaster Response/Management

### IEEE PERSPECTIVES

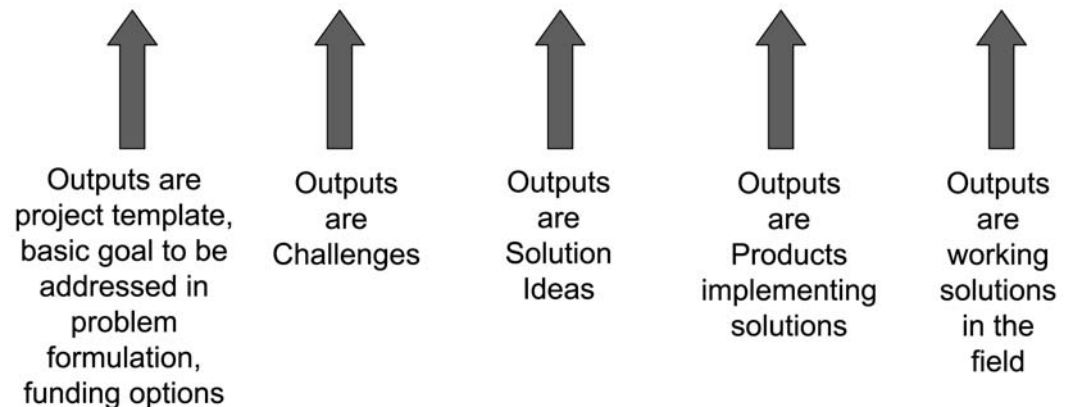
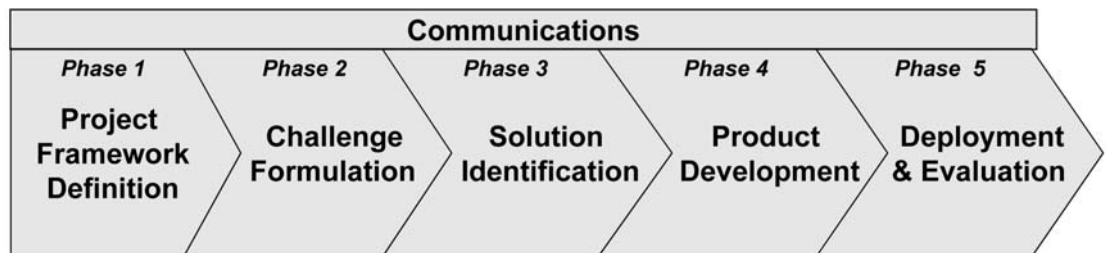
- Bring a more systematic approach to applying technology to help solve world problems. Drive innovation in a directed way
- Trial and Refine “Challenge/Problem Methodology.” Refine repeatable methodologies for addressing challenge oriented, large scale efforts
- Focus on problems needing technology solutions
- Use systems engineering expertise to clearly

### PROPOSED PROJECT FRAMEWORK



We are here: in framing stage

### KEY OUTPUTS FROM EACH PHASE



## Fatalist

We'll jump off that bridge when we come to it.

Lester B. Pearson

- scope problems
- Identify technology based solutions
- Solutions should have a component of sustainability to ensure long-term management given the environmental, cultural, structural, political and socio-economic conditions where they will be deployed. Emphasis is on complete, repeatable, and deployed implementations.
- Engage younger population in these endeavors by providing a web based experience to solicit best ideas from large population in open forums
- Inclusion of potential funders, NGOs, technologists, implementers, and deployers

## PHASE 1

### Project Framework Definition

- Define general approach and project framework
- Draft first pass project plan
- Identify and select possible sponsors
- Develop participation agreements ("public" and "private")
- Arrange funding, Seek
  - internal IEEE funding (initiative or reallocation)
  - IEEE Foundation has committed to support Conferences events
  - UN Foundation has committed to support Challenge Formulation
  - Vodafone has committed to support UNF Challenge Formulation & events
  - other sources (TBD)

### [milestone] Sponsorship and funding defined

- Assign full-time project manager
- Create Steering and Partnership Committees
- Build partnerships with "user gateway" orgs acting as implementation brokers
- Refine project plan

## COMMUNICATIONS

- Socialize project objectives and schedule
- Solicit Society, Council, TAB participation
- Solicit focused participation in Conferences
  - Initial communication announcing challenges and project to IEEE audiences & public
  - "The Institute" article (target June print issue)
  - "IEEE Spectrum" article (target April online edition)
  - Targeted invitation to participate /

register

- Final reminder
- Solicit general participation in online, virtual discussions
  - Initial communications announcing project and invitation to participate
- Announcements of events: Conferences, Workshops, Results
- Publicity ads for general public, government, etc.
- Reminders / marketing messages -- periodically through project duration
- Communications to stakeholders: corporations, foundations, other funders
- Communications assistance to sponsors
- Promotion of results

## STATUS

- Idea investigation between UN Foundation and IEEE completed
- General framework for project proposed
- Partnership between UN Foundation and IEEE defined – event-related MOU completed and signed in November
- Funding solicited
  - UNF approved, Vodafone funding approved
  - IEEE NIC Phase I Initiative approved, preparing Phase II
  - 2008 HTC Conference funded by IEEE Foundation, 2009 pending
  - Interest from other groups is substantial
- First meeting with NGOs to begin problem space understanding was completed, identified some needed changes to project plan
- Additional Focus Groups with NGOs are being planned
- Draft project plan completed in Microsoft Project
- Steering Committee being launched
- Soliciting Society (incl. Council) Partnership Group

## IEEE'S ROLE IN HUMANITARIAN ENDEAVORS

- Engineering and the condition of the world are intimately connected
- IEEE tenets:
  - Advance global prosperity
  - For the benefit of humanity
- Humanitarian activities of increasing interest to IEEE volunteers
  - Ex: IEEE Committee on Earth Observation/GEOSS

---

## Who's that?

Politics doesn't make strange bedfellows – marriage does.

*Groucho Marx*

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## Misogynist? No!!

I used to go missing a lot: Miss Canada, Miss United Kingdom, Miss World...

*George Best*

## 2008 Nuclear and Plasma Sciences Society

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