

# Nuclear & Plasma Sciences

Number 2 • June 2004

SOCIETY NEWS

## CONFERENCES

### 2004 Nuclear and Space Radiation Effects Conference Atlanta, GA July 19-23, 2004

On behalf of the IEEE NPSS Radiation Effects Committee, it is my pleasure to invite you to attend the 41st Annual International Nuclear and Space Radiation Effects Conference to be held July 19-23, 2004, at the Renaissance Waverly Hotel in Atlanta, Georgia. The 2004 Conference will continue the tradition of previous NSRE Conferences by offering an outstanding technical program, a one-day Short Course preceding the technical program, a Radiation Effects Data Workshop, and an Industrial Exhibit. We expect attendance by engineers, scientists, managers, and other interested attendees from all around the world. Some highlights of the Conference are given below. Additional information on the conference can be obtained on the Web at <http://www.nsrec.com>.

The Technical Program Chairman, Jim Pickel (PRT, Inc.), and his program committee have put together an exceptional set of contributed papers that have been arranged into 10 sessions of oral and poster papers, and a Radiation Effects Data Workshop. The Radiation Effects Data Workshop consists of papers emphasizing radiation effects data on elec-

tronic devices and systems and descriptions of new simulation and radiation test facilities. In addition, there are three outstanding invited talks of general interest to which we encourage you to come and to bring your companions.

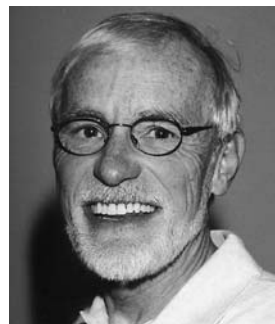
The theme of this year's Short Course, organized by Joe Srour (The Aerospace Corporation), is "Hardness Assurance and Photonics Challenges for Space Systems." The Short Course will start with Monday morning devoted to systems and piece parts hardness assurance issues for microelectronics and photonics, with the afternoon focusing on issues confronting the successful use of photonics in space. This is the Silver Anniversary edition of the NSREC Short Course – it will be interesting and informative for attendees of all backgrounds and experience levels.

This year's Industrial Exhibit, organized by David Meshel (Northrop Grumman) will permit one-on-one discussions between conference attendees and exhibitors on the latest in radiation-hardened and radiation-tolerant electronic devices, radiation analysis and testing services, and radiation test facilities and test equipment.

*continued on page 3*



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Chairman



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Technical Program  
Chairman



**Joseph R. Sour**  
Short Course  
Chairman



**James Kinnison**  
Local Arrangements  
Chairman

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## IEEE NUCLEAR AND PLASMA SCIENCES SOCIETY NEWS

is published three times per year by The Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Lane, Piscataway, NJ 08855.

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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 April 16, 2004.

### CONTRIBUTED ARTICLES

News articles are actively solicited from contributing editors, particularly related to important R&D activities, significant industrial applications, early reports on technical break-throughs, 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.

Committee Chairpersons, Liaison Representatives, and other Ad Com members are particularly reminded that reports, award announcements, or observations on society interests are needed and should be submitted where possible before the copy deadline of April 16, 2004.

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Printed in U.S.A.

On Tuesday evening, attendees and their companions are invited to a reception that showcases the Industrial Exhibit.

Social events have been planned to give Conference attendees and their guests opportunities to informally discuss radiation effects and to become better acquainted. Jim Kinnison (Johns Hopkins University/Applied Physics Lab), this year's Local Arrangements Chairman, has put together a memorable social program. The highlight of the program will be the Wednesday evening social where attendees and their companions can enjoy several popular attractions in downtown Atlanta including the World of Coca-Cola™, Underground Atlanta, and authentic southern cuisine served in Atlanta's historic railroad depot. We strongly encourage you to register as early as possible for the social events, as some are limited in the numbers we can accommodate.

Atlanta is a great destination for the whole family. Its diverse restaurants feature cuisine from around the globe prepared by world-renowned chefs. Atlanta's convenience for travel, wide range of attractions, and southern hospitality make it enjoyable for tourists year-round. The area around the Conference hotel features upscale shopping, easy parking, and a wide range of dining options – downtown Atlanta, Buckhead, and many other attractions are within convenient driving distance. From Atlanta's role in the Civil War to the celebration of the 1996 Centennial Olympic Games, Atlanta's historical attractions promise a visit filled with education and entertainment.

Your 2004 IEEE NSREC Committee has been busy working to ensure that this Conference will be technically beneficial and socially rewarding. We are excited about this year's Conference and look forward to seeing you in Atlanta!

### **Short Course Program**

This one-day Short Course will address two important topics and their related challenges for present and future space systems: hardness assurance and photonics. Assuring space-system radiation hardness involves many technical considerations. One lecturer will provide an overview of the techniques used to assure that hardness is maintained at the system level throughout the program life-cycle. Related challenges and potential solutions will also be addressed. A second speaker will focus on hardness assurance for electronic components. The second major topic at the Short Course is photonics for space systems. Nearly all present and envisioned space systems

include photonic elements and subsystems, with key examples being solar arrays, optical sources and detectors, and optical fibers. To make use of current and emerging photonic components, designers must have knowledge of their radiation response and any associated limitations. Three speakers at the 2004 NSREC Short Course will address key effects of radiation on and challenges for photonics in space. Their comprehensive talks will include optical sources, detectors and imagers, fibers, solar cells, and photonic subsystems. This Short Course will provide a unique and cohesive set of talks for designers, radiation effects engineers, components specialists, and other technical and management personnel involved in developing space systems. Joe Srour of the Aerospace Corporation, the 2004 Short Course Chairman, has organized an exceptionally qualified team of lecturers to address these topics. This is a unique opportunity for NSREC attendees to benefit from the expertise of this world-class team. Each lecturer will provide sufficient background information to allow participants to appreciate the basics. Lectures will also include recent results and emerging technologies. The Short Course will benefit both new and experienced engineers, scientists, and managers.

### **Technical Program**

The NSREC technical program will consist of contributed oral and poster papers, three invited papers, and a data workshop. All oral papers will be 12 minutes in length with an additional 3 minutes for questions. The technical sessions and chairpersons are:

- Basic Mechanisms of Radiation Effects  
– Chair: Shyam Khanna, Defence Research Establishment / Canada
- Single-Event Effects: Mechanisms and Modeling  
– Chair: Ken Galloway, Vanderbilt University
- Space Radiation Environments  
– Chair: Mike Xapsos, NASA Goddard Space Flight Center
- Terrestrial Radiation Environments and Effects  
– Chair: Phillipe Roche, STMicroelectronics / France
- Single-Event Effects: Devices and Integrated Circuits  
– Chair: Bill Heidergott, General Dynamics
- Radiation Effects in Photonics  
– Chair: Gordon Hopkinson, SIRA Electro-Optics Ltd. / United Kingdom

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## Thy will be done

The world would be a safer place if leaders could tell the difference between God's will and their own.

*The Very Rev.  
Alan Jones*

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## Basic assumption

[George H. W. Bush is] a man who was born on third base and thinks he hit a triple.

*Jim Hightower*

## Then, why do we vote?

One might say that a nation is politically stable when nothing of radical consequence is determined by its elections.

*Walter Lippmann*

- Hardness by Design
  - Chair: Harald Schone, Air Force Research Laboratory
- Dosimetry and Facilities
  - Chair: Dave Roth, Johns Hopkins University Applied Physics Laboratory
- Hardness Assurance
  - Chair: Mike Maher, National Semiconductor
- Radiation Effects in Devices and Integrated Circuits
  - Chair: Marion Rose, Jaycor/Titan Systems

### **INVITED SPEAKERS**

Three invited speakers will give stimulating and entertaining presentations during the conference on subjects outside the radiation effects area. Dr. Paul Charp of the Centers for Disease Control and Prevention (CDC) will discuss the role of the CDC in radiological emergencies. Dr. Alan Stern of Southwest Research Institute will describe “New Horizons,” the first mission in NASA’s flagship New Frontiers program to explore the planets robotically. Dr. David Griscom of impactGlass Research International will present evidence that Washington DC is built on asteroid ejecta deposits of the 35.5 million-year-old Chesapeake Bay Crater.

### **INDUSTRIAL EXHIBIT**

Starting at noon on Tuesday, July 20 this year’s Industrial Exhibit, organized by David Meshel Northrop Grumman will provide an opportunity for conference attendees to discuss the latest radiation-resistant electronics, radiation analysis and testing equipment and facilities, and hardware and software simulation products and services. An Industrial Exhibits Reception will occur on Tuesday evening. Exhibitors include:

- 3-D Plus
- Actel
- Aeroflex Colorado Springs
- ATMEL
- BAE Systems
- Boeing Phantom Works
- Defense Microelectronic Activity
- DPA Components International
- Honeywell
- ICS & JL Shepherd & Associates
- International Rectifier
- Interpoint, A Crane Company
- Intersil Corporation
- J.D Instruments
- Lawrence Berkeley National Lab

- Maxwell Technologies
- Modular Devices
- MRC Microelectronics
- NASA Goddard Space Flight Center
- NASA Marshall Space Flight Center
- Northrop Grumman
- Peregrine Semiconductor Corporation
- Prairie View A&M Univ-NASA Center for Applied Radiation Research
- Sandia National Laboratories
- Silvaco
- SVC/WSMR
- Texas A&M Cyclotron
- US Semiconductor
- Vanderbilt University
- Xilinx, Inc.

### **SOCIAL PROGRAM**

Jim Kinnison (Johns Hopkins University/Applied Physics Lab), this year’s Local Arrangements Chairman, has put together a memorable social program. The highlight of the program will be the Wednesday evening social where attendees and their companions can enjoy several popular attractions in downtown Atlanta including the World of Coca-Cola™, Underground Atlanta, and authentic southern cuisine served in Atlanta’s historic railroad depot. We strongly encourage you to register as early as possible for the social events, as some are limited in the numbers we can accommodate.

Please visit [www.nsrec.com](http://www.nsrec.com) to view the activities and obtain the registration forms.

Please call the Renaissance Waverly Hotel 770-953-4500 at and ask for the “IEEE NSREC” block of rooms. Reservations must be guaranteed. The cut-off date for room reservations is June 15, 2004. After that date, room accommodations will be confirmed on a space available basis and the conference room rate is not guaranteed.

### **ADDITIONAL INFORMATION**

For the latest NSREC information (technical program, conference & social registration forms, hotel and travel information, etc.) please visit our web site at <http://www.nsrec.com>.

You may contact the General Chairman, Dan Fleetwood, Vanderbilt University at (615) 322-2498 or Email: [dan.fleetwood@vanderbilt.edu](mailto:dan.fleetwood@vanderbilt.edu).

Or you can contact the Publicity Chairwoman, Teresa Farris, Aeroflex, at (719) 594-8035; E-mail: [teresa.farris@aeroflex.com](mailto:teresa.farris@aeroflex.com) who prepared this article.

# IEEE International Conference On Plasma Science

## Baltimore, MD

### June 28 - July 1, 2004

IEEE International Conference on Plasma Science to be held in Baltimore, MD, June 28 through July 1, 2004. The conference, held at the Hyatt Regency on the Inner Harbor in Baltimore, Maryland, will feature an exciting technical program with up-to-date reports on new developments in plasma science and engineering.

Information regarding abstract submittal, conference registration, hotel registration, and minicourse registration can all be found on the web site [www.ieee.org/icops2004](http://www.ieee.org/icops2004).

Plasma science covers a broad spectrum of topics and a wide range of applications. This conference will offer a balanced technical program with representation from all of these research areas including:

- Basic Processes in Fully and Partially Ionized Plasmas
- Microwave Generation and Plasma Interaction
- Charged Particle Beams and Sources
- High Energy Density Plasmas and Their Interactions
- Industrial, Commercial, and Medical Applications of Plasmas
- Plasma Diagnostics
- Pulsed Power and Other Plasma Applications

Researchers from the world over will be presenting results of their work. The conference will have seven plenary talks of general interest to the plasma physics community given by recognized leaders in their fields. Contributions from plenary and invited talks will be published in a Special Issue of the IEEE Transactions on Plasma Science. In addition to the annual ICOPS ban-

quet and PSAC award, the conference will host a two-day mini-course on "Non-Thermal Medical/Biological Applications of Ionized Gases and Electromagnetic Fields" (see below for further details) and a job placement center for persons interested in employment throughout various areas of plasma science.

The Hyatt Regency-Baltimore overlooks the Baltimore Inner Harbor and boasts meeting facilities ideally suited for moving between poster and oral talks, all the while providing ample room for interactions with colleagues. The hotel is within walking distance of many attractions such as the Baltimore Aquarium, the Maryland Science Center, Camden Yards, and many fine shops and restaurants. For more information on the Baltimore area, please visit their web site at [www.baltimore.org](http://www.baltimore.org). The conference location is also only a 30 to 40 minute drive from the nation's capital, Washington, DC and Annapolis, the state capital of Maryland. As conference dates merge with the Independence Day weekend, a limited number of rooms have been reserved at the conference rate for those wishing to take part in the elaborate 4th of July festivities in Baltimore, Annapolis, and Washington, DC.

The conference organizers, including committee members, session organizers, and conference planners, encourage you to attend this meeting. We will work hard to ensure that the technical program will be rewarding and that your stay in the Baltimore/Washington area will be especially enjoyable. For more details, please visit the conference website at [www.ieee.org/icops2004](http://www.ieee.org/icops2004).



**Joseph W. Schumer**  
*Local Chair  
ICOPS 2004*

## Non-magnetic personality

... here is a man so boring that even a boomerang wouldn't come back to him.

*John Ivison*

## They think?

But most politicians have trained themselves to think thoughts that are useful, not thoughts that are necessarily true.

*David Brooks*

# 2004 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)

including  
The Symposium on Nuclear Power Systems (SNPS)  
and  
The 14th International Workshop on Room Temperature Semiconductor X- and Gamma- Ray Detectors (RTSD)  
Rome, Italy, October 16 - 22, 2004  
Conference Web Site: <http://www.nss-mic.org/2004>



**Alberto Del Guerra**  
2004 NSS/MIC Chair

Dear Colleagues,

The Nuclear Science Symposium (NSS), Medical Imaging Conference (MIC), Symposium on Nuclear Power Systems (SNPS) and 14th International Workshop on Room Temperature Semiconductor X- and Gamma- Ray Detectors (RTSD) will be held for the first time in Italy, in the prestigious city of Rome, on October 16-22, 2004. This Conference represents a unique opportunity for scientists and engineers from all over the world to participate and present their original work in a variety of subjects related to nuclear science and medical imaging.

The **Nuclear Science Symposium (NSS)** offers an outstanding occasion for scientists and engineers interested or actively working in the field of nuclear science, radiation instrumentation, software and their applications to meet and network with colleagues from around the world. Instruction on specialized topics will also be available through the Short Course program. Authors are invited to submit papers describing original, previously unpublished work in the topics areas listed below:

- Analog and Digital Circuits
- Astrophysics and Space Instrumentation
- Data Acquisition and Analysis Systems
- Environmental Health and Safety Instrumentation
- Gaseous Detectors
- High Energy Physics Detectors
- New Radiation Detectors
- Nuclear Measurements and Monitoring Techniques
- Photodetectors and Radiation Imaging
- Radiation Damage Effects
- Scintillation Detectors
- Solid State Tracking Detectors
- New Solid State Detectors

- Synchrotron Radiation Instrumentation
- Trigger and Front-End Systems
- Instrumentation for Medical and Biological Research
- Nuclear Physics Instrumentation
- Accelerators and beam line instrumentation
- Computing and Software for Experiments

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The **Medical Imaging Conference (MIC)** is one of the most productive international scientific meetings on the physics, engineering, and mathematical aspects of nuclear medicine based imaging. In addition, significant contributions in X-ray and other imaging modalities involving ionizing radiation are an emerging area of the MIC. Authors are invited to submit papers describing original and innovative tech-

nical contributions to the general field of medical imaging in the following list of topics:

- Emission Tomography Instrumentation (PET, SPECT)
- Multimodality Systems
- High Resolution and Animal Imaging Systems
- Image Reconstruction Methods
- Intra-operative Probes and Portable Imaging Systems
- Modeling of Medical Imaging Systems
- Evaluation of Imaging Systems and Reconstruction Methods
- Dynamic Data Acquisition and Processing Methods
- Quantitative Image Processing Methods
- Application of New Detector Materials and Technologies to Medical Imaging
- X-ray Computed Tomography
- Nuclear Magnetic Resonance
- Optical Imaging Technology and Processing
- Other Imaging Modalities: Ultrasound, Synchrotron Radiation, Impedance/Biomagnetic/Bioelectric Imaging

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The **Symposium on Nuclear Power Systems (SNPS)** will again be held in conjunction with the Nuclear Science Symposium. The technical paper sessions on nuclear power systems cover subjects of current major interest to

the operation of nuclear power stations and supporting services and suppliers, including:

- Upgrading Digital Technology for Reactor Protection and Other Applications
- Reliability-based Maintenance and Plant Modernization
- New Aspects on Equipment Qualifications
- Plant Life Extension with Cost Effectiveness
- A Special Annual Overview Report of Major Importance to Nuclear Power Utilities
- Risk Informed Regulation - Panel Session

For information concerning the Symposium on Nuclear Power Systems, please contact:

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The **14<sup>th</sup> International Workshop on Room Temperature Semiconductor X- and Gamma-Ray Detectors (RTSD)** represents the largest forum of scientists and engineers working to develop new solid-state radiation detectors and imaging arrays. The training program for early state researchers offers a great opportunity to increase knowledge and professional skills. Room temperature semiconductor radiation detectors are finding increasing application in such diverse fields as astrophysics, nuclear medicine, national security, and environmental remediation. The objective of this workshop is to provide a forum for discussion of the latest results to advance the state-of-the-art of this technology. To provide a comprehensive review, oral and poster presentations representing a broad spectrum of research activities emphasizing either device or materials understanding are sought. Authors are encouraged to submit abstracts on original, unpublished work in the following areas:

- Wide Band-gap Semiconductor Materials for Radiation Detection
- Strip, Pixel and Discrete Semiconductor Arrays
- Crystal Growth and Materials Characterization
- Properties of Electrical Contacts and Internal Field Distributions
- Radiation Damage, Long-Term Stability and Environmental Effects

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### **Our loss is...**

We have a government that ... uses the power of government and the money of tax-payers for the overriding purpose of keeping itself in office.

*Mark F. Proudman*

## Unbounded!

Genius may have its limitations but stupidity is not thus handicapped.

Wendy Northcott

- Scintillator/Semiconductor Array Hybrids
- Semiconductor Neutron Detectors
- Detector/ASIC Hybridization and Interconnects
- Spectrometer Systems for Nuclear Inspections Safeguards, Portal Monitoring and International Security
- Imaging Systems for Medical, Astrophysics and Cargo Monitoring Applications

For questions concerning the International Workshop, please contact:

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The venue of the Conference is the Ergife Palace Hotel, one of the largest exhibition and conference centers in Europe. Its complex is unique, combining one of the largest hotels in Italy with extension exhibition facilities on the same site. It provides a relaxed atmosphere far from the hustle and stress of the city, making the conference activities pleasant and time effective. The Ergife Palace Hotel is located in a residential area of the capital city in a key position near S. Pietro Cathedral and within a short distance from the historical center of Rome. It is only 4 kilometers from the main Ring Road, and 26 kilometers from Fiumicino's Leonardo da Vinci International Airport. It is within walking distance of the subway ('Metro') station. Regular bus services provide connections with all of the important cultural sites and commercial centers in Rome. Taxi services are constantly available to guests and a shuttle service is provided by the hotel on demand. I look forward to meeting you in the splendid city of Rome and wish you a pleasant and fruitful stay.

### Alberto Del Guerra

General Chairman  
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## Call for Papers 2004 Symposium on Nuclear Power Systems (SNPS)

Rome, Italy, October 21, 2004



**Jay Forster**  
SNPS Program  
Chairman

The 2004 Symposium on Nuclear Power Systems (SNPS) will again be held in conjunction with the Nuclear Science Symposium and Medical Imaging Conference. The technical paper sessions on nuclear power systems cover subjects currently of major interest to the operation of nuclear power stations and supporting services and suppliers, including:

- Upgrading digital technology for reactor protection, I&C, and other systems
- Reliability-based maintenance and plant modernization
- New aspects on equipment qualifications

- A special annual overview report of major importance to nuclear power utilities
- A panel session of major importance to operating NPGS
- And more

*Please send an abstract (11.5 x 10 cm, block) and a summary of maximum two pages by May 15, 2004 to Jay Forster, SNPS Program Chairman, GE Nuclear Energy, M/C 334, 175 Curtner Ave., San Jose, CA 95125; Phone: +1 408 925-5090; Fax: +1 408- 925-2923; E-mail: jay.forster@gene.ge.com*



# Workshop RADECS2004 Radiation on Components and Systems

22-24 September 2004  
Madrid, Spain

The RADECS Conference and Workshop are international technical meetings, organized in Europe. The first RADECS Conference was organized in 1989 by the University of Montpellier, and since then the RADECS Conference and RADECS Workshop have run in alternate years. Both the RADECS Conference and Workshop address technical issues related to radiation effects on components, electronic devices, sensors, integrated circuits, as well as radiation hardening, new radiation testing methods, models and simulation techniques. This field is of importance for the space, nuclear and defense industries, as well as for research in high-energy physics. The IEEE Nuclear and Plasma Sciences Society (NPSS) has been a technical sponsor of both the RADECS Conference and Workshop since 1991, and an issue of IEEE Transactions on Nuclear Science highlights technical work from at these meetings.

The main theme of Workshop RADECS2004 will be: "Radiation Effects on Optoelectronic Components and Photonic Devices".

This subject has been identified as of general interest for the radiation community and also represents a large area of Spanish research in radiation effects.

Other topics to be addressed will be:

- Basic mechanisms of radiation effects.
- Radiation effects on materials, devices and circuits.
- Single Event Phenomena.
- Total dose and dose-rate effects.
- Displacement damage effects.
- Radiation environment, characterization and modeling: Ground level and Aerospace.
- Radiation hardening techniques on circuits and systems.
- Radiation test methods, metrology and test facilities.
- Nuclear power plants and high-energy physics.
- New developments of interest and radiation effects on new technologies.

- Other topics related to radiation effects on components and systems.

Invited talks and a round table will take place during the Workshop.

**Workshop RADECS2004** will take place in Madrid from 22nd to 24th September 2004 at CIEMAT (Research Centre for Energy, Environment and Technology). This is the first time that the RADECS Workshop will be organized in Spain. The INTA (Spanish Institute for Aerospace Technology) is leading the RADECS Workshop organization in collaboration with Tecnologica Componentes Electrónicos and Alcatel Espacio.

**A Grants program** for students and young graduates will be established. It will be sponsored by MCYT (Science and Technology Ministry) and the CSIC-MCYT (Consejo Superior de Investigaciones Científicas)

The papers from Workshop RADECS2004 will be published after the event and sent to all attendees, and a selection of these papers will be in an issue of IEEE Transactions on Nuclear Science.

More Information about the workshop is available at:

E-mail: [Radecs\\_Hlt642604452BM\\_1\\_004@inta.es](mailto:Radecs_Hlt642604452BM_1_004@inta.es)

Web pages: <http://www.radecs.org>

Fax: +34 91 5359617

**MADRID**, the capital of Spain, is the city where Workshop RADECS2004 will take place. Located in the heart of the Iberian peninsula, it is right in the center of the Castillian plain 646 meters above sea level, and has a population of over three million. It is a cosmopolitan city, a business center, headquarters for the Public Administration, the Government, the Spanish Parliament and the home of the Spanish Royal Family, Madrid also plays a major role in both the banking and industrial sectors. Most Aerospace, Electronics and Communications industries are clustered round the northern fringe of the city.

Madrid is characterized by intense cultural and artistic activity and a very lively nightlife. The grand metropolis of Madrid can trace its or-



**Harold L. Flescher**  
*Liason to RADECS  
Conferences and  
Workshops  
Div. IV Director*

## Last chance

If at first you don't  
succeed... then  
skydiving is not  
for you.

*Wendy Northcott*

iginis to the times of Arab Emir Mohamed I (852-886), who ordered the construction of a fortress on the left bank of the Manzanares River. Madrid later became the subject of a dispute between the Christians and Arabs until Alfonso VI conquered it in the 11th century. At the end of the 17th century, a defensive wall was built for the protection of the new outlying areas, tracing the roads of Segovia, Toledo and Valencia. During the 18th century, under the reign of Carlos III, the great arteries of the city were designed, such as the Paseo de la Castellana, Paseo de Recoletos, Paseo del Prado and Paseo de Acacias. At the beginning of the 19th century, Joseph Bonaparte undertook the reform of the Puerta del Sol and vicinity. The commercial

street known as the Gran Vía was built as an east-west avenue at the start of the century. In the 1950's, a north-south boulevard called Paseo de la Castellana was extended, and modern buildings were erected which house the major financial institutions. What remains today of the distant past are mainly the Baroque and neo-classical structures of the 17th and 18th centuries, such as the Plaza Mayor (Main Square) and the Palacio Real (Royal Palace).

Madrid is also famous for its Museums. It has three wonderful art museums, the most well known of which is the Museo Nacional del Prado.

You can find more information about Madrid in the following website: <http://www.red2000.com/spain/madrid/>

## NPSS GENERAL BUSINESS

### Vice President's Report



**William W. Moses**  
*NPSS Vice President*

**W**hile the last few years have been difficult ones financially for the IEEE, I am pleased to say that the situation has gotten a lot better. The IEEE as a whole is once again operating in the black, and our focus is shifting from “survival mode” to more forward looking activities. Within the NPSS, one major focus is conferences. Little has changed recently in the “conference scene” — the conferences that we sponsor continue to be highly regarded scientifically (our primary concern), although the financial woes of the past few years mean that they have gotten considerably more financial scrutiny (which is also a good thing). We strive to make all of our conferences affordable, and are pleased to report that a recent study finds that our conferences are not only less expensive than competing conferences, but they also tend to be longer in duration and include more “extras” (such as a CD containing manuscripts presented at the conference). In other words, we provide more bang for less bucks!

Publications are our other major activity, and I anticipate a lot of changes in the coming years. While our primary concern is maintaining the high scientific quality of our publications, the last few years have again taught us that the business aspects cannot be ignored. High quality is useless if we cannot afford to publish the journal! It is clear that the importance of electronic publication is rapidly growing and that of paper is rapidly declining. If we extrapolate this trend to all-electronic publishing, we are faced with numerous

intriguing questions. Will the notion of a “journal” become obsolete, replaced by a search engine that finds articles on related topics (or those presented at a specific conference)? Would you subscribe to such a “journal,” or would you pay per article downloaded? Would libraries be replaced by site licenses? How could “Open Access” (a proposal whereby all government funded scientific papers would be freely accessible to all) fit in? These questions are presently unanswered, but they promise significant changes in the future.

Finally, we have always received a tremendous amount of help from our volunteers, who have generously donated their time, effort, and intellect to advancing their professions. I would like to thank two of our volunteers who are stepping down for their excellent work — John Valentine is stepping down as the Associate Editor for Transactions on Nuclear Science (TNS) who was responsible for manuscripts associated with the NSS, and Vern Price will be cutting back on his Membership and Recruitment activities. We need enthusiastic people to replace them, so please let me know if you (or somebody that you know) would be interested! In addition, the IEEE Women in Engineering is asking for Society representatives / liaisons. Please email Cary Loh ([c.loh@ieee.org](mailto:c.loh@ieee.org)) with questions or if you know anybody who is interested.

Bill Moses can be reached at the Lawrence Berkeley National Laboratory, One Cyclotron Road, MS55-121 Berkeley, CA 94720-8099, E-mail: [wmmoses@lbl.gov](mailto:wmmoses@lbl.gov).

## Secretary's Report

New Orleans, LA, 12-13 March 2004

The AdCom held a retreat and business meeting in New Orleans on March 12-13<sup>th</sup>, 2004. This meeting was unusual as both the President and Secretary were unable to attend and so the Vice President, Bill Moses, took the chair and the author of this report paid the price of not attending the evening meal the day before when the problem of the lack of a secretary was discussed and he found himself appointed the relief secretary. It is my belief that the relief was elsewhere when I succumbed to the *fait accompli*.

With the New Year, there are new members of AdCom and so part of the retreat was taken with an introduction to NPSS, the IEEE and in particular to the financial issues. Just like any organization, the infrastructure takes resources to develop and maintain and this infrastructure does not, in itself, always have sufficient revenue. Thus taxes are necessary. Of course, the costs are not always appreciated and even the benefits are forgotten. Hal Flescher covered all of these prickly financial issues.

Other topics discussed were:

- Publications Review
- Educational Activities
- Overseas Conferences
- Communications with NPSS Members and to Potential Members
- Communication Among AdCom Members
- Meeting Finances and Audit Committee
- Effective AdCom Subcommittees

The AdCom business meeting was the second day. The writer apologizes to the reader that the following is hardly riveting reading. This reflects the meeting which, while interesting and useful to the members in their work of running the many activities of the NPSS, could by no way be described as attention holding. There are the moments of high drama when personalities and opinions clash for a moment but these occasional interludes are difficult and sometimes inappropriate to capture in writing for the membership.

Ed Lampo, our treasurer, reported the details of the publications' finances, meetings' finances and general society finances. Conferences are our most demanding activity on the volunteers who manage them and there

are many details to be attended to. The treasurer of the conference has not only to manage the finances but also prepare the books for the IEEE audit. Bills and payments follow the meeting and so it is the treasurer who has to do a considerable portion of the work when the meeting is over and everyone else can relax. There are good, legal, reasons to close out the conference books as soon as possible, leaving outstanding payments and bills to be handled by the society. However, it seems that even though Ed Lampo is happy to handle the tail ends, some conference treasurers find the preliminary closing difficult to do and the society pays fines to the IEEE for late closings. Overall the finances of the society are healthy and this was helped by the bonus that TNS received for publishing pages within the tolerance of the page budget in 2003.

Both Bill Moses and Hal Flescher gave reports to AdCom and these are covered elsewhere in this newsletter.

From the technical committees, Computer Applications (CANAPS) is selecting the site for the 2005 meeting and this could be in the US or Europe with a decision to be made at about the deadline for this newsletter. Hopefully, the next meeting will not suffer the equivalent of the SARS scare. Christian Boulin also reported that he will be updating the CANAPS web site.

Phil Heitzenroeder, the chairman of the Fusion Technology Technical Committee reported on the 20<sup>th</sup> SOFE meeting and the plans of the next meeting in 2005. At the time of the AdCom, the Proceedings of the last meeting were in final review. The next meeting will be held in September 2005 in Knoxville, TN, but the hotel has not yet been chosen. The Chairman of this meeting is Nermin Uckan and David Rasmussen is the Program Chair. There is a discussion underway to co-locate the 2007 meeting with ICOPS as has been done before. This meeting will be held in Albuquerque at the Convention Center.

Ron Keyser, the chairman of Nuclear Instrument and Detector Standards Committee reported that work on reviewing the membership has begun as well as the search for new members. In the future expanded role of the



**Peter N. Clout**  
*Secretary pro tempore*

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### Hollow core

When they discover the centre of the universe, a lot of people will be disappointed to discover they are not it.

*Bernard Bailey*

## Not finished yet!

The value of old age depends upon the person who reaches it. To some men of early performance it is useless. To others who are late to develop, it just enables them to finish the job.

*Thomas Hardy*

committee as a standards functional committee, more members are needed with expertise in the other technical committee areas. The review of several standards for reaffirmation is underway. No new standards have been started.

Magnus Dahlbom, the chairman of the Nuclear and Medical Imaging Sciences Committee, reported that the 2003 NSS/MIC had an attendance of over 1350, a very significant increase in attendance over the previous meeting. Arrangements are well in hand for the Rome meeting in October and the following two meetings. There is consideration being given to holding later meetings in Germany and Australia.

Bruce Brown, the chairman of the Particle Accelerator Science and Technology Committee, reported that the arrangements for the 2005 PAC in Knoxville are well under way under the chairmanship of Norbert Holtkamp who has recruited Swapan Chattopadhyay from Jefferson Lab to serve as Program Chair. The 2007 PAC will be held in Albuquerque chaired by Stan Schriber and the 2009 PAC will be held in Vancouver, May 4-8 chaired by Paul Schmor. PAC continues to post the proceedings of the PAC openly on the web with the agreement of NPSS and the IEEE. Bruce and others are active in nominating members of the PAC community to Senior and Fellow level with success.

Bob Reinovsky, the chairman of the Pulsed Power R&D Committee, reported that the next Pulsed Power Conference will be in Monterey, June 14-17, 2005. This will be co-located with ICOPS and held at the end of the week before the ICOPS meeting. The meeting is chaired by John Maenchen. In 2007 the Pulsed Power Conference will be held combined with the ICOPS meeting and with the same general chair. This will be held in Albuquerque, NM, June 17-22, 2007 and interestingly, the PAC will be held in the same convention center the following week. The Pulsed Power Committee has been continuing its dialog with several independent conferences whose field of interest includes pulsed power with a view to cooperation. Dave Stoudt has agreed to chair the 2009 meeting.

Ron Schrimpf, the chairman of the Radiation Effects Committee, reported that the 2005 NSREC will be held in Seattle, July 11-15 and the 2006 meeting will be held near Jacksonville, FL. Ron reported that the delay in the December NSREC issue of TNS caused

problems for reviewers of the 2004 meeting abstracts as the previous year's papers were not available for consultation.

Radiation Instrumentation: Craig Woody, the chairman of the Radiation Instrumentation Committee, reported on NSS meetings from three years ago to over three years ahead. Upcoming NSS meetings are in Rome (this year), St Juan, PR (2005) chaired by Tom Lewellen, San Diego, CA (2006), chaired by Graham Smith and for 2007 the site selection is underway under the chairmanship of Ron Keyser as reported above.

Erik Heijne, the chairman of the Transnational Committee, reported that the committee has expanded with new members so that all regions of the world are represented except Africa. Several members of the committee are active in the support of the Rome MIC/NSS with monthly meetings. The committee has also been active in supporting local chapters. Patrick Le Dú then presented his data and analysis of holding NPSS meetings outside North America. There are differences that need to be taken into account, business culture, tax law and the additional costs of convention centers rather than large hotels with convention facilities. The changed attendance when moving an established meeting to a new continent can also present challenges of success. All the recent numbers have been impacted by the events of 9/11 and the SARS epidemic.

This concluded the reports from the technical committees and the transnational committee. All the chairs of these committees have a vote on AdCom as a result of this office. The functional chairs and liaison representatives, whose reports made up the remainder of the oral reports, do not have a vote and are thus, presumably, motivated to do the job for reasons other than the power of the AdCom vote. Most of the information in these reports is also presented to the membership in articles on issues of this newsletter and so I will not repeat them here.

Under new business, there was a proposal from Tony Lavietes that the NPSS should purchase computers, wireless networking equipment, projectors and shipping containers for the MIC/NSS and other meetings that would like to use them. The motivation is the large cost of local rental (often a 5-day rental equals the cost of purchase). Tony and his volunteers would maintain the equipment and set it up for each meeting. This expenditure was approved and it was decided to expedite the purchase. A

proposal to generalize the MIC/NSS web registration software was tabled as it was not clear that there would be sufficient use by other meetings to justify the cost.

The final part of the AdCom was to finish consideration and vote on motions that had come forward in the meeting. Significant motions passed were those to endorse, "in cooperation with," the 4<sup>th</sup> World Congress on Microwave and Radio Frequency Applications, Austin, TX, 7-12 November 2004, to co-sponsor the not-for-profit Megagauss Institute Inc. International Conference on Megagauss Magnetic Fields and Application in Santa Fe, sponsor the Beams Conference when it is organized in the US and to "technically co-sponsor" the Beam Conference when held outside the US, that, until withdrawn, the IEEE-NPSS is a continuing technical co-sponsor of ICALEPCS, and that the

IEEE-NPSS shall be a continuing sponsor of RADECS as Technical Co-Sponsor.

The changes to the bylaws were passed unanimously.

It was also voted that there should be another member interest survey to assign the AdCom voting member allocation among the fields of interest. This survey is important in the operation of the society and some of our larger activities are under represented on AdCom because of low NPSS membership in that community or lack of ballot returns.

The meeting finally adjourned at 5:30pm, 30 minutes behind schedule.

*Peter Clout, Secretary Pro Tempore of NPSS, can be reached at Vista Control Systems, Inc., 176 Central Park Square, Los Alamos, NM 87544-4031, Phone: 1+505 662-2484; Fax: +1 505 662-3956; E-mail: clout@vista-control.com.*

## TECHNICAL COMMITTEES

### Radiation Instrumentation Update

I'd like to give a short update on the activities of the RITC since the last Newsletter. One of the main activities has been to start to plan for the 2007 and 2008 NSS/MIC meetings. The Site Selection Committee, chaired by Ron Keyser, has been busy looking into a number of possible sites. These include Hawaii, Las Vegas, Salt Lake City, St. Louis, Germany and Australia. Each of the sites is being investigated by a small subcommittee which will make their proposals to the Site Selection Committee for consideration. The proposal for Australia was presented by Anatoly Rozenfeld at the last RISC meeting in Portland last October. The proposal for Germany was also discussed at this meeting, and a number of further discussions with our European colleagues have followed. The general feeling is that the NSS/MIC meeting should be held in Europe every three to four years, and with the 2004 meeting being held in Rome this year, Germany would be a very attractive site for 2008. However, the Committee is now focusing its attention more on the 2007 meeting, and will work to choose a site and identify the key members of the organizing committee as soon as possible.

After all of the proposals are in, the Committee will narrow down the number of possible sites to two or three, and then visit those

properties and try and negotiate a contract with one or more hotels at each site. This process will take place over this spring and summer, with the aim of having a short list of sites and contracts to choose from by the time of the Rome meeting in the fall. There the Site Selection Committee will make its recommendations to the RISC and the NMISC and the final site for the 2007 meeting will be selected.

In addition to the long range planning for future NSS/MIC meetings, there is also intensive activity going on for the 2004, 2005 and 2006 meetings. The 2004 meeting, which will be chaired by Alberto Del Guerra, will be held from October 16-22 2004 at the Ergife Palace Hotel in Rome, Italy. The deadline for paper submission was May 17, 2004, so hopefully all of you got your papers submitted on time. Their website is <http://www.nss-mic.org/2004>, so please check this site for future announcements, and start thinking about making your travel plans to Rome, as we expect that this will again be another large and very exciting meeting.

The dates, locations and General Chairs for other future NSS/MIC meetings are:

- 2005 Oct 22 to 29, San Juan, PR General Chair: Tom Lewellen
- 2006 Oct 28 to Nov 4, San Diego, CA General Chair: Graham Smith

**My boss knew that**

Just because everyone is mad at you doesn't necessarily mean you're doing the right thing.

*James Bennet*



**Craig L. Woody**  
*RISC Chair*

No need to know

Technology makes it possible to blow up places you can't spell.

Grover Norquist

The other RISC activity which is under way is with the Awards Committee, chaired by David Wehe. The RITC offers two awards: the Outstanding Achievements Award, which is given to an accomplished IEEE member for outstanding contributions to the field of nuclear instrumentation; and the Early Career Award, which is given to a more junior person for outstanding achievements in the early part of his or her career. Normally, the Outstanding Achievement Award is given in odd years, and would have been given out last year, but this did not take place due to a delay in the final balloting. However, this award will be presented this year at the Rome meeting. The Early Career Award will also be given this year, and nominations are currently being accepted. They can be submitted to David Wehe using the nomination form located at <http://ewh.ieee.org/soc/nps/awards.htm>. One other change which has taken place since the last round of nominations is that the requirement for nominees for both of these awards to be IEEE or NPSS members has been eliminated. This change was approved by the AdCom at its last meeting in March. Therefore, any person who meets the achievement criteria for these awards, regardless of whether or not they are IEEE or NPSS members, can now be nominated.

We are also calling for nominations for new people to serve on the RISC starting next year.

The individuals whose terms are expiring this year are Leon Kaufman, Zane Bell, Patrick Ledu, Marek Moszynski and Tony Peurrung, and we thank them all for their service on the committee. We will therefore have five seats open on the RISC for three year terms starting in January of 2005. Any member in good standing of the RITC, which means you must be a member of the IEEE and NPSS, and be a subscriber to the Transactions on Nuclear Science, is eligible to serve on the RISC. Please consider serving on this important committee (self nominations are allowed), or whether you would like to nominate someone else to serve. This is an excellent opportunity to get involved in the workings and decision making process of how our society is run. It also plays an extremely vital role in preserving the continuation of our annual NSS/MIC meeting, which I can say without hesitation, is one of the most respected and prestigious meetings of its kind in our field. So, please, get involved and make your opinion count. The closing date for nominations is July 1, 2004. Nominations should be sent to [woody@bnl.gov](mailto:woody@bnl.gov) or give me a call at 613-344-2752.

*Craig Woody can be reached at Brookhaven National Laboratory, Physics Dept., Bldg 510C, Upton, NY 11973; Phone: +1 613 344-2752; Fax: +1 631 344-3253; E-mail: [woody@bnl.gov](mailto:woody@bnl.gov).*



**Ronald M. Keyser**  
Chair, Standards Committee



**William W. Moses**  
Vice President NPSS

## NIDCOM is now the “Standards Committee”

*Ron Keyser and Bill Moses*

At the last AdCom meeting we made some changes to NIDCOM, the Nuclear Instrumentation and Detectors Standards Committee. The major change was to broaden the scope of this committee to include standards for all NPSS activities, not just those associated with nuclear instrumentation and detectors. To reflect this increase in the scope, we changed its name to the “Standards Committee.” However, the Standards Committee will continue to perform all of the activities of NIDCOM. In addition, an administrative change was made, transforming its status within the NPSS from a Technical Committee to a Functional Committee. Within NPSS, a Technical Committee is a group of members (typically more than 100) that share a common technical interest, and virtually all of these Technical Committees organize a conference. Functional Committees

perform a specific function — the Publications Committee and the Awards Committee are examples of Functional Committees. The main consequence of this change is that while the Chair of the Standards Committee will still be an AdCom member, he will not be a voting member.

This change required a modification of the NPSS Bylaws. For those with a penchant for detail, the entire (revised) Constitution and Bylaws is printed below. True aficionados will note that several other “housekeeping” changes were also made at this time, such as removing the TMI Editor from the NPSS Publications Committee and correcting punctuation.

The Standards Committee membership currently reflects its history and needs more members in the new areas of NPSS. The duties of membership are to review and update existing standards and to write new standards. The

request for a new standard can come from anyone who sees a need for a standard. The recent IEEE-USA newsletter describes some standards in everyday use. I doubt that NPSS standards will be as well known as 802.11b or 1284, but they are just as important to the people who use them. For example, 325 is used in every HPGe detector test and description. The standards written by the committee are reviewed by the IEEE Standards Board and become international standards available to everyone. The committee reviews 10 to 20

standards a year and writes 1 to 2 new standards each year.

Contact Ron Keyser to join the committee or submit a need for a new standard.

*You can reach Ron Keyser at ORTEC, 801 S. Illinois Ave., Oak Ridge, TN 37830-7985; Phone: +1 865 483-2146; E-mail: ronkeyser@ieee.org.*

*You can reach Bill Moses at Lawrence Berkeley National Lab, One Cyclotron Road, MS 55-121, Berkeley, CA 94720-8099; Phone: +1 510 486 4432; Fax: +1 510 486-4768; E-mail: wwmoses@lbl.gov.*

## Constitution

### Article I - Name and Object

Section 1. This organization shall be known as the IEEE Nuclear and Plasma Sciences Society.

Section 2. The Society's purpose shall be scientific and educational in character. The Society shall strive for the advancement of the theory and practice of electrical and electronic engineering and of the allied arts and sciences and for the maintenance of high scientific and technical standards among its members, all in consonance with the Constitution and Bylaws of the IEEE and with special attention to such aims within the field of interest of the Society, as hereinafter defined.

Section 3. The Society shall aid in promoting close cooperation and exchange of technical information among its members and affiliates, and to this end shall hold meetings for the presentation and discussion of original contributions, shall publish transactions reporting advances within the scope of the Society and through its committees shall study and otherwise provide for the needs of its members and affiliates.

### Article II - Field of Interest

Section 1. The fields of interest of the Society are the nuclear and plasma sciences. The Society shall devote itself to publication or other dissemination of original contributions to the theory, experiments, educational methods and applications of these fields, and to the development of standards. Areas of technical activity shall include but not be limited to the following:

Section 2. Nuclear science and engineering, including instrumentation for research; detection and measurement of radiation; nuclear biomedical applications; radiation monitoring and safety equipment; particle accelerators; nuclear instrumentation development for reactor systems; effects of radiation on materials, components, and systems; and applications of radiation and nuclear energy to other than utility power generation.

Section 3. Plasma science and engineering, including: magnetofluid dynamics and thermionics; plasma dynamics; gaseous electronics and arc technology; controlled thermonuclear fusion; electron, ion, and plasma sources; space plasmas; high-current relativistic electron beams; laser-plasma interactions; diagnostics; plasma chemistry and colloidal and solid state plasmas.

### Article III - Membership

Section 1. Membership in the Society shall be available to all members of the IEEE having an interest in the nuclear or plasma sciences.

Section 2. Affiliates may participate in the activities of the Society as provided by the IEEE Bylaws and subject to the applicable IEEE rules and regulations and to any additional limitations imposed by the Society Bylaws.

### Article IV - Financial Support

Section 1. The Society shall collect from each member and affiliate an assessment or fee in accordance with IEEE Bylaws and applicable rules and regulations. The amount of the fees shall be established by the AdCom.

Section 2. The Society may make registration charges at its meetings, symposia, conferences, and conventions. The registration fee for non-members of the IEEE shall normally be higher than for members.

Section 3. The Society may raise revenues by other means such as, but not limited to, advertising, shows, requests for contributions, and charges for sending out notices to non-Society members, provided such means are consistent with applicable IEEE rules and regulations.

### Article V - Administration

Section 1. The Society shall be managed by an Administrative Committee (AdCom) consisting of 16 directly elected members plus certain ex officio members as specified herein and in the Bylaws.

Section 2. The terms of office of the directly elected members shall be four years. Elections of members shall be held annually to fill vacancies for the coming year. The terms of office of the ex officio members shall be specified in the Bylaws. The terms of office of the Chairs of elective technical committees shall be defined in the Constitution and Bylaws of the elective technical committee.

Section 3.

(a) The affairs of the Society shall be managed by the President, as directed by the AdCom and in accordance with the powers and duties as defined hereunder and in the Bylaws. In the event of the President's absence or incapacity, the Vice-President, or if the Vice-President is unable, then the most recent Past-President shall perform the presidential duties.

## Stranglehold

Technology is like a vine - it's glorious at first blossom but quickly overgrown gradually altering and choking its surroundings.

Todd  
Oppenheimer

## Gamy mot

Bigamy is having one spouse too many; monogamy is the same thing.

Oscar Wilde

## Profane consequence

When science achieved power equal to the power of religion, science often became cruel and perverted too.

*Freeman Dyson*

## Academic attitude

If I could explain it to the average person, I wouldn't have been worth the Nobel Prize.

*Richard P. Feynman*

(b) The President shall appoint a Secretary and Treasurer for the Society.

### Section 4.

(a) The President and Vice-President shall be elected for coincident two-year terms by the voting members of the AdCom from among the eligible members of the AdCom. These elections of President and Vice-President shall be held as defined in the Bylaws.

(b) All directly elected AdCom members are eligible for election as President or Vice-President. In addition the Vice-President is eligible for election as President. No individual may be elected to two successive terms as President.

(c) In the event the Vice-President is required to complete the term of the President, the Vice-President will be eligible to run for President in the next full-term election

(d) In the event that neither the President nor Vice-President is able to take office as prescribed in the Bylaws, or if both are incapacitated or if both offices become vacant for a period greater than 60 days, the AdCom (under the direction of the most recent Past President) shall promptly elect an Acting President from among the eligible elected members to assume the duties of President until either the President or Vice-President takes or resumes office, or until the next election.

(e) The NPSS Vice-President will, except under circumstances deemed unusual by a majority of the voting members of AdCom, become the sole nominee for the succeeding NPSS Presidential election.

Section 5. The AdCom shall utilize the services of IEEE Headquarters as bursar for Society funds as provided by the IEEE Bylaws and rules and regulations. If any part of the Society funds are received and deposited separately, the terms and conditions shall be in accordance with IEEE policies and subject to the provisions of Society Bylaws and to any special limitations that may be imposed by the AdCom.

Section 6. The President shall be an ex officio member of all committees of the Society. As a member of the IEEE Technical Activities Board (TAB) the President shall ensure appropriate representation of the Society at IEEE and TAB meetings by personal attendance, or by ensuring that one of the alternates defined in Section 3(a) attends. Failing this, the President should designate a representative.

Section 7. The work of the Society shall be conducted through the AdCom and through both standing and ad hoc committees as provided herein and in the Bylaws.

Section 8. The President, as soon as expedient after election, shall appoint the Chairs of the standing Functional Committees provided in the Bylaws. Other special or ad hoc committees may be authorized by the AdCom and appointed by the President.

Section 9.(a) Standing Technical Committees may be administered by either elected or appointed committee officers as specified herein and in the Bylaws.

(b) Each Appointive Standing Technical Committee shall be directed by a Chair who shall be appointed or reappointed annually by the President of the Society as specified in the Bylaws.

(c) Each Elective Standing Technical Committee shall consist of at least 15 members and shall be governed according to a written Constitution and Bylaws approved by the committee and by the AdCom which shall include the

following: (1) provision for periodic election of officers; (2) provision for amendment of the rules of operation subject to the approval of the AdCom; and (3) a statement of criteria for membership. Each Elective Standing Technical Committee shall maintain a roster of its membership.

### Section 10.

(a) All Presidential appointees serve at the pleasure of the President, and as such can be removed from office by the President.

(b) Any AdCom member may be removed from office if they fail to perform their duties in a manner that is consistent with the best interests of the IEEE and NPSS. This prerogative of AdCom should be exercised only in extreme cases and always with great caution and after due circumspection. A petition signed by a minimum of five voting AdCom members is necessary to instigate the removal process and the petition must include the name of the member to be removed, the position in question, and a description of the grounds for removal. Upon receipt of the petition, the Secretary will notify all AdCom members that such a petition has been received, notify the member in question, and give that member 30 days to provide a written response. After this period, the Secretary will send a ballot that includes the statement of the grounds for removal and its rebuttal to each voting AdCom member. The ballots will be returned to the Secretary who will tally the votes 30 days after the ballots were sent. Should a minimum of two-thirds of the voting AdCom members vote in favor of removal, then the member in question will be removed from office immediately. In the event that the Secretary is the member in question, the President will designate an alternate AdCom member to perform the duties assigned to the Secretary in this Section.

## Article VI - Nomination and Election of Administrative Committee Members

Section 1. Nominating procedures shall be as prescribed in the Bylaws and shall include provision for nomination by petition of Society members. Nominations by petition shall be included on the ballot and shall be so identified.

Section 2. Election of the members of the AdCom shall be as prescribed in the Bylaws.

Section 3. If a member of the AdCom does not complete a term, the vacancy shall be filled at the next AdCom election if more than one year remains in the term. Otherwise, the President will appoint a replacement for the remainder of the term. When an AdCom member is elected or appointed for a partial term, that person is eligible to run for the next full-term election to the same position.

## Article VII - Meetings

Section 1. The Society may hold meetings, conferences, symposia or conventions either alone or in cooperation with other organizations subject to applicable IEEE rules and regulations.

Section 2. Meetings, conferences, symposia, or conventions of the Society shall be open on an equal basis to all members of the IEEE. The Society may not sponsor or co-sponsor a meeting that is in any way subject to limitations on attendance by members for reasons other than availability of space.

Section 3. Twelve(12) voting members of the AdCom shall constitute a quorum. No member shall be able to cast more than one vote for any reason.



Section 4. A majority of the voting members present at an AdCom meeting must vote affirmatively for a motion to pass except as otherwise provided in this Constitution.

Section 5. Business of the AdCom may be handled by any written means which includes (but is not limited to) correspondence, fax or e-mail if, in the opinion of the President, matters requiring prompt action can be adequately handled in that manner. A majority of the voting members of AdCom is required to take action in such a case. Such actions are to be promptly confirmed in writing by the President to AdCom.

Section 6. The AdCom shall meet as required to conduct business and in accordance with the Bylaws.

#### Article VIII - Amendments

Section 1. Amendments to the Constitution may be initiated following approval by a two-thirds vote of the AdCom. After such approval, the proposed amendment shall be publicized in the Society Newsletter, with notice that it will be submitted to the Technical Activities Board and to the Executive Committee of the IEEE for final approval unless 25 Society members object within 60 days of the date of mailing of the notice. If such objections are received, a copy of the proposed amendment shall be mailed with a ballot to all members of the Society at least 45 days before the date set for the return of the ballots; the ballots shall carry a statement of the postmark deadline for their return to the IEEE office. When a mail vote of the entire Society membership is made necessary, approval of the amendment by at least two-thirds of the ballots returned shall be necessary for its enactment. If approved by Society members, the proposed amendment will be submitted to the Technical Activities Board and to the Executive Committee of the IEEE for final approval.

Section 2. As an alternative to the procedure outlined in Section 1 above, twenty-five members of the Society may submit a petition to the Technical Activities Board and to the IEEE Executive Committee. If approved by TAB and after notification of the AdCom, the proposed amendment shall be submitted to the membership by mail ballot as described above.

Section 3. Society Bylaws and amendments thereto may be adopted by a two-thirds vote of the AdCom, provided that notice of the proposed Bylaw or amendment has been sent to each member of the AdCom at least two weeks prior to such meeting; or a Society Bylaw, or amendment, may be adopted by a two-thirds written vote of the eligible voting members of the AdCom, provided a two week period is provided for such responses. In either event, the proposed Bylaw or amendment shall be published in the Society Newsletter. No Bylaw or amendment shall take effect until it has been: (1) published and (2) mailed to the secretary of the IEEE Technical Activities Board.

#### Article IX - Publications

Section 1. The Society shall support a program by which Transactions, Conference Proceedings, newsletters, and other forms of publication appropriate to the Society's fields of interest are published and distributed. Publications undertaken by the Society shall be subject to IEEE policies and to further guidance and controls prescribed by the AdCom or its duly appointed committees. The Society shall be responsible for the financial aspects of its publication program.

Section 2. All publications of the Society shall have unrestricted circulation, subject only to the payment of appropriate fees. Circulation of Society Publications to

non-members shall be subject only to the payment of appropriate fees or charges.

Section 3. The President with the advice of the AdCom shall appoint an Editor-in-Chief to oversee the publication program and to assure financial soundness and maintenance of schedules and format standards. The responsibilities of the Editor-in-Chief shall include the preparation of the Society's Annual Directory. The responsibility for technical content of any Transactions shall be controlled by the Transactions Editor who shall be nominated by the Editor-in-Chief or by the Society President and approved by the AdCom.

#### Article X - Periodic Review

Section 1. The President shall appoint 5 members of the AdCom every five years beginning in 2005 to evaluate the effectiveness and currency of this Constitution and Bylaws, to study the rules and governance required by the activities of the Society at that time, and to define the changes appropriate to the existing and anticipated needs of the Society. The committee will be Chaired by the Vice-President, and will issue its report for action at the final AdCom meeting of that year.

### Bylaws

1. Membership: There shall be two grades of Society membership: Student Members and Higher Grade Members. Student Members of the IEEE may become Student Members in the Society upon payment of the fee specified in Bylaw 3. Members of the IEEE in all grades may become members of the Society upon payment of the fee specified in Bylaw 3.

2. Affiliates: Nonmembers of the IEEE who are members of certain other organizations accredited by the IEEE as provided in IEEE Rules and Regulations may become affiliates of the Society upon payment of the fees specified in Bylaw 4. The rights of Affiliate members shall be as specified by IEEE.

3. Membership Fees: The assessment or fee for membership in the Society shall be established by the AdCom. It will include the NPSS Newsletter.

4. Affiliate Fees: Affiliates shall pay the fee or assessment specified in IEEE rules and regulations.

5. Administrative Committee: Article V of the Constitution provides that the AdCom shall consist of 16 directly elected members plus certain ex officio members. The ex officio members of the AdCom shall be the President, Vice-President, most recent past-President, the Chairs of the Standing Technical Committees, the Chairs of Standing Functional Committees, Secretary, Treasurer, Liaison Representatives for Standards and IEEE-USA, Editors of the Transactions and Newsletter, Editor-in-Chief and other ex-officio members as provided for in the IEEE Constitution.

5.1. The voting members of the AdCom shall be the elected members, President, Vice-President, most recent Past-President, and the Chairs of the Technical Committees.

5.2. The AdCom shall meet at least three times per year, upon dates determined by the committee at least three weeks in advance of the meetings. Additional meetings may be called at the discretion of the President or upon request of at least twelve (12) voting members of the AdCom with at least three weeks notice.

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## On target

A scientist's aim in a discussion with his colleagues is not to persuade, but to clarify.

*Leo Szilard*

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## Happy as a ...

It is better to be human being dissatisfied than a pig satisfied; better to be a Socrates dissatisfied than a fool satisfied.

*John Stuart Mill*

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## The advantages of talent

Ordinary people can say stupid things. Brilliant people do it brilliantly.

*The Atlantic Monthly*

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## School daze

I thought it more blessed to teach than to be taught.

*Randolph Churchill*

5.3. The final regularly scheduled meeting in the calendar year is the meeting at which written reports of all committees shall be presented.

5.4. In the absence of extenuating circumstances (as approved by AdCom), directly elected members who miss three successive meetings shall automatically be dropped from the AdCom. Representation by a designated alternate does not constitute attendance.

6. Nomination and Election of the Administrative Committee: The Nominating Committee shall be chaired by the most recent Past President and shall nominate candidates for all elected positions on the AdCom.

6.1. Apart from the Chair, the Nominating Committee should include all the Technical Committee Chairs. In exceptional circumstances a Technical Committee Chair may, in consultation with the relevant Technical Committee and the President, name a replacement to serve on the Nominating Committee.

6.2. The number of vacancies for elected members shall be the difference between the number authorized in Article V, Section 1, of the Constitution and the number with continuing terms. The Transnational Functional Committee will be allocated one directly elected AdCom member. The vacancies shall be divided into categories corresponding to the appropriate Standing Technical Committees with the number per category chosen to maintain representation of the entire AdCom in proportion to the NPSS membership technical interests as determined by periodic surveys. The Nominating Committee shall submit a slate of at least two names for each vacancy to be filled.

6.3. The Chair of the Nominating Committee shall assure, before April 1, that a call for nominations is conveyed to the whole membership either through the Newsletter or through a separate mailing. Nominations must be submitted to the Chair of the Nominating Committee on a nomination form that includes a statement of the willingness and ability of the nominee to serve if elected, the membership status of the nominee in IEEE and NPSS, a short biography and a statement of the issues that the candidate wishes to address as an AdCom member. Additional nominations for the available category vacancies may be submitted to the Society President using the same nomination form, between June 1 and July 1 upon petition signed by 20 members in good standing of the Society or by 5 members of the AdCom.

6.4. The Chair of the Nominating Committee shall, with the aid of the committee members, determine the slate of nominees by July 1.

6.5. Current elected members of the AdCom and current Nominating Committee members are ineligible for nomination.

6.6. All nominees and petition candidates must be members in good standing of the Nuclear and Plasma Sciences Society and the IEEE.

6.7. The Chair of the Nominating Committee shall annually arrange for the distribution (through IEEE Headquarters) to the members of the Society on or about July 31, a ballot to elect the candidates to fill vacancies on the AdCom. The names on the ballot shall be followed by an indication of the method of nomination, whether by committee nomination or by petition. The names of the nominees shall be grouped and labeled by categories corresponding to the Standing Technical Committees. The ballot shall be accompanied by a short biographical

sketch and position statement prepared by each nominee or petition candidate.

6.8. Sixty days after distribution of the ballots, the IEEE Headquarters shall count and tabulate the votes received and report the results to the AdCom. The candidate with the most votes shall be elected.

6.9. Election of the President of AdCom: An election for President will be held by written ballot before the final AdCom meeting of the even-numbered years. The ballot for election of the President will indicate two choices: 1) the current Vice-President and (2) an indication that an open election is desirable. The ballots shall be distributed by the Chair of the Nominating Committee to all voting members of AdCom for return to the Secretary of AdCom 30 days prior to the final AdCom meeting of the year. The Secretary of AdCom is responsible for counting the ballots and announcing the results of the election. Should the Vice-President fail to receive a majority of the votes on the returned ballots, then AdCom will itself determine a slate of candidates for President and vote at the final AdCom meeting.

6.10. Nomination and Election of the Vice-President of AdCom. The Nominating Committee shall determine a slate of candidates for Vice-President according to the guidelines set forth in Article V, Section 4. In selecting candidates for the NPSS Vice-President the Nominating Committee will ensure that those candidates shall be eligible for and will, barring unforeseen circumstances, be willing to serve for the full terms of all succeeding positions (two years as Vice-President, two years as President, and two years as the most recent Past President). The slate of candidates for Vice-President will appear on the same ballot as the election for President (specified in Bylaw 6.9) and will be subject to the same election schedule.

6.11. Executive Committee (ExCom): An executive committee consisting of the President, Vice-President, Past President, Secretary, Treasurer and any other current members of AdCom, whether voting members or not, who have held the position of President, shall form the ExCom.

6.12. The ExCom shall advise the President on issues that the President or other members of the ExCom choose to raise between meeting of the AdCom. Business shall generally be conducted by telephone, e-mail or similar means of communication. In exceptional circumstances, the President can call a meeting of the ExCom.

7. Standing Technical Committees: The Standing Technical Committees of the Society shall be:

- The Computer Applications in Nuclear and Plasma Sciences Technical Committee
- The Fusion Technology Technical Committee
- The Nuclear Medical Imaging and Sciences Technical Committee
- The Particle Accelerator Science and Technology Technical Committee
- The Plasma Sciences and Applications Technical Committee
- The Pulsed Power Science and Technology Technical Committee
- The Radiation Effects Technical Committee
- The Radiation Instrumentation Technical Committee

7.1. Standing Technical Committees may be of either of two forms, elective or appointive, in accordance with Article V, Section 9, of the Constitution of the Society.

7.2. The Chairs of Standing Technical Committees shall be members in good standing of the Nuclear and Plasma Sciences Society and the IEEE.

7.3. The terms of office of the Chairs of elective Standing Technical Committees shall be in accordance with the rules of each committee except that no Chair shall serve consecutively for more than three years or for two conferences when the technical committee has conferences every two years.

7.4. The President of the Society shall appoint the Chairs of the appointive Standing Technical Committees for a term of one year. A Chair may not serve consecutively for more than three years except in the case where a conference is held biennially and it is the wish of the appointive Standing Technical Committee that runs the conference to have their Chair serve for two of the conferences.

7.5. The Chairs and the Vice-Chairs of elective Standing Technical Committees shall be elected by the respective committees. The name of the Chair and the Vice-Chair so elected shall be transmitted along with a notification of the length of term of office to the Secretary of the AdCom by the outgoing Chair of each elective Technical Committee as soon as expedient after election.

7.6. A standing Technical Committee shall gain elective status by presenting a petition requesting such status signed by at least 15 members of the Committee which shall demonstrate that the requirements of Article V, Section 9 of the Constitution have been met. Approval of the elective status of a Standing Technical Committee shall be processed as an amendment to the Bylaws in accordance with Article VIII of the Constitution.

7.7. Standing Technical Committees may be created or changed by amending the Bylaws in accordance with Article VIII of the Constitution.

7.8. The Standing Technical Committee shall take the initiative in their respective fields of interest on behalf of the Society.

7.9. Each of the Standing Technical Committees shall as a minimum submit a written report of its activities to the AdCom prior to the final meeting of each year. The membership and activities of the Standing Technical Committees will be publicized to the membership of the Society via the newsletter or Transactions, and suggestions for committee membership will be invited from Society members and chapters.

7.10. Status and Fields of Interest of Standing Technical Committees:

7.10.1. The field of interest of the Appointive Computer Applications in Nuclear and Plasma Sciences Standing Technical Committee shall include real-time and off-line computer systems, including hardware and software aspects of data acquisition, data analysis, data storage, and control, in any and all of the technical disciplines covered by the Society.

7.10.2. The field of interest of the Appointive Fusion Technology Standing Technical Committee shall include the engineering aspects of controlled fusion research and fusion reactor technology.

7.10.3. The field of interest of the Elective Nuclear Medical and Imaging Sciences Standing Technical Committee shall include radiation sources and detectors, radiation standards and monitoring, scanning and imaging systems, including image reconstruction and analysis.

7.10.4. The field of interest of the Appointive Particle Accelerator Science and Technology Standing Technical Committee shall include the theory, design, construction and operation of nuclear particle accelerators, their beam diagnostics, and their applications in high energy

particle physics, low energy nuclear physics, radiation sources and general technology.

7.10.5. The field of interest of the Elective Plasma Science and Applications Standing Technical Committee shall include plasma science and engineering, including: magnetofluid dynamics and thermionics; plasma dynamics; gaseous electronics and arc technology; controlled thermonuclear fusion; electron, ion, and plasma sources; space plasmas; high current relativistic electron beams; laser-plasma interactions; diagnostics; plasma chemistry, plasma processing and colloidal and solid state plasmas.

7.10.6. The field of interest of the Appointive Pulsed Power Science and Technology Standing Technical Committee shall include the understanding, development and applications of pulsed power to plasma physics, nuclear science and related fields.

7.10.7. The field of interest of the Radiation Effects Standing Technical Committee shall include the effects of radiation on materials, components and systems.

7.10.8. The fields of interest of the Elective Radiation Instrumentation Standing Technical Committee shall include sensors, electronic instrumentation, and systems for the measurement of ionizing radiation and high-energy particles with the emphasis on the tools, not the results of experiments using these tools.

8. Functional Committees: The President of the Society shall appoint the Chairs of the following Standing Functional Committees:

- Awards Committee
- Chapters and Local Activities Committee
- Communications Committee
- Fellow Committee
- Finance Committee
- Conference Policy Committee
- Membership Committee
- Standards Committee
- Students and Careers Committee

The remaining Functional Committees have their Chairs defined elsewhere in the Bylaws:

- Nominating Committee
- Publications Committee
- Transnational Committee

8.1. Except where otherwise specified in the Bylaws, each committee Chair shall appoint the members of the committee.

8.2. The terms of office of Chairs of Standing Functional Committees shall be one year.

8.3. The Chairs of Standing Functional Committees shall be members in good standing of the Nuclear and Plasma Sciences Society and the IEEE.

8.4. Awards Committee: Solicits nominations for the various awards made by the Society, evaluates the nominees and selects those to whom the awards will be made. The Chair of the Awards Committee serves as the NPSS liaison to the TAB Awards and Recognition Committee.

8.5. Chapter and Local Activities Committee: Provides organization and program assistance, especially with respect to conferences, educational activities and the Speakers Bureau, to support and motivate existing Chapters. Promotes and assists in the creation of new Chapters in collaboration with the appropriate IEEE Section or Council Chairs.

8.6. Communications Committee: Prepares and maintains promotional material for membership recruitment and other purposes as required. Responsible for the maintenance of the web site for both membership promotion and

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## Dawning thought

... but the trouble with an alarm clock is that what seems sensible when you set it seems absurd when it goes off.

*Rex Stout*

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## Quick Jeeves, the zits!

Retirement at 65 is ridiculous. When I was 65, I still had pimples.

*George Burns*

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## Quiet please!

The right word may be effective, but no word was ever as effective as a rightly timed pause.

*Mark Twain*

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## The price we pay

If men were angels, there would be no need for government.

*James Madison*

to publicize NPSS activities either directly or through links to conference, publication, and other web sites.

8.7. Fellow Committee: Evaluates the credentials of and ranks the IEEE Fellow Candidates referred to the NPSS for evaluation. The committee shall follow the procedures and guidelines established by the IEEE Fellows Committee.

8.8. Finance Committee: Monitors the financial status of the Society and reports any developing trends along with recommended actions, conducts financial studies and analyses on any Society or IEEE issues having financial implications for the Society, and reports on these matters regularly at AdCom meetings.

8.9. Conference Policy Committee: Responsible for recommending policies and procedures to AdCom for all conferences and symposia for which the NPSS takes full or partial responsibility and for ensuring compliance with IEEE conference policies as stated in the IEEE Meetings Organizational Manual. Note that conference officers with fiduciary responsibility are to be members in good standing of the IEEE NPSS or of a co-sponsoring society.

8.10. Membership Committee: Responsible for encouraging and recruiting new Society members and Society affiliation by inviting IEEE members who have an interest in NPSS activities, by generating interest among non-IEEE members, and by making application forms available and soliciting memberships at appropriate meetings and symposia.

8.11. The Nominating Committee The Nominating Committee shall be formed and administered according to the Bylaws pertaining to nominations. The Nominating Committee develops a slate of nominees for the directly elected member positions on the AdCom that become vacant each year and recommends candidates for Vice-President of the Nuclear and Plasma Sciences Society.

8.12. Publications Committee: Reports to AdCom on all publications activities sponsored by the NPSS. In particular, proposes an annual budget for each publication and brings to AdCom's attention any proposed new initiatives for discussion and possible approval. Also keeps AdCom apprized of IEEE publications policies and procedures and is responsible for ensuring that NPSS publications follow these policies and procedures. The Publications Committee shall be chaired by the Editor-in-Chief, and include the Editor of the Transactions on Nuclear Science, the Editor of the Transactions on Plasma Science, the Editor of the Newsletter, and the Treasurer of the Society.

8.13. Standards Committee: Responsible for all activities related to standards for the technical areas associated with this Society. This includes proposing, developing, and maintaining standards for measurement techniques and tests of devices of general interest to manufacturers, developers, and users.

8.14. Students and Careers Committee: Studies and proposes specific programs to foster engineering careers, including the following: special support for students to attend conferences, short courses and related IEEE activities; scholarship support for graduate students specializing in Nuclear and Plasma Sciences; programs to help engineers in career transition; programs to encourage women, minorities and the handicapped into and within the profession.

8.15. Transnational Committee: The purpose of this committee is to foster the involvement in NPSS activities

of people from countries other than the United States and Canada. The directly elected member representing the Transnational Committee is the Chair for this committee. Candidates for this position may not be from the United States or Canada.

9. Disbursements: Disbursement from Society funds shall be on the authority of the Treasurer as directed by the AdCom, and in accordance with established procedures and policies of the IEEE. The President and AdCom may authorize the Treasurer to disburse funds to defray legitimate expenses incurred by the Chairs and members of the Standing Technical and Functional Committees and others in connection with required attendance at official Society, IEEE or other meetings and the costs of publications. Such expenditures must be approved by the President before being incurred.

9.1. The compensation and expense allowance of the Editor-in-Chief and the Editors of the Society's Transactions and Newsletter shall be reviewed annually as a part of the preparation of the annual budget by the Treasurer and shall be approved by the AdCom as part of the budget approval.

10. Ballots: All ballots, for purposes of election of members of AdCom or changes in the Constitution, shall be issued to all voting members of the NPSS on instructions of the Chair of the Nominating Committee pursuant to action by the AdCom. Ballots for directly elected AdCom members will direct Society members to only vote for candidates of Standing Technical Committees of which they are members or in which they are active. No ballot shall be counted unless unambiguously marked by a qualified voter to indicate a choice, sent in a sealed envelope bearing the voters name, and received on or before the specified deadline date. This specified deadline date shall be at least sixty days subsequent to the date of mailing of the ballots. The counting of the ballots shall be entrusted to IEEE Headquarters. The Chair of the Nominating Committee shall report the results to the AdCom.

11. Beginning of Terms of Office: All terms of office of elected members of the AdCom shall begin January 1 of the year immediately following their election, except in the case where an elected member of AdCom does not complete a term of office. In this special case, the term of office of the replacement will begin immediately after the results of the election are known.

12. Meetings: The Society may not organize or sponsor a meeting, conference, symposium, or session thereof without consulting the Chair of the Conference Policy Committee.

13. Alternates:

13.1. The Chair of a Standing Technical Committee may designate any member in good standing of the Society to represent the Standing Technical Committee at AdCom meeting. The representative shall have the privilege of the floor, but may not vote on any matters coming before AdCom.

13.2. The Constitution and Bylaws of an Elective Standing Technical Committee may include a provision that a specified Committee officer can, when needed, serve as an alternate for the Chair at AdCom meetings. This alternate has the privilege of the floor and may vote on all matters coming before AdCom.

*February 18, 2004*

## Report from the Communications Committee

**W**ith the new year we are printing a new, one-page, flyer on the IEEE and NPSS as a promotional piece for recruiting new members at meetings and by mailing to the general IEEE membership who are not currently NPSS members and have a item in their interest profile that overlaps with the NPSS. This flyer will also serve as a reminder to our members of the broad and far reaching interests of the activities of the society.

Ken Connor and Dick Kouzes continue to work on the web site and keeping it up to date. However, they mostly manage the content and rely on the members of NPSS, and particularly the volunteers who run the society, for the content. Please use the web site as a source of information and if you have comments, preferably constructive, please send them to the webmaster. Even better, if you have content prepared about any aspect of the society, including introductions to your field for those who might be interested.

Vern Price will be at the meetings this year with the recruiting booth and material to introduce meeting attendees to the IEEE and NPSS. Please feel free to drop by and chat – even better, send a friend who should really join and get more involved with our community.

We have recently been made aware, by Ron Jaszczak, that the journals are printed with a multiple of four pages while the number of pages taken by the articles has no such order. Thus, on average, only one in four issues have no pages “free” and left to their own devices, the IEEE places general IEEE information in this available space. I have produced pages promoting conferences and the NPSS generally to be used in this space and other meetings could well use this space for promotion. I arranged the content and a professional design house produced the actual copy. With publication schedules and printing and delivery time, this has to be done well ahead. NSS/MIC should benefit from this promotion in TMI and TNS in coming issues.

As ever, I welcome comments and suggestions as to how we can do better. Material is available from me and my company looks after the storage and shipping of NPSS literature and the booth to the meetings. We are always looking for volunteers to help and I am sure that Vern would enjoy a break from looking for new members if you have a moment at a meeting.

*Peter Clout can be reached at Vista Control Systems, Inc., 176 Central Park Square, Los Alamos, NM 87544-4031, Phone: 1+505 662-2484; Fax: +1 505 662-3956; E-mail: clout@vista-control.com.*



**Peter N. Clout**  
Communications  
Committee Chair

## New IEEE Fellows

*Each year the Board of Directors elects no more than 0.1% of the full members to the grade of Fellow. Nominations are made by Senior Members or by Fellows and must be supported by at least six Fellows. After being reviewed and ranked by the appropriate IEEE Society, the*

*nominations are forwarded to the Fellows Committee of the Board who then recommend a list of candidates for the Board's consideration. The NPSS is pleased that the following members were elected by the Board this year and extends its congratulations to all of them.*

### Grant T. Gullberg

**G**rant T. Gullberg received his B.S. degree in mathematics from Seattle Pacific University in 1966, M.S. degree in mathematics from the University of Washington in 1971, and Ph.D. degree in biophysics from the University of California, Berkeley in 1979. He worked as an Engineer at the Boeing Company from 1967 to 1971, as a Scientist at the Lawrence Berkeley Laboratory from 1972 to 1980, as a Senior Physicist at GE Medical Systems from 1980 to 1985, and as a Professor of Radiology at

the University of Utah from 1985 to 2002. He was Director of the Medical Imaging Research Laboratory in the Department of Radiology at the University of Utah from 1989-1997. He is currently a Senior Staff Scientist at the E. O. Lawrence Berkeley National Laboratory.

His research interests involve the study of inverse problems with application to medicine and biology that involve the use of positron emission tomography (PET), single photon emission computed tomography (SPECT),



**Grant T. Gullberg**

magnetic resonance imaging (MRI), acoustic imaging, and magnetocardiography (MCG).

Currently, he is involved in the application of converging tomography to improve cardiac SPECT, the investigation into determining whether tensor tomography can improve magnetic resonance diffusion tensor imaging, the use of dynamic cardiac SPECT to better diagnosis cardiac perfusion defects and evaluate cardiac viability, the study of the relationships between cardiac function and cardiac deformation by fitting gated SPECT and cine MRI data to mechanical models of the heart, and the investigation into methods for determining unique solutions of cardiac electromagnetic inverse problems in magnetocardiography.

He is presently a member of the AdCom for IEEE Nuclear and Plasma Science Society as a representative from the Nuclear Medical and Imaging Science Technical Committee. He has previously served as an Associate Editor of *IEEE Transactions on Medical Imaging*, and as Program Chairman for the 1999 IEEE Medical Imaging Conference.

Dr. Gullberg's Fellow citation reads "*For contributions to medical imaging technologies.*"

Grant Gullberg can be reached at the Lawrence Berkeley National Laboratory, One Cyclotron Road MS55R0121, Berkeley, CA 94720, Phone: +1 510 486-7483 ; Fax: +1 510 486-4768 ; E-mail: [gtgullberg@lbl.gov](mailto:gtgullberg@lbl.gov)

## Erik H. M. Heijne



**Erik H. M. Heijne**

**E**rik Heijne has been elected a new fellow of the IEEE "for contributions to semiconductor detector systems and radiation tolerant detector readout electronics."

Erik H.M. Heijne is an instrumentation physicist at CERN, Geneva, Switzerland. In 1971 he received a degree in experimental physics at the University of Amsterdam where, in 1983, he became Dr. Rer. Nat. (Ph.D.). His thesis, the basis for the degree, was "Muon flux measurement with silicon detectors in the CERN neutrino beam." In 1980 he led the introduction of silicon microstrip detectors for use in particle physics. After visiting IMEC in Leuven in 1984, he created a microelectronics design group at CERN to develop readout chips of segmented silicon sensors. Between

1988 and 1999 he directed the team that worked on monolithic and hybrid pixel detectors and on ideas to deal with severe radiation in CMOS. He has 200 publications and has edited five conference records. He is a member of several IEEE societies, aiming to combine expertise from several areas to develop innovative instrumentation. He is an elected member of the IEEE NPSS AdCom and chair of its TransNational Committee.

Erik Heijne was named Fellow "*For contributions to semiconductor detector systems and radiation tolerant detector readout electronics.*"

*Erik Heijne can be reached at CERN, 1211 Geneva 23, SWITZERLAND, Phone: +41 22 767-3946; Fax: +41 22 767-3394; E-mail: [erik.heijne@cern.ch](mailto:erik.heijne@cern.ch).*

## Spencer S. Kuo



**Spencer S. Kuo**

**S**pencer Kuo received both his B.S. and M.S. degrees from National Chiao-Tung University, Taiwan R.O.C. in 1970 and 1973, respectively. After he received the Ph.D. degree in 1977 from Polytechnic University, he began his career in a Research Associate position at Rensselaer Polytechnic Institute to work at the Oak Ridge National Laboratory on the Elmo Bumpy Torus (EBT) fusion program. He returned to the Polytechnic University in September 1978 as Research Assistant Professor in the Electrical Engineering Department and was promoted to full professor in 1986. He initiated and ran a "summer research program for college juniors" in the EE department from 1985 to 1991. A similar program has since then been adopted in many universities and national laboratories.

Dr. Kuo's research activities cover several areas including microwave plasma interactions, ionospheric and magnetospheric plasma physics, plasma sources, and plasma aerodynamic effects on shock waves. He conducted a novel experiment using rapidly created plasma to up-shift the electromagnetic wave frequency. He also showed analytically and experimentally that an added spatial-periodic distribution in plasma density could trap a wave by downshifting the wave frequency. He originated the instability idea to enhance the efficiency of a virtual ionospheric antenna to generate ELF/VLF waves for underwater communication and for the exploration of the magnetosphere. He has patented a plasma torch module,

which can be used to form an array of plasma torches as a large-volume atmospheric-pressure plasma source. This module was installed on a wind tunnel model for on-board plasma generation to study the plasma aerodynamics in a Mach 2.5 supersonic flow. The experiment showed that the shock wave appearing normally in front of the model, which resembled a supersonic vehicle, could be eliminated totally by the on-board generated plasma. The experimental discovery paves a new way for solving aeronautic problems of sonic booms and severe wave drag in supersonic flights.

Dr. Kuo has authored more than 150 journal papers and more than 60 proceedings arti-

cles, and holds one U.S. patent. He was an associate editor of Radio Science from 1993 to 1996. He received an outstanding research award from the New York Chapter of the Sigma Xi in 1990, and was a recipient of the 1997 Tamkang Chair from Tamkang University, R.O.C.

Dr. Kuo's Fellow citation reads, "*For contributions to the understanding of electromagnetic wave propagation in plasmas.*"

*Spencer Kuo can be reached at the Polytechnic University, Department of Electrical and Computer Engineering, 6 Metro Center, Brooklyn, NY 11201-3840 USA; Phone: +1 718 260-3143; Fax: +1 718 260-3906; E-mail: skuo@duke.poly.edu.*

## Jean-Luc Leray

**J**ean-Luc Leray is currently Director of Research at CEA, the French Atomic Energy Commission. He earned an Engineering degree in 1978 at Ecole Centrale de Paris with a specialty in physics and then a Doctor es Science - State Doctorate in Physics, University of Paris. In 1978, he joined the CEA as a Research Engineer in charge of qualifying the first radiation-hardened technology industrialized in France (CMOS on Sapphire). He has held various positions such as senior scientist, and as section head he managed many studies and applications in fields of interest: space, front-end electronics for high energy physics and military electronics. As Group Leader and Section Head, he was responsible for the development of radiation hardening for many generations of CMOS/SOS, CMOS/SOI and BiCMOS/SOI technologies from the older 8  $\mu\text{m}$  to more recent 0.25  $\mu\text{m}$  technologies within his Agency and at several European microelectronic manufacturers.

Meanwhile, in the course of preparing his thesis entitled "Contribution to the study of the phenomena induced by ionizing radiation in silicon and gallium arsenide field effect structures used in microelectronics", he undertook basic studies of the effects of process-induced defects on radiation degradation of microelectronic technologies such as modeling of radiation effects from the material/process level to the device level and as a result, the development of radiation hardened Silicon On Insulator technologies (SOI) which eventually replaced SOS. Dr. Leray promoted the simulation of charge trapping in MOS insulators.

This led to the first self-consistent modeling of radiation damage in MOS/SOI transistors, including the effects of parasitic structures and scaling. This code, unique in enabling treatment of 3D problems of charge trapping in devices, can be used for radiation effect studies in deep submicron SOI technologies, and is commercially available. He has published more than 140 papers, including over 80 in IEEE transactions and records. He has contributed to 7 books or textbooks in which his works on radiation effects and radiation hardening, as well as Silicon On Insulator technologies, are synthesized.

He has been instrumental in opening the national and European radiation technical communities to the international community, in the spirit of the IEEE commitments. He has been active in establishing the European Radiation and its Effects in Components and Systems (RADECS) Conference. In 1993, he served as the RADECS Technical Chairman and Guest Editor for publications in a special issue of *IEEE Transactions on Nuclear Science*. He has also been active in the IEEE SOI Conference as an invited speaker and many times as a paper contributor. Dr Leray has been proactive in the development of the Nuclear and Plasma Physics Society, by founding in 2000 the French Chapter. He also serves the IEEE community in Conferences and NPSS technical bodies (French Chapter, Transnational Committee), as well other Societies (SEE, RADECS) and Working Groups. He shows special interest and success in linking IEEE and other technical institutions of acad-

## Physics lesson

In a world of cause and effect, all coincidences are suspect.

Rex Stout



Jean-Luc Leray

## From the high horse

To assert dignity is to lose it.

Rex Stout

mia or administration or industry at the French, European or overseas levels.

One of his present interests is in the effects of atmospheric neutrons on electronic components and systems which have been recognized for more than 10 years to be similar to those induced by the action of solar and cosmic rays on satellite electronics. Considering the trends of future electronics technologies, the sensitivity of components and systems to atmospheric neutrons is bound to increase drastically. Within the RADECS Conference, Dr. Leray organized the first short course on this subject in Europe in 2001. In 2002, Dr Leray promoted the creation of a joint IEEE French NPSS Chapter/RADECS Society Working Group named SECSTAN, devoted to the "Susceptibility of Electronic Systems To Atmospheric Neutrons". Now it becomes more and more interesting, as copious high energy neutrons fluxes will be produced in the experimental area of new physics instruments such as the Large Hadron Collider LHC (CERN, Geneva), the U.S. and French Thermonuclear

Laser Fusion Facilities (NIF, LMJ) and the International Thermonuclear Experimental Reactor ITER, which are under construction or planned to come to operation in the next two decades.

Dr. Leray has been instrumental in basic science, applied science, technical development and project leadership as well as in education, in the field of radiation effects on electronics. For these activities, Dr Leray has been awarded the national prize: "*Grand Prix de l'Electronique Général Ferrière*" by the French Federation of the Electronic Industries (1994) and the national medal: "*Chevalier des Palmes Academiques*" by the French Minister of Research and Education (1995).

Dr. Leray was named Fellow of the IEEE "*for contributions to the implementation of radiation hardened silicon-on-sapphire and silicon-on-insulator technologies.*"

Jean-Luc Leray may be reached at CEA, B.P. 12 BRUYERES-LE-CHATEL F-91680, France, Phone: +33 169 267 926; Fax: +33 169 267 064; E-mail: jean-luc.leray@cea.fr.

## Patrick G. O'Shea



Patrick G. O'Shea

**P**atrick G. O'Shea is Director of the Institute for Research in Electronics & Applied Physics, and Professor of Electrical & Computer Engineering at the University of Maryland. He was born in Cork, Ireland, and received his B.S. degree in physics from University College Cork. He received his Ph.D. in physics from the University of Maryland in 1986.

His early research was at Los Alamos National Laboratory (1986-94) on particle accelerator projects. He was the Chief Beam Physicist, and Launch Pad Chief on Beam Experiment Aboard Rocket Project (BEAR), the first rf accelerator launched into space to explore the propagation of ions in the earth's magnetic field. In 1990, he was appointed the Project Leader of the APEX Free-Electron Laser Project where he led the construction of the first photoinjector linear

accelerator, and the first linear-accelerator-driven ultraviolet free-electron laser.

Later he worked at Duke University (1994-98), where he supervised the construction of the 300-MeV linac at the FEL Laboratory.

Prof. O'Shea's current research is in the area of space-charge-dominated beam physics, free-electron lasers and applications. He is exploring intense beam physics on the University of Maryland Electron Ring (UMER). He is a Fellow of the American Physical Society.

Dr. O'Shea's Fellow citation reads "*For contributions to charged particle accelerators and free-electron lasers.*"

Patrick O'Shea can be reached at the Energy Research Building/ Bldg. 223, University of Maryland, College Park MD 20742-3511USA; Phone: 301 405 4977; Fax: 301 314 943; Web: [www.ece.umd.edu/~poshea](http://www.ece.umd.edu/~poshea)

## Michael B. Silevitch



Michael B. Silevitch

**M**ichael B. Silevitch is currently the Robert D. Black Professor of Electrical and Computer Engineering at Northeastern University in Boston. His training has encompassed both physics and electri-

cal engineering disciplines. An author/co-author of over 65 journal papers, his research interests include laboratory and space plasma dynamics, nonlinear statistical mechanics, and K-12 science and mathematics curriculum im-



plementation. Avocations include long distance hiking and the study of 17th Century clocks and watches.

Prof. Silevitch is the Director of the Center for Subsurface Sensing and Imaging Systems (CenSSIS), a National Science Foundation Engineering Research Center (ERC). Established in September of 2000, the mission of CenSSIS is to unify the methodology for finding hidden structures in diverse media such as the underground environment or within the human body. An intrinsic part of the CenSSIS 10 year strategic plan is to create research and educa-

tion advances to enable progress on important societal problems such as living cell structure, reliable breast cancer diagnosis, coral reef health, and humanitarian demining.

Dr. Silovitch was named Fellow of the IEEE for "*leadership in advancing interdisciplinary subsurface sensing and imaging techniques.*"

Michael Silevitch can be reached at Northeastern University, ECE Department, Rm 302 ST, 360 Huntington Ave., Boston, MA 02215-5005; Phone: +1 617 373-3033; Fax: +1 617 373-8627; E-mail: msilevit@ece.neu.edu.

## W. T. "Bill" Weng

**W**u-Tsung, Bill, Weng was born in 1944 in Taiwan. He received his BSEE degree from National Taiwan University in 1966, MS in Physics from National Tsing Hua University in 1968, and Ph.D. in Nuclear Physics from the State University of New York at Stony Brook in 1974. He spent two years at the University of Arizona in Tucson from 1974 to 1976 as a postdoctoral fellow. He joined Brookhaven National Laboratory (BNL) in 1977, beginning his accelerator physics career in the then Alternating Gradient Synchrotron (AGS) Department working on the fast extraction system and the beam transfer line to the Relativistic Heavy Ion Collider (RHIC). He moved to the Stanford Linear Accelerator Center (SLAC) in 1983 to work on the construction of the SLAC Linear Collider (SLC) project where he made major contributions to the beam optics and magnet measurement and field quality analysis of the 1000 combined-function magnets and to the Arc system. He moved again in 1987, back to Brookhaven, to assume the position of the Project Head of the Booster Project to lead its design and construction, which was completed in 1991. The Booster accelerator is crucial for both the AGS and RHIC to be able to accelerate heavy ion species with masses higher than calcium, to allow the AGS to accelerate protons more than 70 trillion particles per pulse which is a factor of five increase for the AGS and a world record since 1995, and finally to accumulate sufficient numbers of polarized protons for collision in the RHIC Collider. To satisfy the many conflicting physics and technical requirements for to achieve those three functions in one accelerator is a great challenge to the accelerator designer.

Dr. Weng served as the Accelerator Division Head from 1991 to 1994 to work on the

upgrade program of the AGS accelerator. Due to the success of the AGS high intensity proton operation, he was tapped by Oak Ridge National Laboratory in 1996 to lead the design and construction of the Accumulator Ring and Beam Transport system of the Spallation Neutron Source project. The accumulator ring is required for the conversion of the one millisecond linac beam into a one microsecond short pulse for physics research in the materials science, biological, and pharmaceutical fields. He served as the Senior Team Leader from BNL for the Spallation Neutron Source (SNS) from 1996 to 2002 as one member of the six-lab partnership in the construction of the SNS. He was appointed as the Head of the Center of Accelerator Physics at BNL in 2002 to coordinate the lab-wide accelerator R&D efforts and interface with other national laboratories and government agencies on accelerator affairs.

He served as the chair of the Particle Accelerator Science and Technology committee of the NPSS from 1991 to 1994. During his tenure as the Chair, he played important role in bringing the IEEE/NPSS and APS/DPB together for constructive interaction, which culminated in the joint sponsorship of the Particle Accelerator Conference (PAC) by both organizations in 1995. This is necessary, since accelerator physics and technology are a thoroughly interdisciplinary endeavor that involves many subfields and people associated with both the IEEE and APS. He was the Chair of the 1999 PAC conference that was held in New York City and drew more than 1300 participants from all over the world. He has been on every Organizing Committee of the PAC from 1991 to 2005. He has frequently given lectures in



W. T. "Bill" Weng

### OUCH!

Growing old is like being increasingly penalized for a crime you haven't committed.

Anthony Powell

## Olympian thought

There are two kinds of losers: (1) the good loser, and (2) those who can't act.

Peter Laurence



**Habib Zaidi**  
2003 NMIS  
Young Investigator

the US Particle Accelerator School for the training of young scientists. He received the Outstanding Scholarship Award from the Y. T. Lee Foundation in 1995, is a fellow of the American Physics Society and now of IEEE. He has served frequently as technical consultant for many DOE-sponsored accelerator program reviews and as a member of the Machine Advisory Committee for several projects in Canada, Europe, China, Japan, and Taiwan. His current interest is in the design of a Super

Neutrino Beam Facility at BNL. His specialties in accelerator physics are in nonlinear beam dynamics, space charge effects, and high power proton synchrotrons.

Dr. Weng's Fellow citation reads "*for leadership in particle accelerator development.*"

Bill Weng can be reached at Brookhaven National Laboratory, Bldg 911A, Upton, NY 11973-9999, USA; Phone: +1 631 344-2135; Fax: +1 631 631-5954; E-mail: weng@bnl.gov.

## Habib Zaidi

### 2003 Nuclear and Medical Imaging Sciences Young Investigator

**D**r. Habib Zaidi was recognized with the 2003 Young Investigator Nuclear and Medical Imaging Sciences Award "For contributions to the development and better understanding of Monte Carlo simulation tools, improvement and quantitative analysis of attenuation and scatter correction algorithms in PET imaging, and publication of textbooks." The award was presented to Dr. Zaidi at the IEEE Medical Imaging Conference in Portland (Oregon) last October.

Dr. Zaidi is senior physicist and head of the PET Instrumentation & Neuroscience Laboratory at Geneva University Hospital. He received a Ph.D. in medical physics from Geneva University for a dissertation on Monte Carlo modeling and scatter correction in positron emission tomography. He is actively involved in developing imaging solutions for biomedical research and clinical diagnosis in addition to lecturing graduate and postgraduate courses on medical physics and medical imaging. His research centers on modeling nuclear medical imaging systems using the Monte Carlo method, dosimetry, image correction, reconstruction and quantification techniques in emission tomography as well as statistical image analysis in functional brain imaging, and more recently on novel design of dedicated high-resolution PET scanners in collaboration with CERN.

In his brief career, Dr. Zaidi has already made substantial research contributions relating to Monte Carlo modeling and image correction for positron emission tomography (PET). He developed an evolutive Monte Carlo simulation package to generate data sets corresponding to the geometry and actual size

of most commercial and prototype cylindrical PET scanners, which was successfully implemented on a high-performance parallel platform consisting of several PowerPC processors. He also developed a new PET scatter correction technique and a robust segmentation tool for short transmission scans in whole-body PET based on the fuzzy-clustering approach. More recently, he developed an original method for determining the attenuation map in brain PET imaging using coregistered MRI, and made an exhaustive comparative evaluation of the effect of the attenuation map on absolute and relative quantification in functional brain PET imaging using clinical data.

Dr. Zaidi has been an invited keynote speaker at several international events, and is the editor of two textbooks on therapeutic applications of Monte Carlo calculations in nuclear medicine and quantitative analysis in nuclear medicine imaging. His academic accomplishments in the area of quantitative PET imaging have been well recognized by the medical faculty of Geneva University, which elected him to become Privat-Dozent (PD) this year.

He recently joined the Computed Imaging for Medical Imaging (CIMA) collaboration hosted by CERN to work on novel designs of high-resolution, parallax-free Compton enhanced PET scanners based on long scintillation crystals readout on both sides by hybrid photon detectors with integrated readout electronics.

Despite his brief carrier, Dr. Zaidi has an excellent academic record and a strong research aptitude and skills. His career has already shown an evolution of logical and powerful ideas related to fundamental issues of image quantifica-

tion, which merited him the Young Investigator Medical Imaging Science Award for 2003.

*Habib Zaidi can be reached at Geneva University Hospital, Division of Nuclear Medicine, CH-1211 Geneva, Switzerland; Phone: +41 22*

*3727258; Fax: +41 22 3727169; E-mail: habib.zaidi@bcugc.ch.*

## Award Nominations for 2005

### Think Ahead

**C**ompleted nomination forms for all NPSS Awards are due on May 15, 2005. This is your next opportunity, so think now of the members of your community deserving of these Society awards and start to prepare applications.

The NPSS Awards funded directly by the Society comprise the following.

#### **The Richard F. Shea Distinguished Member Award**

**Description:** To recognize outstanding contributions through leadership and service to the NPSS and to the fields of Nuclear and Plasma Sciences

**Award:** \$2000, plaque and certificate

**Funding:** Funded by the IEEE Nuclear and Plasma Sciences Society.

**Eligibility:** Any member of the IEEE and NPSS who has contributed to the fields of nuclear and plasma sciences through leadership and service.

**Basis for Judging:** Selection criteria are:

- Leadership roles and leadership quality;
- Innovative and important contributions to Society activities;
- Service and dedication to the NPSS;
- Technical achievements.

**Presentation:** One award presented annually at Nuclear Science Symposium (Or at any other IEEE NPSS meeting that the awardee chooses.)

#### **The NPSS Merit Award**

**Description:** To recognize outstanding technical contributions to the fields of Nuclear and Plasma Sciences.

**Award:** \$ 2,000, Plaque and Certificate.

**Funding:** Funded by the IEEE Nuclear and Plasma Sciences Society.

**Eligibility:** Any individual who has made technical contributions to the fields of Nuclear and Plasma Sciences.

**Basis for Judging:** Selection criteria, in order of importance are:

- Importance of individual technical contributions;

- Importance of technical contributions made by teams led by the candidate;
- Quality and significance of publications and patents;
- Years of technical distinction;
- Leadership and service within the fields of nuclear and plasma sciences and related disciplines.

**Presentation:** One award presented annually at Nuclear Science Symposium or at an NPSS sponsored meeting chosen by the nominee.

#### **The NPSS Early Achievement Award**

**Description:** To recognize outstanding contributions to any of the fields making up Nuclear and Plasma Sciences, within the first ten (10) years of an individual's career.

**Prize:** \$ 1,800, plaque, and certificate.

**Funding:** Funded by the IEEE Nuclear and Plasma Sciences Society.

**Eligibility:** Member of the IEEE NPSS who at the time of nomination is within the first ten (10) years of his or her career within the field of interest of NPSS.

**Basis for Judging:** Three (3) letters of recommendation, publications and/or reports, patents, etc. which demonstrate outstanding contributions early in the nominee's career.

**Presentation:** At any major NPSS sponsored conference chosen by the awardee.

#### **The NPSS Graduate Scholarship Award**

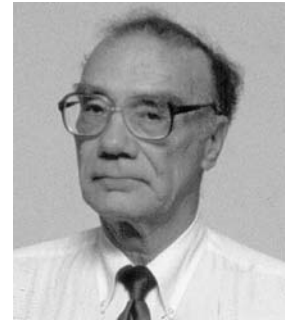
**Description:** To recognize contributions to the fields of Nuclear and Plasma Sciences.

**Award:** \$ 500, certificate, and one – year paid membership in the NPSS.

**Funding:** Funded by the IEEE Nuclear and Plasma Sciences Society.

**Eligibility:** Any graduate student in the fields of Nuclear and Plasma Sciences.

**Basis for Judging:** Evidence of scholarship such as academic record, reports, presentations, publications, research plans, related projects and related work experience, Participation in IEEE activities through presentations, publications, student Chapter involvement, etc., will also be considered.



**Igor Alexeff**  
Awards Committee  
Chair

### The need to know

I mean, if I'm dead, why would I care about it [being remembered] anyway? I'd rather be remembered while I'm living.

*Dave Thomas*

## Nearness breeds...

All marriages are happy. It's the living together afterward that causes all the trouble.

Raymond Hull

**Presentation:** Up to four (4) awards presented annually. Check and certificates sent to nominator to be presented at a special occasion at the winner's institution.

### **Paul L. Phelps Award**

**Description:** The Paul L. Phelps award is different, in that its objective is to permit people to attend short courses at IEEE NPSS meetings by giving them travel grants.

**Award:** Several travel grants per NPSS conference.

**Funding:** Funded by the IEEE Nuclear and Plasma Sciences Society.

**Eligibility:** Any graduate student in the fields of Nuclear and Plasma Sciences. Also members of the IEEE who are unemployed or have trouble obtaining travel funds. Each grantee **must** attend a short course.

**Basis for Judging:** Each conference shall have an appointed chairman to handle Phelps travel grants. The amount of funding per conference is determined by the short course attendance at the previous conference. (Consult the IEEE NPSS Treasurer.) This amount may then be subdivided at the discretion of the appointed chairman to accommodate several recipients. Application for the grant is by a letter to the appointed chairman (Or the conference chairman, who will forward it to the proper person.) **well in advance of the conference date.** The letter will convey the need for the grant, as well as biographical and scientific information to demonstrate the scientific capability of the potential grantee.

**Presentation:** A check will be sent to each grantee, preferably well before the conference, but as soon as possible in the case of late application.

### **The IEEE Awards Program**

There are an abundance of high – level awards obtainable directly from the IEEE. In general,

our society has ignored these awards. To my knowledge, the NPSS has only received ONE such award in its 30 - year history.

**Award:** Download the IEEE Award Manual from the web at IEEE AWARDS and be amazed at what is available! And get to work! Certainly you have colleagues worthy of nomination.

### **IEEE NPSS Technical Committee Awards**

Most of the Technical Committees under the IEEE NPSS umbrella have their own awards. These awards are in general funded from the committee's conference returns. These awards are tabulated below. Details are obtainable from the IEEE Web page, <http://ewh.ieee.org/soc/nps/>

- Computer Applications in Nuclear and Plasma Sciences Award.
- Radiation Effects Award.
- Radiation Instrumentation Early Career Award.
- Radiation Instrumentation Outstanding Achievements Award.
- Fusion Technology Award.
- Particle Accelerator Science and Technology Award (PAST Award).
- Plasma Science and Applications Award.
- Medical Imaging Scientist Award.
- Young Investigator Medical Imaging Science Award.
- Erwin Marx Award
- Peter Haas Pulsed Power Award.
- Outstanding Pulsed Power Student Award.

*Igor Alexeff, the NPSS Awards Committee chairman, welcomes your inquiries and nominations. He can be reached at the University of Tennessee, Ferris Hall 315, Middle Drive, Knoxville, TN 37996-2100; Phone: +1 865 974-5467; E-mail: alexeff@utk.edu*

## What's Happening in Fusion

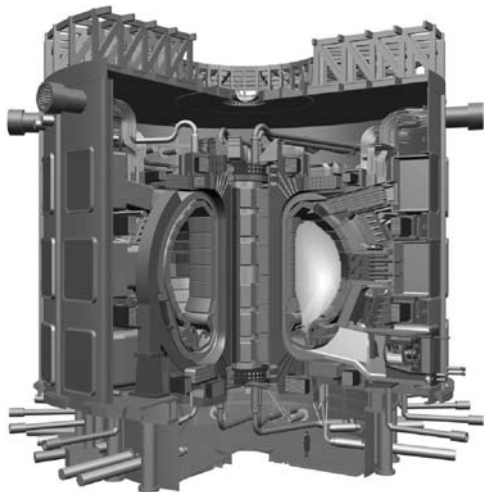


**Charles L. Neumeyer**  
NPSS AdCom

**R**esearch aimed at harnessing nuclear fusion as a long-term solution to our energy supply continues worldwide, with some major developments expected in the very near term. A collaboration of nations is nearing agreement to proceed with an international fusion project of unprecedented scale to harness the promise of fusion energy, the same form of energy that powers the sun.

In fusion, nuclei of light atoms are fused together to form a new element of slightly less

mass. The “missing” mass is converted into energy, as predicted by Einstein's famous formula,  $E=mc^2$ . The most attractive reaction involves the fusion of deuterium (D) and tritium (T) ions which releases 17.6Mev in the form of a neutron at 14.1Mev and a helium ion (alpha particle) at 3.5Mev, with an energy gain ~ 500. For power production, the challenge is to produce a “burning plasma” where enough ions are confined at sufficient density and temperature such that the heat from the alpha particles



*International Thermonuclear Experimental Reactor*

| Main Plasma Parameters and Dimensions           |                        |
|---|------------------------|
| Total fusion power                              | 500 MW                 |
| Q (Fusion power/auxiliary heating power)        | $\geq 10$              |
| Plasma major radius                             | 6.2 m                  |
| Toroidal field @ 6.2 m radius                   | 5.3 T                  |
| Plasma current                                  | 15 MA                  |
| Plasma Volume                                   | 837 m <sup>3</sup>     |
| Average (14 MeV) neutron wall loading           | 0.57 MW/m <sup>2</sup> |
| Installed auxiliary heating/current drive power | 73 MW                  |

can maintain the plasma without significant auxiliary heating power.

One measure of the performance of a plasma is the ratio “Q” of fusion output power produced to auxiliary heating power input. A major step was achieved in the early 1990’s when fusion devices achieved  $Q \sim 1$  conditions referred to as “breakeven”, where the fusion power production reached the level of heating power input. Three devices entered this domain, namely the Tokamak Fusion Test Reactor (TFTR) in Princeton, the Joint European Torus (JET) in England, and the Japanese Tokamak 60m<sup>3</sup> (JT-60) in Japan. For example, the TFTR succeeded in producing controlled D-T reactions yielding pulses of  $\sim 10$  MW of fusion power lasting for a few seconds at a time. The TFTR, JET, and JT-60 machines were the result of  $\sim \$0.5$ B investments made by each of the host countries in the late 70’s, as public interest in energy R&D reached a peak.

The next major step in the program is to enter the burning plasma domain where the alpha particle power begins to surpass the auxiliary power. Since the alpha energy is roughly 1/5 of the energy released per D-T reaction, and since Q is defined as the ratio of fusion power to heating power, the alpha particle heating becomes dominant when  $Q > 5$ .

The design and construction of a burning plasma fusion machine is a major scientific and engineering challenge. The device itself will be of the same scale as a large electric power generating station with a cost  $\sim \$5.0$ B. The scale of such an endeavor, the tradition of collaboration between nations in fusion research, along

with the vital implications for the future of mankind all suggest an international project.

Indeed, the next major fusion project on the horizon is the International Thermonuclear Experimental Reactor (ITER). The idea of ITER was born as an initiative at the 1985 Geneva Summit between the US and the USSR. President Reagan and General Secretary Gorbachev began a process that led to a collaboration among the European Union, Japan, Russia (initially the Soviet Union) and the US, to design and carry out the supporting research and development for ITER, whose programmatic objective is “to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes.”

From the beginning of the formal collaboration in 1988 through the completion of the initial six-year agreement for the ITER Engineering Design Activities (EDA), the US was an equal party to the ITER effort, carrying out significant tasks in design and supporting R&D. However, with support for “big science” waning, in 1998, the Congress directed the DOE to conduct an orderly closeout of its ITER activities, which was done during FY1999. Meanwhile, work continued by the European, Japanese, and Russian teams in developing a more cost effective design.

In January 2003, President Bush committed the U.S. to join the ITER negotiations, noting that “the results of ITER will advance the effort to produce clean, safe, renewable, and commercially available fusion energy by the middle of this century. Commercialization of fusion has the potential to dramatically im-

## Progress??

In one century we went from teaching Latin and Greek in high school to offering remedial English in college.

*Joseph Sobran*

## So, why write them?

Good people do not need laws to tell them to act responsibly, while bad people will find a way around the laws.

*Plato*

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## Stairway to...

Some people reach the top of the ladder only to find it is leaning against the wrong wall.

*Anonymous*

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## Like some defence projects

In the arts nothing is ever finished. It is abandoned

*Arthur Rimbaud*

prove America's energy security while significantly reducing air pollution and emissions of greenhouse gases."

Momentum has been building since the US announced its intention to re-join the project, and the ITER Parties have negotiated an understanding on sharing the cost of ITER, on allocating the hardware procurements, and on most of the terms and conditions of a formal agreement. Additional developments include the addition of China, and Korea to the roster of participating nations.

The site decision remains to be completed, but has been narrowed down to two locations, one in Cadarache, France, and the other in Rokassho, Japan. A final decision is imminent. However, legislative bodies in the various countries must still appropriate funds for actual construction before the project can move forward. The Parties hope to begin construction in 2006, with completion in 2014.

The ITER machine (<http://www.iter.org/>) utilizes a magnetic confinement system called a "tokamak," a toroidal (doughnut-shaped) configuration which contains the hot plasma in a "magnetic bottle." The plasma is fueled and heated to reach a high power amplification (Q) burn of deuterium-tritium (D-T). Pulse lengths up to 300 s can be achieved using inductive current drive via the poloidal field coils, primarily the central solenoid. The heating systems and other non-inductive current sources can be further used to drive the plasma current, extending the nominal pulse-length of 300 s up to steady state. Plasma control is provided by the poloidal field system, and the pumping, fueling and heating systems, based on feedback from diagnostic sensors.

The major tokamak components are the superconducting toroidal and poloidal field coils which magnetically confine, shape and control the plasma inside the toroidal vacuum vessel. The internal, removable components, including blanket modules, divertor cassettes, and port plugs for the plasma limiter, heating antennae, test blanket modules and diagnostics sensors, absorb most of the heat from the plasma and protect the vessel and magnet coils from excessive nuclear radiation. The divertor exhausts the helium from the fusion reaction and limits the concentration of impurities in the plasma. The heat deposited in the components is rejected to the environment via the cooling water system. The tokamak is housed in a cryostat, with thermal shields between the hot parts and the magnets and support struc-

tures which are at cryogenic temperature. Successive barriers are provided for tritium (and activated dust). These include the vacuum vessel, the cryostat, and active air conditioning systems, with detritiation and filtering capability in the building. Under normal operation of ITER, the additional radioactive dose to any member of the public will be below 1% of natural background. Under the worst imaginable sequence of events, the additional radioactive dose to any member of the public will be below natural background. Even in hypothetical situations, no member of the public will need to be evacuated for technical reasons.

Since the start of the EDA, \$920M (year 2000 values) has been spent on technology R&D, mostly on seven large R&D projects (toroidal field and central solenoid model coils, vessel, blanket and divertor models, and blanket and divertor remote handling), to give confidence in the manufacturing capability to build ITER, and in the safe and reliable operation of components. Direct capital costs for ITER have been estimated at \$3800M. Staff and R&D costs during construction add a further \$760M. Operation costs will be ~\$260M/annum, and decommissioning will cost ~\$470M.

Although the ITER Project has strong momentum now and a good chance of moving forward, contingency plans exist in the US for an alternate approach to achieving a burning plasma via a machine called the Fusion Ignition Research Experiment (FIRE). The FIRE machine (<http://fire.pppl.gov/>) would utilize liquid nitrogen cooled copper magnets instead of superconductors, and could produce a burning plasma on a smaller scale than the ITER machine.

Additional research at various laboratories around the world aims to enhance the scientific understanding of plasma behavior, to provide input to the ITER design process, and to identify alternate configurations which could lead to more economical fusion energy in the future. Major projects in the US include the National Spherical Torus Experiment (NSTX) at the Princeton Plasma Physics Laboratory (<http://nstx.pppl.gov/>), the Doublet (DIIID) device at General Atomics in San Diego (<http://www.gat.com/>), and the Alcator C-Mod device at MIT in Cambridge (<http://www.psfc.mit.edu/cmod/>).

In summary, fusion energy shows great promise to contribute to securing the energy future of humanity. The risk of conflicts arising from en-

ergy shortages and supply cutoffs, as well as the risk of severe environmental impacts from existing methods of energy production, are strong reasons to pursue fusion energy now. The world effort to develop fusion energy is at the threshold of a new stage in its research: the investigation of burning plasmas. This investigation, at the frontier of the physics of complex systems, would be a huge step in establishing the potential of magnetic fusion energy to contribute to the world's energy security. There is an overwhelming consensus among fusion scientists that we are now ready scientifically, and have the full technical capability, to embark on this step. The fusion community is prepared to construct a facility that will allow us to produce this new plasma state in the laboratory, uncover the new physics associated with the fusion burn, and develop and test new technology essential for fusion power.

With a decision on ITER, fusion research will move into a new era which will hopefully re-invigorate the US program. In fact the attendance at the IEEE/NPSS Symposium on Fusion Engineering (SOFE) is a good measure of the health of the program, which has been in decline during the last decade due in part to the impasse over ITER. The fusion community is hopeful that this trend will reverse now, and the impact of ITER will be evident by the time of the 21<sup>st</sup> SOFE to be held in Knoxville, Tennessee in September 2005.

*Charles Neumeyer is a member of the IEEE/NPSS AdCom Committee representing Fusion Technology. He can be reached at the Princeton Plasma Physics Laboratory, P.O. Box 451, Princeton, NJ 08543-0451; Phone: +1 609 243-2159; E-mail: cneumeyer@pppl.gov.*

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## Exposed!

Sports do not  
build character.  
They reveal it.

*Heywood Hale  
Broun*

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## What's missing?

Never in the history of the world have so many people been so rich; never in the history of the world have so many of those same people felt themselves poor.

*Lewis Lapham*

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## Thought transfer

Middle age is when you stop criticizing the older generation and start criticizing the younger one.

*Laurence Peter*

## 2004 Nuclear and Plasma Sciences Society Administrative Committee

|                            |                          |
|----------------------------|--------------------------|
| President                  | Edward J. Hoffman        |
| Vice President             | William W. Moses         |
| Secretary                  | Alberta M. Dawson Larsen |
| Treasurer                  | Edward J. Lampo          |
| Most Recent Past President | Peter S. Winokur         |
| Division IV Director       | Harold L. Flescher       |

### Elected Administrative Committee Members

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**Terms expiring 2005:** Dennis B. Brown (RE), Mounir Laroussi (PSAC), Patrick LeDû (CANPS), William W. Moses (RI)

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