NPSS NEWS

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Nuclear and Space Radiation Effects Conference, NSREC 2015

Boston, Massachusetts July 13th–17th, 2015

The 52nd annual IEEE International Nuclear and Space Radiation Effects Conference (NSREC) will be held July 13th–17th, 2015, in Boston, Massachusetts, at the Marriott Copley Place. Our committee has worked hard to offer an outstanding venue and program for this special edition. We will continue the tradition of previous NSRE Conferences by offering an outstanding Technical Program, a one-day Short Course, a Radiation Effects Data Workshop, and an Industrial Exhibit. Engineers, scientists, and managers from around the world who are interested in radiation effects will attend. Mike Xapsos, NASA Goddard Space Flight Center, is the General Conference Chair.

A complete technical and social program is being planned to maximize opportunities for information exchange and networking in the areas of radiation effects on microelectronic and photonic devices, circuits, and systems. Supporters of the conference include 3D Plus, Atmel, Cobham Semiconductor Solutions, BAE Systems, Boeing, Intersil, International Rectifier, Honeywell, Jet Propulsion Laboratory, Northrop Grumman, Sandia National Laboratories, Southwest Research Institute, and VPT Rad.

TECHNICAL PROGRAM

The Technical Program Chair, Ron Lacoe, The Aerospace Corporation, and his committee, have assembled an outstanding set of contributed papers that are arranged into ten sessions of oral and poster papers, and a Radiation Effects Data Workshop. The Workshop consists of papers emphasizing radiation effects data on electronic devices and systems, and descriptions of new simulation techniques and radiation test facilities. In addition, there are three invited talks of general interest to both conference attendees and their companions. "Meet John Adams—A Lively and Revolutionary Conversation with America's Second President" by George Baker, Performer and Lawyer; "Brilliant Blunders: From Darwin to Einstein—Colossal Mistakes by Great Scientists that Changed Our Understanding of Life and the Universe" by Mario Livio, Author and Astrophysicist at the Space Telescope Science Institute and "Witch City: Salem, Massachusetts and its Infamous Witch Trials" by Emerson "Tad" Baker, Author and History Professor at Salem State University. We will also have a Women in Engineering event during the conference with a presentation by Janet Barth, retired-NASA Goddard Space Flight Center.

Teresa Farris
Vice-Chairperson for Publicity

Tim Oldham, Ball Aerospace, has organized this year's Short Course with a theme of "Practical Problems in Spacecraft Design" which will be held Monday, July 13th. This Short Course is an excellent learning opportunity for those who are new to the radiation effects community and need a quick introduction to the field, as well as those who want to stay abreast of current issues. The Short Course

CONFERENCES Continued on **PAGE 2**

Not an IEEE or NPSS member? Visit the NPSS Membership booth for an introductory discount.

NSREC 2015

Continued from **PAGE 1**

INDUSTRIAL EXHIBITS

This year's Industrial Exhibits, organized by David Hansen, Maxwell Technologies, Inc., will permit one-on-one discussions between conference attendees and exhibitors on the latest developments in radiation-hardened and radiation-tolerant electronics, engineering services, facilities, and equipment. On Tuesday evening, attendees and their companions are invited to a reception that showcases the Industrial Exhibit. If you need more information on the exhibit, please visit http://www.nsrec.com. The current list of exhibitors includes:

- 3D Plus
- Aeroflex
- Analog Devices
- BAE Systems
- The Boeing Co.
- Branch of JSC URSC-ISDE
- Crane Aerospace & Electronics—Interpoint
- Cypress Semiconductor
- E2V
- Experimental and Mathematical Physics Consultants (EMPC)
- Honeywell
- Hopewell Designs, Inc.
- International Rectifier
- Intersil
- Vanderbilt Univ./ISDE
- ixFiber / Photline
- J.L. Shepherd & Associates
- JD Instruments
- Linear Technologies
- Maxwell Technologies
- Micropac Industries
- Microsemi
- Modular Devices, Inc.
- National Reconnaissance Office
- PULSCAN
- Ridgetop Group
- Robust Chip
- Rochester Electronics
- Science and Technology Facilities Council
- ST Microelectronics
- Synopsys, Inc.
- Texas A&M Cyclotron Institute
- Texas Instruments
- Towerjazz
- ULTRA TEC
- UC Davis—Crocker Nuclear Lab
- VPT Rad
- VPT, Inc.

features four parts taught by experts from our community.

SOCIAL EVENTS

Heather Quinn, Los Alamos National Laboratory, is the Local Arrangements Chair. She has arranged an outstanding social program in Boston. The Conference Social on Wednesday evening will be a clambake held at Thompson Island. Visits to the American Textile History Museum and John F. Kennedy Presidential Library are highlights of an outstanding companions program. The Conference location right in the heart of Boston also allows easy access to any city site through the Massachusetts Bay Transportation Authority (MBTA).

BOSTON, MASSACHUSETTS

Boston is one of the oldest cities in the United States and is a unique combination of historic and modern sites and green open areas. As the center of the American Revolution, the city is filled with history highlighting its role in American independence. Boston is one of the most walkable American cities, allowing for a leisurely stroll through areas such as the Back Bay and the Esplanade Park that borders the Charles River. It is also the home to many premier colleges and universities, museums, and shops that are perfect for exploring.

The Boston Marriott Copley Place, located in the historic Back Bay area of the city, is the site for NSREC. In addition to the hotel amenities it is connected to two major shopping destinations with over 200 shops and restaurants all via climate-controlled walkways. It is within walking distance of the Skywalk Observatory, Museum of Fine Arts, Fenway Park—home of the Red Sox, the Theater District and famous Newbury Street with its shopping and outdoor dining. There are also two subway stations nearby for a cost-effective way to see the city. Come join us for NSREC in one of America's most memorable cities.

ADDITIONAL INFORMATION

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

Or you may contact the General Chair, Mike Xapsos, 301-286-2263 or E-mail: Michael.a.xapsos@nasa.gov.

Or you may contact the Publicity Chair, Teresa Farris, Aeroflex, at 719-594-8035 or E-mail: teresa.farris@aeroflex.com.

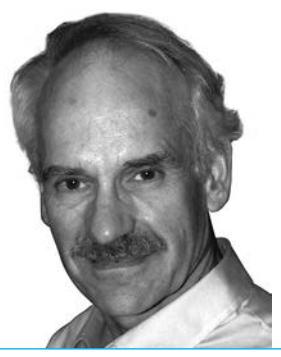
NO MIDDLE CLASS

There are people who have money and people who are rich.

Coco Chanel

Mike Xapsos
General Chair

Heather Quinn
Local Arrangements



Tim Oldham
Short Course

Ronald Lacoe
Technical Program Chair

2015 Nuclear Science Symposium and Medical Imaging Conference (NSS-MIC), 31st October–7th November 2015

The 2015 IEEE Nuclear Science Symposium (NSS) and Medical Imaging Conference (MIC), together with the 22nd International Symposium on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors will be held at the Town and Country Hotel in San Diego, California, from October 31st–November 7th. This conference is the premier meeting on the development and use of instrumentation in the Nuclear and Medical fields. The meeting has a very long history of providing an exciting venue for scientists to present their latest advances, exchange ideas, renew existing collaborations and form new ones; we will continue this strong tradition.

The Nuclear Science Symposium (NSS) is an ideal forum for scientists and engineers in the fields of Nuclear Science, radiation instrumentation, software engineering and data acquisition. The MIC is one of the most informative venues for the state-of-the-art use of physics, engineering, and mathematics in Nuclear Medicine and related imaging modalities, such as CT and MRI, through the development of hybrid devices. The RTSD is an ideal companion to both the NSS and MIC segments of the conference and impacts both interest areas. There is synergy and overlap between the three main areas of the conference. Several joint sessions are thus planned to further foster discussions among scientists who work on similar problems, but possibly in different areas.

The main meeting will be enriched by short courses that will run from the preceding Saturday through Tuesday. The topics are currently being finalized and will include Radiation Detection and Measurement, Accelerator-Driven Light Sources and Image Reconstruction, Theory and Practice and others. In addition, the popular refresher courses will be offered during the NSS and MIC. Workshops are also being planned together with special events such as Women in Engineering and Young Professional sessions as well as specific Users Meetings.

The conference will provide an industrial exhibits area where the providers and developers of many of the technical tools and services used by our attendees will be presenting their products. This will give ample opportunity to exchange technical details and innovation between the academic and the industrial sectors. An exhibitor reception is planned as a further catalyst to such exchanges and collaborations.

The meeting will be held in the Town and Country (T&C) hotel, a location familiar to some. We hope that you will be pleasantly surprised by some of the renovations done to the conference facilities, resulting in more spacious poster sessions, lecture halls, excellent IT services and pleasant outdoor and indoor atmosphere. Special room rates have been negotiated at $135 per night for regular attendees and $119 for students. T&C is at a short drive from the airport reachable either by taxi or by shuttle.

Based on the feedback received from last year's attendees, we are once again going paperless. We are working at further improving the mobile application so as to eliminate even the past minor difficulties. Both the paper program previously mailed and the mobile app will be available on the website well in advance of the conference.

Presentation of excellent science is the first and foremost characteristic of the conference. Another very important aspect is the surrounding relaxed atmosphere, conducive to the exchange of new ideas and fruitful discussions. Such an interdisciplinary flavor offers an excellent milieu to students and postdoctoral fellows; a presentation at this meeting is indeed almost a 'rite of passage' for a student in his or her research career, as they have an opportunity to interact and learn from world experts in the field. Every effort will be made to provide as much student support as possible to make this unique scientific and educational experience more easily accessible. The IEEE NPSS Awards, Paul Phelps Continuing Education Grants, the Valentin T. Jordanov Radiation Instrumentation Travel Grants, and the Conference Trainee Grants will be available for the 2015 NSS-MIC. Please check the application deadline for each award or grant and do not forget to submit your applications and recommendations online.

We have also assembled an excellent companion program which will offer excursions to some of the main attractions in the area, such as the USS Midway, the San Diego Zoo and wine tasting in the Temecula Valley; the conference social program includes the now-traditional NSS and RTSD lunches and the MIC dinner.

We are planning on a full week of excitement and discovery. On behalf of the whole organizing committee I am looking forward to welcoming you in San Diego.

Vesna Sossi, General Chair, E-mail: vesna@physics.ubc.ca, Phone: 01-604-822-7710

Vesna Sossi
General Chair

President's Report

The Nuclear and Plasma Sciences Society is off to a great start in 2015. We have an exciting slate of conferences this year, two new awards, and a proposed new journal.

John Verboncouer
IEEE NPSS President

The first NPSS conference of the year is the *International Conference on Advancements in Nuclear Instrumentation, Measurement Methods and their Applications* (ANIMMA), which was held 20th–24th April 2015 in Lisbon, Portugal. ANIMMA is technically cosponsored by the Radiation Instrumentation Technical Committee. The next conference is the International Particle Accelerator Conference (IPAC), held in Richmond, Virginia, USA 2nd–8th May. IPAC is cosponsored by the Particle Accelerator Science and Technology Technical Committee. The *4th Conference on PET/MR and SPECT/MR*, held 17th–21st May in Elba, is technically cosponsored by NPSS for the second time. *The International Conference on Plasma Sciences* (ICOPS), held in Antalya, Turkey 24th–28th May, is sponsored by the Plasma Sciences and Applications Committee. The following week, the *Symposium on Fusion Engineering* (SOFE) and the *Pulsed Power Conference* (PPC) are collocated in Austin, Texas USA; both run from 31st May–4th June. SOFE is sponsored by the Fusion Technology Standing Committee, while PPC is sponsored by the Pulsed Power Science and Technology Technical Committee. Next up is the *International Conference on Inorganic Scintillators and Their Applications*, held 8th–12th June in Berkeley, California USA. The *Nuclear and Space Radiation Effects Conference* (NSREC) will be held in Boston, Massachusetts USA 13th –17th July, sponsored by the Radiation Effects Technical Committee (see cover story for detail). Lastly, the *Nuclear Science Symposium and Medical Imaging Conference* (NSS-MIC) along with the 22nd *International Symposium on Room-Temperature Semiconductor X-ray and Gamma-ray Detectors* (RTSD) will be help in November in San Diego, California USA from 31st October—7th November, jointly sponsored by the Radiation Instrumentation Technical Committee and the Nuclear Medical and Imaging Sciences Technical Committee. You can learn more about IEEE NPSS meetings at http://ieee-npss.org/. I am looking forward to attending at least five of these meetings, three for the full technical meetings.

The inaugural winner of the Charles K. Birdsall Award, developed under NPSS Past President Janet Barth, is Mark Kushner of Michigan State University. Mark's impressive contributions to the field of plasma physics set the tone for this award, ranging from fundamental developments in fluid models for plasmas, to hybrid kinetic-fluid models, with applications ranging from low-temperature plasmas for materials processing to atmospheric plasmas with biological interfaces. Furthermore, Mark has been a leader in the plasma community since I was a student, a respected rival and peer to my mentor and the namesake of this award, Ned Birdsall. Mark's citation reads: "For contributions in low temperature plasmas and applications, and leadership of the plasma community."

At the February IEEE Technical Activities Board (TAB) meeting series, Division IV Director and NPSS member Bill Moses asked two presidents to present an overview of their society. NPSS President Verboncoeur and the Electromagnetic Compatibility Society President Robert Scully presented overviews of their respective societies. See below for further discussion of the differences in governance. New TAB Chair Vincenzo Piuri presented his vision for the development of worldwide technical communities around the Collabratec tool (https://ieee-collabratec.ieee.org/). Other key initiatives at the TAB level include an effort to improve the transparency of TAB fiscal operations, with the Ad Hoc Committee on Financial Transparency led by NPSS member Peter Clout. The focus of this effort is to provide volunteers with timely financial information in a form more easily understood by volunteers to assist in making fiscal decisions for their societies. In addition, TAB voted to create the new position of Assistant Treasurer in order to provide a training period. IEEE President-Elect Barry Shoop provided his vision of the future of the IEEE, called IEEE 2030, to look at the long-term evolution of the IEEE in terms of publications, conferences, Chapters, and thinking about new products and services, better interactivity of technical communities, and many other facets of the IEEE.

At the recent NPSS Administrative Committee (AdCom) retreat and meeting on 20th –21st February, AdCom discussed a number of important initiatives. One key vote was in favor of retaining the present annual membership fees, with the exception of the student fee which was reduced to $5 for 2016. NPSS plans to continue to lead the IEEE in development of tools for the financial and technical programs of conferences, with strong interest in moving toward more electronic conference content delivery using multiplatform mobile apps to enable live technical content, feedback, and program customization. One important issue that arose was the census NPSS uses to apportion the voting AdCom seats among the Technical Committees. The Fall 2014 census did not yield reliable results, so the census was rerun with a more transparent question, and the results leave the seat distribution unchanged—see p. 5 and the September Newsletter for more detail..

Another exciting development is a proposal for a new journal, *Transactions on Radiation and Plasmas in Medical Science* (T-RPMS). The journal will be sponsored by NPSS, with cosponsorship by the IEEE Engineering in Medicine and Biology Society (EMBS). EMBS President Andrew Laine recently invited me to attend the EMBS retreat and AdCom meeting in Bonita Springs, Florida USA from 27th –29th March to discuss T-RPMS. Although the weather was unseasonably cold, the meeting was very productive. We worked out the details for cosponsorship of T-RPMS, and look forward to submitting the letter of intent to the IEEE TAB shortly. The Society Presidents will have the opportunity to comment on the letter of intent, and after addressing any concerns, there are two phases to formally completing the journal constitution process.

In addition to discussions on T-RPMS, I had the opportunity to participate in discussions at the EMBS Administrative Committee (AdCom) on their long-term governance strategy, and to present an overview of NPSS governance. I previously presented a similar summary at the Division IV meeting at the February IEEE Technical Activities Board (TAB) series. This is best summarized by considering the NPSS organizational chart, shown in Figure 1 below. The members of NPSS elect the Executive or Steering Committees (ExCom) for most Technical Committees (TC), with a few (Particle Accelerator Science and Technology, and Pulsed Power Science and Technology) currently making a transition from appointed to elected committee status. Fusion Technology and Computer Applications in Nuclear and Plasma Sciences remain appointive committees where the chairman is appointed by the NPSS president. In addition, society members elect Administrative Committee (AdCom) representatives for the TCs of NPSS in which they participate. The number of AdCom representatives is fixed at 16, with one seat reserved for the Transnational Committee. The other 15 seats are apportioned by a census of the member participation in each TC. Each technical committee elects one of their own members as Chair, and these TC Chairs also have a voting position on AdCom. TC AdCom representatives may be voting members of the TC management, depending on the Constitution and Bylaws, or tradition for nonelected TCs, of the particular TC. From among the 16 elected AdCom representatives, the AdCom elects a Vice President/President-Elect who, following a confirmating vote, becomes President after two years of apprenticeship. The President-elect and President are the only voting officers. The Past President also has a vote on AdCom. As shown, all blue shaded components are voting members of AdCom, with the President only voting in the event of a tie. Shown in shades of orange, the nonvoting members also play key roles. The nonvoting appointed officers, comprising the Treasurer and Secretary, typically serve longer than the two-year terms of the elected officers largely due to the complexity and hence experience required of these positions. Additionally, liaisons to other IEEE committees and functions, as well as committee chairs, are appointed annually by the President. Many of these have played significant roles within NPSS, and hence have developed connections and expertise within IEEE. Finally, NPSS has a number of senior present and past leaders who currently or previously held high-ranking positions within IEEE and TAB committees, who provide NPSS with unparalleled inside knowledge and access within IEEE. While the details of governance vary in details among various societies, the gurus are really what set NPSS aside from other societies, and they patiently mentor the rest of us. You can learn more about the NPSS here: http://ieee-npss.org/.

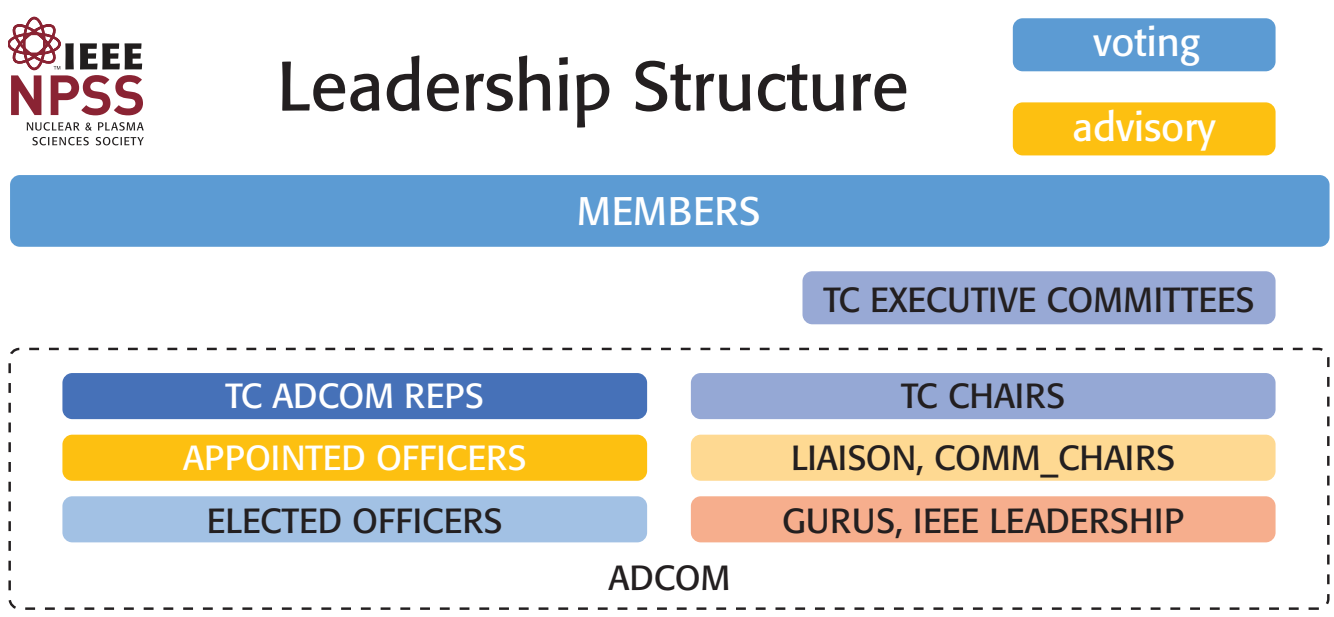


Figure 1: NPSS Structure

The Electromagnetic Compatibility (EMC) Society AdCom has five vice presidents, who serve in roles analogous to many committee chair positions in NPSS AdCom. They also have four elected officers with two-year terms, plus a Past President. Nineteen directors at large round out the voting AdCom membership, with a number of nonvoting positions. Chapters and Standards play a more prominent role in EMC. You can learn more about the EMC Society here: http://www.ewh.ieee.org/soc/emcs/.

The EMBS AdCom also comprises a number of VPs serving functions analogous to NPSS committee chairs. However, their TCs do not have a voting role in their AdCom, and instead their AdCom members are currently chosen on a regional basis, and also includes a student representative. EMBS is currently considering ways of increasing the involvement of both their industrial members and their TCs, and hence was very interested in the NPSS model of a federation of TCs. You can learn more about EMBS here: http://www.embs.org/.

For those of you who would like to volunteer, I encourage you to do so regardless of your experience level. You will discover at each step along the way, there are plenty of willing and able mentors. Your contribution, from reviewing manuscripts for our journals, to helping to organize conferences, to providing advice to the next generation of NPSS members and leaders, are what makes NPSS work, and is greatly appreciated.

I look forward to seeing you at an upcoming conference!

Sincerely,

John Verboncoeur, NPSS President

John Verboncoeur, IEEE NPSS President, can be reached at College of Engineering, Electrical and Computer Engineering, Michigan State University, 3410 Engineering Bldg, 428 S. Shaw Lane, East Lansing, MI 48824-1226; Phone +1 517-355-5133; E-mail: johnv@msu.edu.

WE CONTINUE TO STRUGGLE

Mankind has grown strong in eternal struggles, and it will only perish through eternal peace.

Adolf Hitler

WHILE YOU'RE AT IT, HAVE TWO!

Life is uncertain. Eat dessert first.

Ernestine Ulmer

SOCIETY GENERAL BUSINESS Continued on **PAGE 4**

Secretary's Report

Albe Larsen
IEEE NPSS Secretary and Newsletter Editor

The IEEE Nuclear and Plasma Sciences Society held its first meeting of 2015 in New Orleans, LA, following a day-long retreat at the same venue. New members Christian Bohm, Stephen Gourlay, Paul Lecoq, Steve McClure, Steve Meikle and Stephen Milton were welcomed.

Treasurer Ron Keyser reported large publications and conference losses of order $148k and $60k respectively. Our reserves will show investment return, but as of the meeting it hadn't been posted so our reserves trended down by about $150k. Investment distribution will also be lowered because of contributions from the investment fund to the IEEE Pension Fund. We also made an infrastructure loan to IEEE of $200k.

Conference budgeting and tracking are migrating to standard software packages so tracking and closeout should become easier. In 2013 several conferences had lower attendance than planned due to both sequestration and for San Francisco conferences, the aftermath of the Asiana Airlines plane crash and the BART strike. The 2014 NSREC and NSS/MIC conference books are in external audit.

Our Society budget is developed in a first pass by IEEE Finance based on past activity and performance. It then comes to our Finance Committee, headed by Hal Flescher and to our treasurer where it is tweaked and then sent back. It is important to include initiatives with specific items outlined. IEEE and the Society work back and forth and by fall converge on a budget that then goes to the Board of Directors for its approval.

Ron Keyser is still working with Sal Portillo on the on-line membership application to be used at our membership desks so conferences don't have to collect funds. This is particularly important for non-IEEE conferences

TNS will receive a bonus this year from accurately predicting page count in 2014. TPS is on the cusp of a bonus—TBD.

Do you have an idea for an initiative—let your TC chair or elected AdCom rep know, Initiatives should be simple, with a specific goal and should benefit the operation of the society and/or its membership.

Our new president, John Verboncoeur, noted that the next TAB series was in June. He will attend the EMBS AdCom in late March. He also provided a list of upcoming meetings of TAB and Division IV that he plans to attend. At the February Division IV meeting he presented an overview of NPSS.
At the TAB meeting new officers were introduced. Jose Moura is the new TAB VP and Vincenzo Piuri is the new Chair. There is promotion of the TAB-, MGA- and PSPB-sponsored Collabratec program to develop worldwide technical communities. There is an effort to promote cooperation within IEEE, and to improve TAB operations to align with IEEE and to promote greater financial transparency. A new Ad Hoc committee will address this. Concerns have risen because of the big increase in overhead charges in recent years. Other issues included IEEE's humanitarian program. A TAB assistant treasurer position has been created. There were extensive discussions on overhead, IT and the increasing costs of TAD support. The rate of overhead growth is not sustainable.

Our proposed new journal, *IEEE Transactions on Radiation and Plasma Medical Sciences* was discussed. M. Insana, Editor-in-Chief of TMI had some questions as did the Proposal Development Committee. EMBS may be either a financial or technical partner, and SPS had no concerns so it is hopeful that this journal will soon move forward.

Four new TAB Hall of Honor members were announced: John Vig; Evangelia Micheli-Tzanakou; Gerard Henry (Gus) Gaynor and Saifur Rahman. See the IEEE web site for more information about them.

Bill Moses, our new Division IV director, also addressed the financial concerns raised above. Tom Siegrist, the IEEE CFO, is working to simplify financial reporting, to reduce red ink, and to work to decrease infrastructure charges while working to understand and reduce expenses.

There is also work on a 2030 strategic plan with work on the Board of Directors structure, public initiatives, and humanitarian work and so on.

Work is being done related to standards including licensing guidelines and fees for essential patents.

TECHNICAL COMMITTEES

Computer Applications in Nuclear and Plasma Science has confirmed that the 2016 Real Time conference will be in Padua at the Centro Congressi, outside the center of Padua, but a much better venue for the conference. Dates: 6th–20th June 2016. The 2018 meeting will be hosted by the Jefferson Laboratory in Virginia. The TC itself is undergoing some membership changes.

See John Verboncoeur's report for information on Fusion, Nuclear Medical and Imaging Sciences, Pulsed Power, Particle Accelerator, Plasma Science and Applications, Radiation Effects and Radiation Instrumentation conferences and technically cosponsored conferences.

John also reported on our continuing development of conference management tools. NetSuite is being used for conference budget tracking but is in need of some improvements. Other software is under development.

FUNCTIONAL COMMITTEES

There will be changes in the management of technically cosponsored conferences beginning in 2016 including charges for technical cosponsorship for the conference as well as charges for each Conference Record manuscript submitted to Xplore. This charge will not apply to manuscripts submitted to *IEEE Transactions*.

Tony Lavietes, who is the lead for NPSS on development of conference software, discussed the Network Shop which was started in 1994 for the NSS/MIC to provide a computer room and support personnel, and has now evolved into owning computers, printers, internet equipment, microphones and projection equipment, charges conferences for its services. They also can print and barcode badges to get rid of paper event tickets, and have a range of conference utilities that, for example, allow papers for a technical session to be uploaded centrally. Personnel costs are the largest part of charges and shipping costs follow.

Current issues for them are aging equipment, use of an external web server, aging software, and the need for new personnel. There is also a question of how much a computer room is still needed with the universal availability of laptops, tablets and smart phones.

IEEE/NPSS owns the Network Shop completely.

The Communications Committee has decided not to print new literature or a new NPSS brochure in 2015, but to use the web more extensively. The web site was revamped in 2014 (See article below) but could still use videos, active graphics and other enhancements. Keeping pages up to date remains an ongoing challenge!

The Membership Committee is working on new tools for the membership tables at conferences. They are also looking at ways to keep members once they've joined. Mentoring is a good way, as well as getting new members involved in conference and publication activities. We also need to expand student membership worldwide as well as membership in Regions 9 and 10 (Latin America and Asia/Pacific Rim). Get involved and stay involved!

The Transnational Committee's new chair, Christian Bohm, noted that there is still much work for the committee in Asia, Africa and Latin America. The committee is working on networks and new members. They promote Distinguished Lecturers, our non-North American conferences, and the formation of student branch chapters. Liaisons are needed from each technical committee to ensure balance and support for all our areas of interest.

The Young Professionals committee, chaired by Christoph Ilgner, now includes graduates for 15 years past their first degree. NPSS organizes Young Professional events at a number of conferences to provide networking opportunities. In some cases these may be combined with Women in Engineering activities since the events often compete for time slots as well as for attendees.

Steve Gold (Chapters chair) reported that the Chicago chapter was dissolved in 2014 and the German chapter is in danger of dissolution in the next few years. The Alexandria University student branch chapter is thriving. See their article under the main Functional Committees section. A new student branch chapter in Tamil Nadu, India is being formed and a student branch chapter at University of Aix-Marseille and a regular chapter in Beijing are under discussion . The Western Michigan chapter is working at revival with help from John Verboncoeur and Mark Kushner.

Dan Fleetwood reported that from 2007 through 2014 the number of lectures presented under the Distinguished Lecturer (DL) program has increased with 16 out of 31 lecturers giving at least one lecture in 2014. Often the lectures are tied to other travel so aren't reflected in the DL budget. There will be more effort to have DLs participate in summer schools and tutorial programs. If you are involved with a chapter or a student branch chapter, invite one of our Distinguished Lecturers to present a program. Details are on the NPSS web site.

Publications, under Paul Dressendorfer, are doing well, TPS has implemented the no-page-charges policy to bring it into alignment with TNS. It will publish 11 special issues in 2015. A big change will be the implementation of the policy that an article published in a journal cannot be included in a conference record unless the journal article is significantly different.

The Awards committee under Craig Woody, announced the 2015 Society Awards. See the Awards section under Functional Committee Reports below to see biographies and citations for the 2015 recipients. In 2016 Award nominations will be fully electronic, so watch the web site http://ieee-npss.org/awards/npss-awards/

Watch for requests from Nominations chair Gerald Cooperstein to fill AdCom seats that will be vacated at the end of this year. A ballot should be out in mid-to-late summer. Also watch for requests from your technical committees because many have elections for seats on the management committee at the same time and candidate nominations are welcome.

Jane Lehr, Chair of the Fellow Candidate Evaluation committee, noted that Jim Schwank will be stepping down. New and returning members include Gary Eden and Peter Winokur. Nominations were due March 1st for the Fellow Class of 2016. It isn't too early to start to work on nominations for the Class of 2017! Check the web site for new Fellow information.

Hal Flescher, Finance committee chair, noted that we are doing well financially and have money for initiatives, but they need to go into the budget now. The new child-care support funds will be managed by each conference and they will work to make sure the system isn't abused. Since the meeting the application has been tweaked and we're all curious to see how this pilot program works. Considerable conversation went into discussion of conference tools, as well as on tool development and improvement. International banking issues related to conferences were also discussed. The value and appropriateness of Chapter awards was discussed.

LIAISON REPORTS

Ray Larsen, liaison to SSIT, IEEE Smart Village and IEEE HAHC, reported that Greg Adamson is the new SSIT chair. NexTek president Paul Savage, who was instrumental in supporting the original SunBlazer work for Haiti, has developed a proposal to FiRE, Funding for Resilience. The proposal made the first cut and by the time this is published we will know whether it has made the second/final cut. If it has, there will, it is hoped, be considerable funding to rapidly expand Smart Village work.

In Sandra Biedron's absence, Brendan Godfrey discussed the IEEE-USA activities. He focused on the Congressional Visiting days that were held in March. See his article below. In addition, the R&D Policy group works on Position Papers, on Export Controls and related issues.

Peter Clout, ICALEPCS liaison, noted the next meeting is in Melbourne, Australia in May. There has been no request for NPSS technical cosponsorship, nor are there any NPSS members on the committee. The 2017 meeting is scheduled for Barcelona.

Janet Barth is our new liaison to Women in Engineering. She will attend the WIE general meeting in San Jose, CA in late April and will participate in the WIE luncheon at NSREC this July. Other WIE functions will be held at the collocated Fusion/Pulsed Power conferences and at NSS/MIC in the fall.

Edl Schamiloglu, liaison to EAB, discussed the Engineering Projects in Community Service (EPICS) program and MOOCS. See http://www.ieee.org/education_careers/education/preuniversity/epics_high.html to learn more about EPICS, which has excited many of our students worldwide. MOOCS are 'Massive open online courses'. A number of articles about them csn be found here: http://www.ieee.org/searchresults/index.html?cx=006539740418318249752%3Af2h38l7gvis&cof=FORID%3A11&qp=&ie=UTF-8&oe=UTF-8&q=MOOCS.

NUCLEAR & PLASMA SCIENCES SOCIETY NEWS

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ADCOM ACTIONS

» It was moved, seconded and passed that a new census, asking only about technical committee affiliation be undertaken immediately.

» It was moved by the RITC, and passed, that the following change to their Consitution and Bylaws be approved: If a member of the RISC does not complete their term and the term has more than one year remaining, the RISC Chair shall appoint a replacement, with approval by simple majority from the RISC membership, to serve for the unexpired portion of the term. For a term with a remaining duration of less than one year, the vacancy shall be filled at the next election.

» It was moved by the Pulsed Power technical committee, and passed, that IEEE NPSS technically cosponsor the 2016 EAPCC/BEAMS conference and that NPSS pay the $1000 technical cosponsorship fee.

» It was moved by the Finance Committee, and passed, that 2016 dues remain at the same level as those for 2015. Dues include electronic access to TNS and TPS as well as to NPSS conference records.

» A motion presented by Juergen Kolb and seconded by Stefan Ritt reduced student dues from $18 in 2015 to $5 for 2016. The motion carried by a large margin.

» A motion by Steven Gold, seconded by Don Shiffler to create an outstanding chapter award was defeated.

» A motion by Steven Gold, seconded by Brendan Godfrey, to recognize the founder of a new chapter by presentation of a plaque, was passed.

Albe Larsen can be reached by E-mail at a.m.larsen@ieee.org.

AND QUICKER TOO!

The e-mail of the species is deadlier than the mail.

Stephen Fry

NPSS Census Results for Representation on the Administrative Committee

John Verboncouer
IEEE NPSS President

The members of the Nuclear and Plasma Sciences Society (NPSS) take a census every five years in order to determine the distribution of voting representatives on the Administrative Committee. The census question and answer series employed in the Fall 2014 census provided ambiguous results, which differed significantly depending upon how the question and answers were interpreted. 2013–2014 NPSS President Janet Barth constituted an ad hoc committee comprising Janet Barth, Brendan Godfrey, Albe Larsen, Steve Meikle, and John Verboncoeur (chair). Stefan Ritt joined the committee in 2015. The committee proposed, and the Administrative Committee agreed, to re-run the census survey in Spring 2015 using a clear question in which members were asked to distribute their single vote by assigning percentages to the Technical Committees in proportion to their desired representation.

The survey has been completed, and the distribution of Administrative Committee seats among Technical Committees will remain unchanged, as follows:

» Computer Applications in Nuclear and Plasma Sciences Committee: **one**

» Fusion Technology Committee: **one**

» Nuclear Medical and Imaging Sciences Committee: **two**

» Particle Accelerator Science and Technology Committee: **one**

» Plasma Science and Applications Committee: **three**

» Pulsed Power Science and Technology Committee: **two**

» Radiation Effects Committee: **three**

» Radiation Instrumentation Committee: **two**

» Transnational Committee: **one**

A complete report including the updated census question, the apportionment algorithm, and the detailed results will be presented in the next issue of the NPSS News.

Plasma Science and Applications Technical Committee Chair

Don Shiffler
Chair, PSAC

DONALD A. SHIFFLER, JR.

Don Shiffler received his BS in Physics (1986) from North Carolina State University and a Master's (1988) and Doctorate (1990) in Applied Physics from Cornell University. In graduate school he researched the physics of high-power traveling wave tube amplifiers operating in X-band. He served a post-doctoral appointment from 1990 to 1992 at Duke University in the area of infrared free electron lasers. Dr. Shiffler then became of member of the Electrical and Computer Engineering Faculty at the University of New Mexico, pursuing research in novel high-current cathodes. In 1995 Dr. Shiffler moved to the Air Force Research Laboratory where he began work in the areas of L-band high-power microwave sources, high-power microwave-induced breakdown, and field-emission physics. He currently works in several scientific areas. First, he continues work on high-current field emission cathodes, in particular studying the effects of shielding and field enhancement in situations ranging from DC emission to laser-induced electron emission. Next, Dr. Shiffler performs research on high-power microwave sources based on metamaterials and the interaction of electron beams with these metamaterials. Finally, Shiffler works as a field archaeologist for the Bureau of Land Management, where he studies Ancestral Puebloan ceramics and aggregation strategies, with an emphasis on the Pueblo III period from 1150 to 1400 AD.

Don Shiffler can be reached by E-mail at donald.shiffler@us.af.mil.

New NPSS Web Site Goes Live

Richard Kouzes
IEEE NPSS Webmaster

The NPSS web site has a new look! The new NPSS home page, located at http://ieee-npss.org/, has an updated organization and is dynamically formatted to work on all desktop and mobile devices. Peter Clout (NPSS Communications Chair), Albe Larsen (NPSS Secretary) and Dick Kouzes (NPSS Webmaster) oversaw the development of the new site, which was implemented by Cisneros, a multimedia company, and Big Swing, a website design, graphic design, and communications studio. This is the first major redesign of the NPSS web site in five years.

The goals for developing a new NPSS web presence include:

» Actively build the international community of nuclear and plasma science professionals by creating opportunities for networking, education, and recognition.

» Increase participation in NPSS conferences, sponsored conferences and chapter activities. Serve as easy information resource for access to conference information, ability to find out who's running them, get there quickly to get the information and be done. The list of conferences is a very important element of the home page.

» Attract nuclear and plasma science professionals who are just starting to specialize.

» Engage nuclear and plasma scientists whose work extends across several fields of interest.

» Serve as an educational resource for professionals at all levels (from new professionals through advanced researchers).

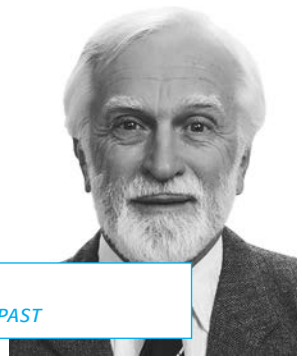
The target audience for the web site includes NPSS members, nonmember professionals in the nuclear and plasma sciences, professionals just starting to specialize in nuclear and plasma science or who cross multiple disciplines, and the general public seeking information on nuclear and plasma sciences.

The objectives for the redesign were to improve the overall information architecture of the site to allow for intuitive access to all areas of information (e.g., newsletters, awards, publications, conference information, committee activity, chapter activity) across all platforms, promote attendance at conferences and chapter events, to optimize search engine results allowing the site to be found more readily and frequently, and to promote the availability of NPSS distinguished lecturers.

Richard Kouzes, IEEE NPSS Webmaster, can be reached by E-mail at RKouzes@pnnl.gov.

Technical Committees

PARTICLE ACCELERATOR SCIENCE AND TECHNOLOGY



Stan Schriber
Former Chair, PAST

CHAIR

Stan Schriber served as the Chair of the appointed Particle Accelerator Science and Technology (PAST) Technical Committee (TC) from 2009 January until 2014 December. As mentioned in the 2014 March IEEE-NPSS Newsletter, Stan planned on stepping down as the PAST TC Chair. The new Chair of the newly formed elected PAST TC Executive Committee (ExCom) is Steve Gourlay from LBNL, who can be reached at sagourlay@lbl.gov.

ORGANIZATION

By the time you read this newsletter, elections for the positions of the new elected PAST TC ExCom will have been completed. On behalf of IEEE, IEEE-NPSS, the new PAST TC and especially from me, thanks are sent to the fourteen individuals who agreed to run for the eight positions of the new elected PAST TC (Members-at-Large)—seven officers of the PAST TC and one PAST TC representative on the IEEE-NPSS AdCom. Thanks also to the IEEE-NPSS members who wrote submitting names of individuals to be considered for the various positions. And, congratulations are sent to those who won the elections. A special thanks is sent to those, who over the years, have worked hard on behalf of IEEE-NPSS and on behalf of the appointed PAST TC members, maintaining PAST TC as an important organization within NPSS. In the past, these individuals held the following responsibilities: Ilan Ben-Zvi (BNL) (past Chair, Fellows and Awards Subcommittee Chair); Bruce Brown (FNAL) (past Chair, Web and Communications Subcommittee Chair); Bob Zwaska (FNAL) (IEEE-NPSS AdCom elected representative, Nominating, Education and Outreach Subcommittee Chair); Sandra Biedron (Colorado State) (past IEEE-NPSS AdCom elected representative, Nominating, Education and Outreach Subcommittee Chair, managing and operating our IEEE booths at NA-PAC and IPAC conferences); and finally a number of individuals who chaired the very successful PAC/IPAC/NA-PAC conferences in North America including PAC'09-Paul Schmor (TRIUMF), PAC'11-Thomas Roser (BNL), IPAC'12-Vic Suller (LSU), NA-PAC'13-Steve Gourlay (LBNL) and those who have agreed to chair our future conferences IPAC'15-Andrew Hutton (JLab), NA-PAC'16-Marion White (ANL), IPAC'18-Lia Merminga (TRIUMF) and NA-PAC'19-Yoshishige Yamazaki (MSU).

The first get-together of the newly formed PAST TC ExCom will be Tuesday, May 5, 2015, 7:00 a.m. for a breakfast meeting at the Richmond Convention Center during the IPAC'15 conference. On the agenda for that first meeting is formation of the following subcommittees (SCs) that report to the ExCom—Fellows and Awards, Web and Information, Nomination, Education and Outreach and Conferences. We are looking forward to feedback from the IEEE-NPSS membership, feedback that can help us with the formation of the SCs and any other related information that would be useful in providing guidance to these SCs.

PAST TC EXCOM MEMBERS *(terms started 2015/01/01)*

Chair (to 2016/12/31):	Steve Gourlay, LBNL, sagourlay@lbl.gov
Vice Chair (to 2016/12/31):	Fulvia Pilat, JLab, pilat@jlab.gov
Past Chair (to 2016/12/31):	Stan Schriber, retired, schriber@nscl.msu.edu
Young Professional M-a-L (to 2016/12/31):	Heather Andrews, LANL, hlac@lanl.gov
M-a-L (to 2018/12/31)	Katherine Harkay, ANL, harkay@aps.anl.gov
M-a-L (to 2017/12/31)	Bruce Carlsten, LANL, bcarlsten@lanl.gov
M-a-L (to 2016/12/31)	Stephen Milton, CSU, milton@engr.colostate.edu
M-a-L (to 2015/12/31)	George Neil, JLab, neil@jlab.gov
PAST TC M-a-L to AdCom (to 2018/12/31)	Stephen Milton, CSU, milton@engr.colostate.edu
Past AdCom M-a-L (to 2018/12/31)	Bob Zwaska, FNAL, zwaska@fnal.gov

EX-OFFICIO EX COM MEMBERS:

IPAC'12 Chair (to 2015/12/31)	Vic Suller, LSU retired
NA-PAC'13 Chair (to 2016/12/31)	Steve Gourlay, LBNL
IPAC'15 Chair (to 2018/12/31)	Andrew Hutton, JLab
NA-PAC'16 Chair (to 2019/12/31)	Marion White, ANL
IPAC'18 Chair (to 2021/12/31)	Lia Merminga, TRIUMF
NA-PAC'19 Chair (to 2022/12/31)	Yoshishige Yamazaki, MSU

CONFERENCES

The successful North American Particle Accelerator Conference (NA-PAC'13) (the 26th xPAC conference in North America) was organized jointly by the Lawrence Berkeley National Laboratory (LBNL) and the SLAC National Accelerator Laboratory (SLAC). The conference with 511 attendees took place 2013 Sept 29th—Oct 4th in the Pasadena Convention Center. The Scientific Program Committee chaired by Alex Chao, SLAC, developed an exciting program of invited oral presentations, oral presentations and posters amounting to 573 in total submissions published on JACoW.

This was our first xPAC conference impacted by the new travel rules for government employees and those funded under government grants. Attendance was almost a factor of two lower than usual, and prompt action had to be taken by the conference planners to reduce expenses significantly, so as to fit within the much reduced income. One of the most severe problems experienced was related to invited speakers who at the last minute had to cancel participation, making the scientific program committee work hard at obtaining very good replacement speakers. Everything worked out very well, but this was only possible with a lot of extra hard work by the conference team.

FUTURE ACCELERATOR CONFERENCES

Planning continues for the next particle accelerator conferences to be held in North America: IPAC'15 in Richmond, VA; NA-PAC'16 in Chicago, IL; IPAC'18 in Vancouver, BC; and NA-PAC'19 to be hosted by Michigan State University at a site within Michigan close to East Lansing.

In particular, our 2015 IPAC'15 conference will be a special conference because it will be the 50th anniversary of holding particle accelerator conferences in North America. Any suggestions for this anniversary event are most welcome—please send suggestions to Fulvia Pilat (pilat@jlab.org) who is the Local Organizing Committee Chair for IPAC'15.

Steve Gourlay
Chair, PAST

In addition, IPAC'15 will be the venue to celebrate the 25th anniversary of the formation and operation of the Division of Physics of Beams (DPB) within the American Physical Society, the organization that with IEEE-NPSS jointly sponsors the IPAC and NA-PAC conferences in North America. Again, please send suggestions to Fulvia Pilat.

MISCELLANEOUS

Based on an initiative from the United States Liaison Committee of IUPAP, a draft resolution has been put to the 28th General Assembly of IUPAP to form a new IUPAP Commission on Accelerator Science. The General Assembly decided to set up a new working group to discuss this issue, with the chair being from FNAL. Please get in touch with Stan Schriber if you have any interest, comments or ideas regarding this resolution.

Just a gentle reminder that DPB recently published the fourth version of the extremely successful brochure Accelerators and Beams, Tools of Discovery and Innovation that was edited by Ernie Malamud (FNAL retired). An electronic version of the brochure can be obtained from the web site http://www.aps.org/units/dpb/index.cfm. We have many hard-bound copies available for those who would like copies or who would like to distribute them at events such as at institution open houses, schools or clubs. If you would like to receive hard copies, please contact Ernie Malamud at malamud@foothill.net.

Please send Stan Schriber (PAST TC Nominations Subcommittee Chair) any suggestions for names of people who might run for the four-year PAST TC ExCom Member-at-Large position that will be open for election this summer.

Stan Schriber can be reached at his home in Eagle, ID 83616 USA; Phone: +1-208-631-8208, E-mail: schriber@nscl.msu.edu

PULSED POWER SCIENCE AND TECHNOLOGY

The 20th Pulsed Power Conference is upon us and being held at the Hilton Austin in Austin, Texas, from May 31st–June 4th, 2015. One of the highlights of our biennial meeting is the recognition of distinguished members of our community through our awards.

Jurgen Kolb
PPST Chair

Dr. William Styger is recipient of this year's Erwin Marx Award. Dr. Styger is currently manager of the Advanced Accelerator Physics Department at Sandia National Laboratories. He is recognized for his outstanding contributions to the physics and technology of superpower pulsed-power generators, in particular to the Z and ZR facilities at Sandia National Laboratories. His efforts have elevated pulsed-power-driven, high-energy experiments to a new level.

The Peter Haas Award is bestowed upon Dr. Edl Schamiloglu. He is distinguished professor of electrical and computer engineering at the University of New Mexico where he has established a world-renowned program of research and education on pulsed-power-driven high-power microwaves. Dr. Schamiloglu is recognized for his outstanding efforts in the areas of pulsed power, beams and microwaves.

With the Arthur H. Guenther Pulsed Power Student Award we further credit two exceptional students of our community for their achievements. Unlike the other awards, this award is given annually. The recipient for the year 2014 is Christopher Leach, who was a Ph.D. student at the University of New Mexico. The award for the year 2015 goes to Sterling Beeson, formerly a Ph.D. student at Texas Tech University. Both have completed their degrees.

Juergen Kolb, chair of the Pulsed Power Science and Technology Committee can be reached by E-mail at jkolb@odu.edu or by phone at +49-383 4554 3950.

NUCLEAR MEDICAL AND IMAGING SCIENCE AND TECHNOLOGY

As you read this newsletter the composition of the program for this year's 2015 IEEE NSS/MIC meeting in San Diego (at the Town and Country Resort from the 31st Oct to 7th Nov) will be underway. Vesna Sossi (General Chair) along with Adam Alessio and Lawrence MacDonald (MIC Program Chair and Deputy Program Chair respectively) will be working on the abstracts review and an exciting program for the 2015 edition of the NSS/MIC meeting http://www.nss-mic.org/2015/public/welcome.asp.

It is also at this time of the year when we are searching to replace five NMISC committee members by motivated volunteers to serve a three-year term starting from 01 January 2016. Self-nominations are encouraged. If you are interested in serving on the NMISC please contact the NMISC Secretary and Chair of the Nominations Subcommittee, Andrew Goertzen (Andrew.Goertzen@med.umanitoba.ca).

Finally nominations are also solicited for this year's NMISC awards. The Edward J. Hoffman Medical Imaging Scientist Award is given annually to an individual in recognition of outstanding contributions to the field of medical imaging science. The Bruce Hasegawa Young Investigator Medical Imaging Science Award is also awarded annually to a young investigator in recognition of significant and/or innovative technical contributions made early in their career. To be eligible for the Hasegawa award the individual must have been awarded their highest degree no more than six years prior to the date of nomination. I would like to take this opportunity to encourage all of you to nominate worthy colleagues for both these awards by the 15th of July deadline (relevant information may be found on the NMISC website-http://ewh.ieee.org/soc/nps/nmisc/MICAwards.html). Please send your nominations to the NMISC Awards subcommittee chair, Glenn Wells (gwells@ottawaheart.ca).

Dimitris Visvikis
NMISC Chair

Dimitris Visvikis can be reached at the National Institute of Health and Medical Research (INSERM), UMR1101, LaTIM, CHRU Brest, Bat 1, 2 avenue Foch, Brest, FRANCE; Phone: +33 298-01-81-14; Fax: +33 298-01-81-24; E-mail: dimitris.visvikis@inserm.fr

ACTION AT A DISTANCE?

Theologians are like pigs, when you pull one by the tail they all squeal.

Constantijn Huygens (father of Christiaan)

SEEING THINGS

Censors tend to do what only psychotics do: they confuse reality with illusion.

David Croneberg

NOTHING DOING...

I know nothing about sex because I was always married.

Zsa Zsa Gabor

Functional Committees

AWARDS

FELLOWS Class of 2015

SOKRATES T. PANTELIDES

Sokrates T. Pantelides
Fellows Class of 2015

Sokrates T. Pantelides is University Distinguished Professor of Physics and Engineering, William A. and Nancy F. McMinn Professor of Physics, and Professor of Electrical Engineering at Vanderbilt University, Nashville, Tennessee. He holds a secondary appointment as Distinguished Visiting Scientist at Oak Ridge National Laboratory. He received his Ph.D. in Physics from the University of Illinois at Urbana-Champaign in 1973. Before joining Vanderbilt in 1994, he spent 20 years at the IBM T. J. Watson Research Center in Yorktown Heights, New York, where he carried out theoretical research in semiconductors and served as manager, senior manager, and program director. He is author or coauthor of ~500 research articles in refereed journals with ~20,000 citations and is editor of eight books. He is a Fellow of the American Physical Society, the Materials Research Society, the American Association for the Advancement of Science, and the Institute of Electrical and Electronic Engineers. His research is theoretical and focuses on the structure, defect dynamics, and electronic properties of electronic materials and nanostructures, complex oxides, two-dimensional materials, radiation effects, electron microscopy and electron-energy-loss spectroscopy, transport in molecules and thin films, device physics, and catalysis.

Citation: *for contributions to point-defect dynamics in semiconductor devices.*

SOCIETY AWARDS

2016 Charles Birdsall Award

MARK J. KUSHNER

IEEE NPSS is proud to announce the first Charles Birdsall Award recipient. The award will be presented at ICOPS 2016. Look for a follow-up story in September 2016.

Mark J. Kushner received the B.S. in Nuclear Engineering and the B.A. in Astronomy from the University of California at Los Angeles; and the M.S. and Ph.D. in Applied Physics from the California Institute of Technology. He served on the technical staffs of Sandia National Laboratory, Lawrence Livermore National Laboratory and Spectra Technology before joining the University of Illinois at Urbana-Champaign in 1986 where he also served in many administrative roles. In January 2005, Dr. Kushner became Dean of Engineering at Iowa State University. Prof. Kushner then joined the University of Michigan in September 2008 as founding director of the *Michigan Institute for Plasma Science and Engineering*. Prof. Kushner's research area is computational low-temperature plasmas—their fundamental properties and technological applications, fields in which he has extensively published. He has held leadership roles in several professional societies, conferences and in editorial capacities including the APS, AVS, Institute of Physics and IEEE. Prof. Kushner is a co-author of several National Research Council studies, including the 2010 Decadal Report on Plasma Science. He was elected to the National Academy of Engineering in 2011.

Merit Award

MICHAEL KONG

Michael Kong
2015 Merit Award Recipient

Dr. Michael Kong is Batten Endowed Chair in Bioelectrics and Professor of Electrical Engineering at Old Dominion University, Norfolk, VA. His research is in low-temperature atmospheric pressure plasmas and their applications in biomedicine and environment. He was a full professor (2004—2012) and a senior lecturer (1999—2004) in bioelectrical engineering at Loughborough University, UK and a lecturer in electrical engineering (1995—1999) at the University of Liverpool, UK. In the span of 20 years in academia, Dr. Kong's research has evolved from electron beam and switchgear arc plasmas, to low-temperature plasmas, and to biological effects of plasmas and electric field. Crossing disciplinary boundaries has led to pioneering studies on several fronts.

His interest in low-temperature atmospheric plasmas began in the mid-1990s when the field was in its infancy with little quantitative understanding; the origin and control of plasma instabilities was one main obstacle to their applications. His group was the first to identify the alpha and gamma modes of atmospheric pressure glow discharges and their link to the sheath and to sheath breakdown as an importance source for plasma instabilities. Both experimental and numerical studies covered a wide frequency range of from 0.01 to 300 MHz. The role of the sheath in plasma instabilities then led to Dr. Kong's proposal for ultra-stable plasma with the gas gap reduced to below the thickness of the sheath as a route to control the build up of space charges. Advances in plasma physics such as these have recently be expanded in Dr. Kong's laboratory to plasma-mediated aqueous chemistry, essential for biomedical and many environmental applications of plasmas but poorly understood since liquid-phase diagnostics and modeling are traditionally outside the remit of the physics of gas discharges. Dr. Kong's group is among the first to report a system-level simulation of the entire plasma-liquid interaction system consisting of three cascading regions of plasma generation, gas buffering region, and liquid.

Dr. Kong was among the first to study the inactivation effects of low-temperature atmospheric plasmas against both microbes and proteins. His group made pioneering contributions to plasma inactivation of biofilm and prion-like proteins. The latter work has addressed infection transmission of Creutzfeldt-Jakob disease (CJD) and contamination of flexible endoscopes. Using bacterial mutants as a biosensor not as contaminants, his group confirmed plasma-induced oxidation as responsible for plasma inactivation of both bacteria and protein. The key reactive oxygen species are oxygen atoms and superoxide against surface-borne bacteria. These and other pioneering plasma studies gained him the inaugural International Plasma Medicine Prize in 2010.

Dr. Kong is an active IEEE NPSS volunteer having chaired the 39th International Conference on Plasma Science (2012) and currently serves as Vice Chair of the Plasma Science and Applications (PSAC) ExCom. He is a Fellow of IEEE and has published some 160 peer-reviewed journal papers with an h-index of 43 (Google Scholar) and over 260 conference presentations. He can be contacted at mkong@odu.edu.

Richard F. Shea Award

JANE LEHR

Jane Lehr
Shea Award Recipient

Professor Jane Lehr is the Chair of the Electrical and Computer Engineering Department at the University of New Mexico. Prior to joining UNM, she was a Research Scientist at Sandia National Laboratories and a Senior Research Engineer at the Air Force Research Laboratory, Directed Energy Directorate. She received the Bachelor of Engineering degree from Stevens Institute of Technology and the Ph.D. degree in Electrical Engineering from New York University, Polytechnic School of Engineering. Dr. Lehr's research interests are in high-power component development; high-power electromagnetics and effects; compact pulsed power; exploding wires and shock wave formation; and the physics and application of electrical breakdown in vacuum, gases and liquids.

Dr. Lehr is a Past President of the IEEE Nuclear and Plasma Sciences Society. She has served as an Associate Editor for the *IEEE Transactions on Dielectrics and Electrical Insulation*, Guest Editor for the *IEEE Transactions on Plasma Science* and served three years on the the IEEE Technical Activities Board Publications Committee. Currently, she is the Chair of the IEEE NPSS Fellow Evaluation Committee. In addition, she serves on numerous national committees. Dr. Lehr is an IEEE Fellow, the 2001 recipient of the Air Force Basic Research Award and the IEEE Region 6 Award for Leadership of the Albuquerque Chapter. She was named an Outstanding Woman of New Mexico and has been inducted into the New Mexico Hall of Fame.

Early Achievement Award

QUANZHENG LI

Quangzheng Li
Early Achievement Award Recipient

Quanzheng Li is Assistant Professor of Radiology at Massachusetts General Hospital, Harvard Medical School. He received his M.S. degree in Biomedical Engineering from Tsinghua University in 2000, and his Ph.D degree in Electrical Engineering from the University of Southern California in 2005. He did his postdoctoral training at USC from 2006 to 2007, and was a Research Assistant Professor from 2008 to 2010. In 2011, he joined the Center for Advanced Medical Imaging Sciences, Radiology Department at Massachusetts General Hospital in Boston where he is currently an assistant professor mentoring a group of graduate students and post-doctoral fellows working in image reconstruction and analysis. Dr. Li has been an active member of NPSS and participant in the NSS/MIC conference since completing his Ph.D. He is an associate editor of *IEEE Transaction on Image Processing* and member of editorial board of Theronostics. His research interests include image reconstruction methods in PET, SPECT, CT and MRI as well as applications combining image formation, analysis and statistical inference together to optimize task-based performance.

GRADUATE SCHOLAR AWARDS

JEFFREY ELDRED

Jeffrey Eldred is a Ph.D. candidate at Indiana University Bloomington in the Department of Physics and the Joint University-Fermilab Doctoral Program in Accelerator Physics and Technology. He studies under the joint supervision of Professor Shyh-Yuan Lee and Dr. Robert Zwaska. Mr. Eldred holds a B.S. with honors in Physics and Applied Mathematics from the College of William and Mary.

FUNCTIONAL COMMITTEES Continued on PAGE 8

Functional Committees Continued from PAGE 7

Jeffrey Eldred
Graduate Scholar

Mr. Eldred researches issues concerning the accumulation and stability of intense, high-energy particle beams. He has participated in the experimental study of collective instabilities in the Fermilab synchrotrons, particularly the Electron Cloud. He has investigated the slip-stacking beam accumulation technique, developing an analytic formulation of the particle dynamics as well as an analysis of scaling phenomena regarding the technique. He has proposed two techniques to dramatically increase the accumulation efficiency.

KEN HARA

Ken Hara
Graduate Scholar

Ken Hara is a doctoral candidate in the Department of Aerospace Engineering at the University of Michigan. He joined the Nonequilibrium Gas and Plasma Dynamics Laboratory (NGPDL) at Michigan in 2010 after completing undergraduate and master's degrees in Aeronautics and Astronautics at the University of Tokyo. His doctoral research focuses on development of a novel grid-based direct kinetic simulation method and its application to plasma propulsion, plasma sheaths, and trapped particle instabilities in nonlinear plasma waves. His major contributions include computational and theoretical investigations of ionization oscillations in Hall-effect thrusters.

Ken is a recipient of the Outstanding Student Paper Award at ICOPS/BEAMS 2014, the Japan Student Services Organization Fellowship, and student awards from the University of Michigan and the Michigan Institute for Plasma Science and Engineering (MIPSE). He has also been awarded the Japan Society for the Promotion of Science Postdoctoral (JSPS) Fellowship for his postdoctoral research after graduation. During his doctoral studies, he initiated collaborations with researchers from industry, academia, and national laboratories, leading to several journal publications and conference presentations. Ken expects to complete his doctorate in May 2015.

NELSON E. LOURENCO

Nelson Lourenco
Graduate Scholar

Nelson E. Lourenco (S'09) is a Ph.D. student in the School of Electrical and Computer Engineering at the Georgia Institute of Technology where he is advised by John D. Cressler, Schlumberger Chair Professor in Electronics. He received his B.Sc. degree in Electrical Engineering and M.Sc. degree in Electrical and Computer Engineering at Georgia Tech in 2009 and 2012, respectively. Nelson received the 2015 NPSS Graduate Scholarship Award for his research contributions on radiation effects in silicon-based heterojunction integrated circuit platforms. His Ph.D. thesis research is focused on investigating transient phenomena within silicon-germanium (SiGe) technologies using advanced laser and 3-D modeling techniques and leveraging this understanding for the development of radiation-hardened systems intended for orbital and space environments. He was awarded the 2014 IEEE Nuclear and Space Radiation Effects Conference (NSREC) Outstanding Student Paper Award for his submission, "On the Transient Response of a Complementary (npn + pnp) SiGe HBT BiCMOS Technology." Recently, Nelson was awarded the 2015 NSF East Asia and Pacific Summer Institutes (EAPSI) fellowship, where he will assist in the development of an optical dosimetry system with researchers at the Japan Aerospace Exploration Agency. In addition to these awards, Nelson's research is supported by the Defense Threat Reduction Agency, the Naval Research Laboratory, CFD Research Corporation, and NASA.

TECHNICAL COMMITTEE AWARDS

Particle Accelerator Science and Technology Award

The IEEE Nuclear and Plasma Sciences Society awards the Particle Accelerator Science and Technology Award to individuals who have made outstanding contributions to the development of particle accelerator science and technology.

Two Awards are granted in each occurrence of the Particle Accelerator Conferences held in North America (PAC or IPAC). The 2015 awards will be given at the 6th International Particle Accelerator Conference May 3rd–8th Richmond, VA USA, during the Awards Session on Thursday May 7th, 2015. One will go to Professor Ivan Bazarov of Cornell University and the other to Dr. Sergey Belomestnykh of Brookhaven National Laboratory.

IVAN BAZAROV

Ivan Bazarov
Particle Accelerator Science and Technology Award

Ivan Bazarov is a Professor of Accelerator Physics at Cornell University. His research areas include high-brightness photoinjectors, low-emittance photocathodes, energy recovery linacs, and advanced optimization algorithms for enhancing accelerator performance. Ivan came to Cornell as a postdoc in the year 2000 and since then he has become one of the leaders in the field of low-emittance photoemission sources and photocathodes. He led in the design and commissioning of the world's brightest high-current photoinjector at Cornell, which demonstrated the theoretical minimum emittance in addition to the record average current beams. He has also made numerous contributions to beam dynamics in energy-recovery linacs and pioneered the use of multiobjective parallel optimizers for accelerator applications.

Citation: *for contributions to science and technology of energy recovery lilacs and high-brightness photoinjectors.*

SERGEY BELOMESTNYKH

Sergey Belomestnykh
Particle Accelerator Science and Technology Award

Sergey Belomestnykh is a scientist and head of the Superconducting RF group in the Collider-Accelerator Department at Brookhaven National Laboratory and Brookhaven Professor at Stony Brook University. He has been at Brookhaven National Laboratory since 2010.

Sergey received his M.S. Degree in Engineering Electrophysics from Novosibirsk State Technical University in 1981 and Ph.D. in Engineering Sciences from Budker Institute of Nuclear Physics in Novosibirsk, Russia, in 1998.

In his early career Sergey Belomestnykh worked at Budker Institute of Nuclear Physics, where he contributed to design, development and commissioning of several normal conducting RF systems for circular accelerators. In 1994 he joined Laboratory for Elementary-Particle Physics at Cornell University and began working on superconducting RF (SRF) technology. Sergey was heavily involved in developing, installation, commissioning and operations of the SRF cavity cryomodules for electron-positron collider CESR, where he served as an RF group leader since 2000. He has participated in the Cornell Energy Recovery Linac (ERL) program, leading R&D and commissioning efforts on several subsystems.

His main scientific and engineering interests are in developing new SRF cavities and photoemission electron sources for particle accelerators, such as the heavy ion collider RHIC, electron-ion collider eRHIC, HiLumi LHC, future circular colliders, new electron cooling schemes and ERL test facilities. Sergey's group is working on a wide variety of SRF structures covering the frequency range from 56 MHz to 2.1 GHz. The structures include quarter-wave resonators for high-beta particles, SRF guns, compact crab cavities, and elliptical cavities. In addition, Sergey's research covers development of normal-conducting RF cavities, high-power RF input couplers, higher-order mode dampers, RF power amplifiers, low-level electronics and synchronization for accelerators as well as studies of electromagnetic interactions of particle beams with accelerating structures.

Sergey's contributions and expertise are widely recognized. Designs developed under his leadership have been adopted at other institutions. He has been invited to deliver talks and tutorials at many conferences and workshops, has taught courses on SRF and accelerator physics and technology, written review papers, served on numerous committees. Sergey was elected as a Senior IEEE member in 2014.

Citation: *for achievements in the science and technology of RF and SRF for particle accelerators.*

Doctoral Student Award

SUBASHINI DE SILVA

The IEEE Nuclear and Plasma Sciences Society awards the Particle Accelerator Science and Technology Doctoral Student Award to individuals who have done outstanding thesis research in particle accelerator science and technology.

This award recognizes significant and innovative technical contributions to the field of particle accelerator science and technology as demonstrated in a student's doctoral thesis.

The 2015 PAST Doctoral Student Award will be presented at the 2015 International Particle Accelerator Conference (May 3rd–8th, 2015) in Richmond VA.

Subashini De Silva received a B.S. degree in Engineering Physics from the University of Colombo, Sri Lanka, in 2004. She received an M.S. (in 2008) and a Ph.D. (in 2014) in Physics from Old Dominion University (ODU) working in the ODU Center for Accelerator Science under the guidance of Prof. Jean Delayen. The title of her dissertation is: "Investigation and Optimization of a New Compact Superconducting Cavity for Deflecting and Crabbing Applications." The experimental work was performed in the SRF Institute at the Thomas Jefferson National Accelerator Facility (JLab). This new type of superconducting structure has a wide range of applications: crabbing systems for circular and linear accelerators; beam spreaders for light sources, electron and hadron accelerators; and beam diagnostics. Her research was supported by the U. S. Department of Energy as part of the U. S. LHC Accelerator Research Program (LARP).

Subashini De Silva
Doctoral Student Award

Currently Dr. De Silva is a Postdoctoral Associate in the Center for Accelerator Science at ODU. She is pursuing a major application of her doctoral research: a crabbing system for the High-Luminosity Upgrade of the CERN LHC as part of a world-wide collaboration. She is working on the design, development, and fabrication of a crabbing cryomodule to be installed and tested with beam at the CERN Super Proton Synchrotron (SPS). This work is also supported by the U. S. LARP.

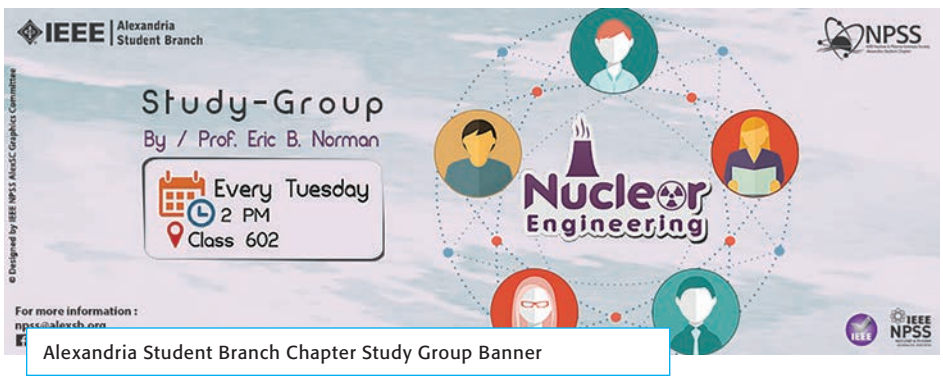
Dr. De Silva was one of the recipients of JSA/Jefferson Lab Graduate Fellowship in 2011. She has won a poster award at the 2010 International Linear Accelerator Conference in Kyoto, and at the 2014 HOM workshop at Fermilab. She gave invited talks at the 2012 International Linear Accelerator Conference in Tel Aviv, Israel, and the 2013 International Conference on RF Superconductivity in Paris, France. She has authored and co-authored several journal articles and conference proceedings, and given numerous talks.

Citation: *For contributions to the development of a new class of superconducting structures for the deflection and crabbing of particle beams with a wide range of applications.*

CHAPTERS

Alexandria Student Branch Chapter

The IEEE NPSS Alexandria Student Chapter (AlexSC) has begun a new track of activities, namely "Student Study Groups." The idea of these study groups is based on the interactive learning concept. It is our conviction that education and learning are not spectator sports. Students do not learn much by just sitting in classes listening to teachers, memorizing prepackaged assignments, and filling up answer-books with standard answers. On the contrary, students must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives. They must make what they learn part of their career. Moreover, open sharing in education is not new. In fact, sharing is probably the most basic characteristic of education: education is sharing knowledge, insights and information with others, upon which new knowledge, skills, ideas and understanding can be built. These aforementioned points were the basic motivation of the study-group



Alexandria Student Branch Chapter Study Group Banner

program, which we intend to make sustainable, taking place throughout the year.

The study-group program is divided into several parts, during which we review an online course, and then we have our discussion during which all the presented topics are discussed and conceptualized by the attendees. After a short break, we review another lecture and discuss it. This is done on a weekly basis.

Additionally, the IEEE NPSS Alexandria Student Chapter was honored to host an open discussion with Dr. Ali Mortada, one of the Alexandria University Nuclear Engineering Department alumni. He is a retired professional engineer having over 30 years of Canadian nuclear safety and regulatory experience at Atomic Energy of Canada Limited (AECL) and the Canadian Nuclear Safety Commission (CNSC). This experience includes research and development, safety analysis, regulatory assessment and compliance activities for research and power reactors as well as prelicensing reviews and assessments of advanced CANDU designs. The open discussion


Hossam M. Farag
AlexSC Secretary

was on different aspects including the engineering, design, safety and construction of nuclear reactors.

Furthermore, as mentioned in our previous article, the Linear Algebra course has been uploaded to the YouTube channel of NPSS AlexSC and is available online to anyone interested to learn about Linear Algebra.

Last but not least, the NPSS AlexSC organized a visit to the black sand processing factory at Rashid that is located about 65 km east of Alexandria. Black sand is the source of thorium which can be used as a nuclear fuel in nuclear power plants. The visit encompassed visiting the concentration facility where we recognized the different concentration types—namely, physical, electrical, and magnetic concentration.

The chapter is looking forward sustaining a better and more dynamic student community, full of knowledge sharing and an engaging, sometimes funny, scientific environment. Finally, I'd like to end up with Alexandria Student Chapter's slogan: "Engraving hope for the coming generations."

Hossam Moustafa Farag, IEEE NPSS Alexandria Student Branch Chapter Secretary can be reached by email at hossam.m.farag@ieee.org.

NOMINATIONS

The NPSS will be holding several elections later this summer in which you may be eligible to vote. These will be for elected AdCom positions for four of our Technical Committees replacing seats held by the Radiation Effects Committee, the Plasma Sciences and Applications Committee, the Pulsed Power Science and Technology Committee, and the Fusion Technology Committee. You should have already received an E-mail notification about these elections with information about how to nominate candidates for these positions, so by the time you receive this Newsletter, there should already be a list of qualified candidates who have agreed to run. The election will be held towards the end of the summer and will be


Gerald Cooperstein
Nominations Chair

conducted by electronic ballot (except in those cases where a paper ballot is specifically requested).

In addition, the Radiation Instrumentation Technical Committee, the Nuclear Medical and Imaging Sciences Committee, the Plasma Sciences and Applications Committee, and the Particle Accelerator Science and Technology Committee will also be holding their annual elections. These are separate elections for their own committee members, but they will be included on the same ballot as the AdCom election. Please remember that when you receive this ballot, you are only eligible to vote in the election of the TC members of a TC in which you are currently a member.

So please be on the lookout for the electronic ballot later this summer and be sure to vote in the elections of your Technical Committee. It's your chance to make a difference in helping the NPSS to better serve you.

Gerald Cooperstein can be reached by E-mail at gerald.cooperstein.ctr@nrl.navy.mil.

Liaison Reports

IEEE-USA ENGINEERS CHAMPION RESEARCH FUNDING ON CONGRESSIONAL VISITS DAY


Brendan Godfrey
IEEE-USA R&D Policy Committee, NPSS AdCom

This article is based on the press release,"2015 CVD a Success," by Russell Harrison of IEEE-USA.

Each year Congress appropriates about $145 billion on programs that IEEE-USA cares about, everything from NASA to university research grants to the National Institute of Standards and Technology. And every year these funds have to be protected. Entitlement spending (Medicare, Medicaid, Social Security and other welfare programs, plus interest on the debt) devours an ever larger portion of the budget each year. Because Congress is trying to rein-in the budget deficit, this leaves less and less money for every other budget line. R&D spending has held up well over the past several years. Congress has demonstrated an admirable commitment to supporting engineering and science at all levels—but this could change any time. As Congress runs out of easy programs to cut, there will be increased pressure to reduce research budgets. The IEEE-USA Congressional Visits Day (CVD) is our best weapon to fight this pressure.

On March 18th, IEEE members hit Capitol Hill in support of fundamental research. Forty-nine members joined about 200 engineers and scientists from other associations at the 2015 CVD. Their goal was to remind Congress how important federal support for fundamental research is, and to ask Congress to protect that funding in the FY2016 budget, which is what the CVD participants did.

Within the chaos of Washington, it often is difficult for policy makers to hear individual voices through the noise of reporters, lobbyists, activists, and everyone else who spend their days yelling at Congress. But when voters travel to Washington to meet their legislators, they stop and listen, if even for just ten minutes. These meetings are simply the best possible way to be heard in Washington. The IEEE members participating in this year's CVD met with 78 individual members of Congress. In all, CVD participants from participating societies spoke with over half of Congress.

The CVD began on the morning of March 17th at the IEEE-USA office in Washington, DC. Participants had a three-hour training session there, where they learned how to interact with legislators and what their message should be. After a quick lunch, participants traveled to Capitol Hill to join colleagues from other associations for briefings on the federal budget and related topics.

The day ended with a reception in the Cannon House Office Building, where the engineers and scientists were joined by members of Congress and their staff. The George E. Brown Award was presented at this reception, honoring legislators who have fought for science and engineering in the federal budget. This year's winners were Senator Richard Shelby (R-AL) and Congresswoman Donna Edwards (D-MD), both of whom attended the reception to receive their awards personally.

The next day, March 18th, the IEEE members traveled back up to Capitol Hill for private meetings with their legislators or their staffs. In addition to asking Congress to protect the R&D budgets, IEEE members raised two other issues of importance to technology professionals, high-skill immigration reform and the integrity of patents. For most, this was a long day but well worthwhile.

For my own part, I was able to meet with staff members of both Texas Senators and of two Representatives. The staff members were in all cases knowledgeable and receptive. As Vice-Chair of the IEEE-USA R&D Policy Committee, I found it particularly gratifying to share our key positions with these decision-makers. I also learned a lot and made new friends from Region V.

IEEE-USA hosts at least one CVD every year, usually in March. All IEEE members are welcome and encouraged to attend, from students to life members. If you have any questions about this year's event, our legislative strategy in Washington, or next year's CVD, please contact Russ Harrison at r.t.harrsion@ieee.org or me at brendan.godfrey@ieee.org. 2015 CVD general information also is available at http://www.setcvd.org/. More generally, learn about IEEE-USA and its public policy activities at https://www.ieeeusa.org/policy/default.asp.

Remember, if we do not stand tall for R&D, who will?

BUT WHAT'S A RISK?

There is no point getting into a panic about the risks of life until you have compared the risks that worry you with the risks that do not.

Lord Rothschild

IEEE Smart Village

In late January Ray Larsen and Robin Podmore, IEEE Smart Village Co-chairs, together with Prof. Dan Wessner, Regis University, head of the Smart Village Education Committee, and Albe Larsen who runs the SMART Village booth at conferences, visited India to assess possible partnerships and to attend the IEEE PES Intelect Power Conference in Mumbai. Ray, Albe and Dan went early to New Delhi where they were hosted by Farid Khan and the principals of MTEKPRO Taiyab and Shiraz Ahmed, a manufacturing company for HV test equipment whom they first met at the rollout of SunBlazer II in Chicago in April 2014. Farid introduced them to a wide range of individuals including academics, government ministers and a number of business people including the Country Director of a company that provides clean water in remote villages using a financial model compatible with that of Smart Village, and another converting the power for telecom cell towers from diesel fuel to solar, who also has a village home lighting business and appears to be a potential partner complementary to IEEE Smart Village. Smart Village may well focus on the northeastern-most area of Uttar Pradesh for its first Indian ventures and partnerships, an area where Farid Khan grew up and has strong family ties to people in 45 villages. After New Delhi, Ray, Dan and Albe travelled to Chennai and Pudicherry where they met with the Tamil Nadu Secretary of Energy and several other business people.

Robin Podmore also went a few days early to Mumbai and principally met with people from ERDA, the Electrical Research and Development Association of power companies, and Tata, a global company with activities from manufacturing steel to automobiles to renewable power and many other techologies. Tata also has a well-known Foundation to support new technical initiatives in less-developed regions. Although a very rich country, India still has about 400M people without electricity. Robin explored some promising areas of collaboration on


Ray Larsen
Cochair, IEEE Smart Village

product development for the India market as well as making connections to prospective on-the-ground partners to launch a SunBlazer business. Smart

LIAISON REPORTS Continued on **PAGE 10**

Smart Village

Continued from **PAGE 9**

Anthony Lobo, V.K. Damodaran, Noha El-Hobashy, Dan Wessner, Ray Larsen at Intelect.

Village's current goal is to launch ten new startups per year with seed funding in the form of products and a sustainable business plan.

The IEEE humanitarian technology group then met in Mumbai for the IEEE Intelect Conference, cosponsored by the IEEE Power and Energy Society and IEEMA, the Indian Electrical and Electronics Manufacturers' Association. The group included people from Smart Village, Engineers for Change (E4C) and the Humanitarian Ad Hoc Committee (HAHC) humanitarian program oversight group headed by Prof. Michael Lightner. The strong humanitarian track was developed for the conference by Dr. Anthony Lobo of Tata Consulting Services . Many Smart Village presentations and several new India initiatives encouraged by Smart Village were included, such as the new Global Himalaya Expedition village empowerment project based on eco-tourism. During the conference Prof. Wessner met with many contacts who were wholly enthusiastic about the Community Based Online Curricula (CBOC) program now being piloted from the IEEE Global Classroom in Denver, Colorado. Dan met with representatives of Seva-Bharati, an academy in Kolkata that is highly interested in launching both the education and electricity programs. The principal is Ranjan Sen who first met with Dan at the Global Humanitarian Technology Conference in October 2014 in San Jose where the Smart Village paper, *Learning Beyond the Light Bulb* was first presented. Overall the humanitarian sessions were extremely well attended and well received.

To highlight the importance of the Humanitarian theme, the conference closed with a keynote talk followed by a panel session featuring a renowned speaker on Ghandian Engineering, Dr. R.A. Mashelkar, National Research Professor, Fellow of the Royal Society and President of the Global Research Alliance. Dr. Michael Lightner, past president of IEEE and current chair of the IEEE HAHC and Ray Larsen were the two respondents to Dr. Meshelkar's stirring address and call to action.

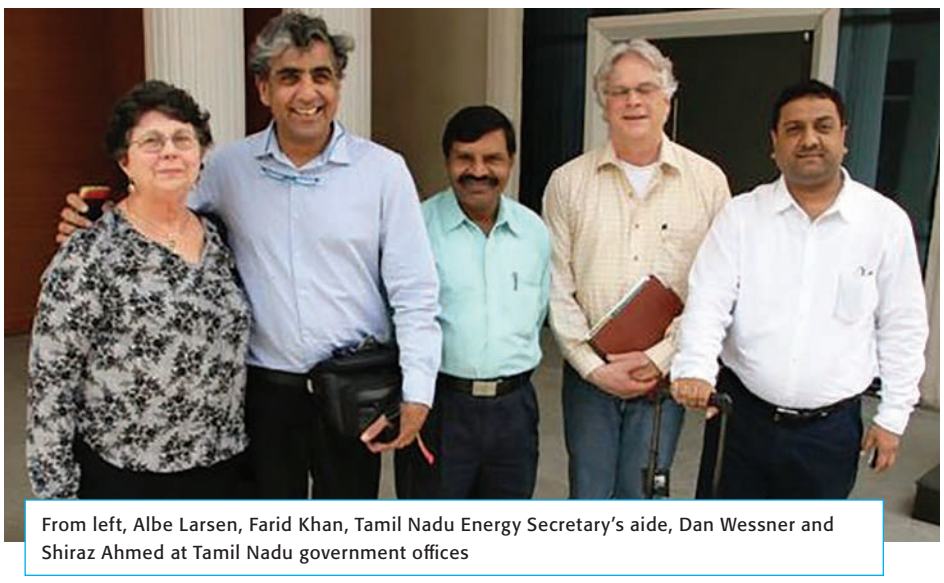
Much of India has grid power, but most remote areas and hamlets do not (a hamlet is a few thousand people in India, whereas a village is about 15,000 people—very different in scale from many areas where a village is a few hundred people). The opportunities and challenges in India are huge, but there is enthusiastic support for the Smart Village sustainable development enterprise aimed at not just bringing light bulbs but empowereing village people to grow community prosperity through business opportunity and education. IEEE Smart Village emphasizes that education is reciprocal; we need to learn as much from the community partnership as they will learn from our technology expertise. In the overall equation for success, 80% depends not on the technology but on the work of the community enterpreneurs and customers who will organize and conduct the business professionally to bring benefits to all participants.

Finally we recognize that electricity is only one of several infrastructure needs for prosperity and besides education, others include clean water, sanitation, medical services, refrigeration and power for manufacturing and agriculture. In this regard Smart Village partners at the Posner Center for International Development can play a key role, many of whom have up to 30 years of global sustainable development experience and a presence in over 100 countries. We are confident that this combination together with IEEE's global membership can indeed make a major contribution to elimination of the worst of global poverty.

Steps ahead include establishment of an IEEE Foundation fund for seeding development at the IEEE India office in Bangalore, Harish Mysore, Director; crafting Memoranda of Understanding with the aforementioned potential partners; and establishing prototype pilots for manufacturing and deployment in India by the end of 2015.

Special thanks to our many hosts in India from MTEKPRO, ERDA and Tata as well as the many prospective partners we interviewed, and to Anthony Lobo for the superb organization of the Humanitarian track at Intelect 2015. Thanks also go to Tommy Mayne, the Power and Energy Society VP for Conferences who played a key role in organizing Intelect, including an excellent industrial exhibit, and providing constant support for the Smart Village enterprise.

Ray Larsen, IEEE Smart Village Cochair, can be reached by E-mail at larsen@slac.stanford.edu.



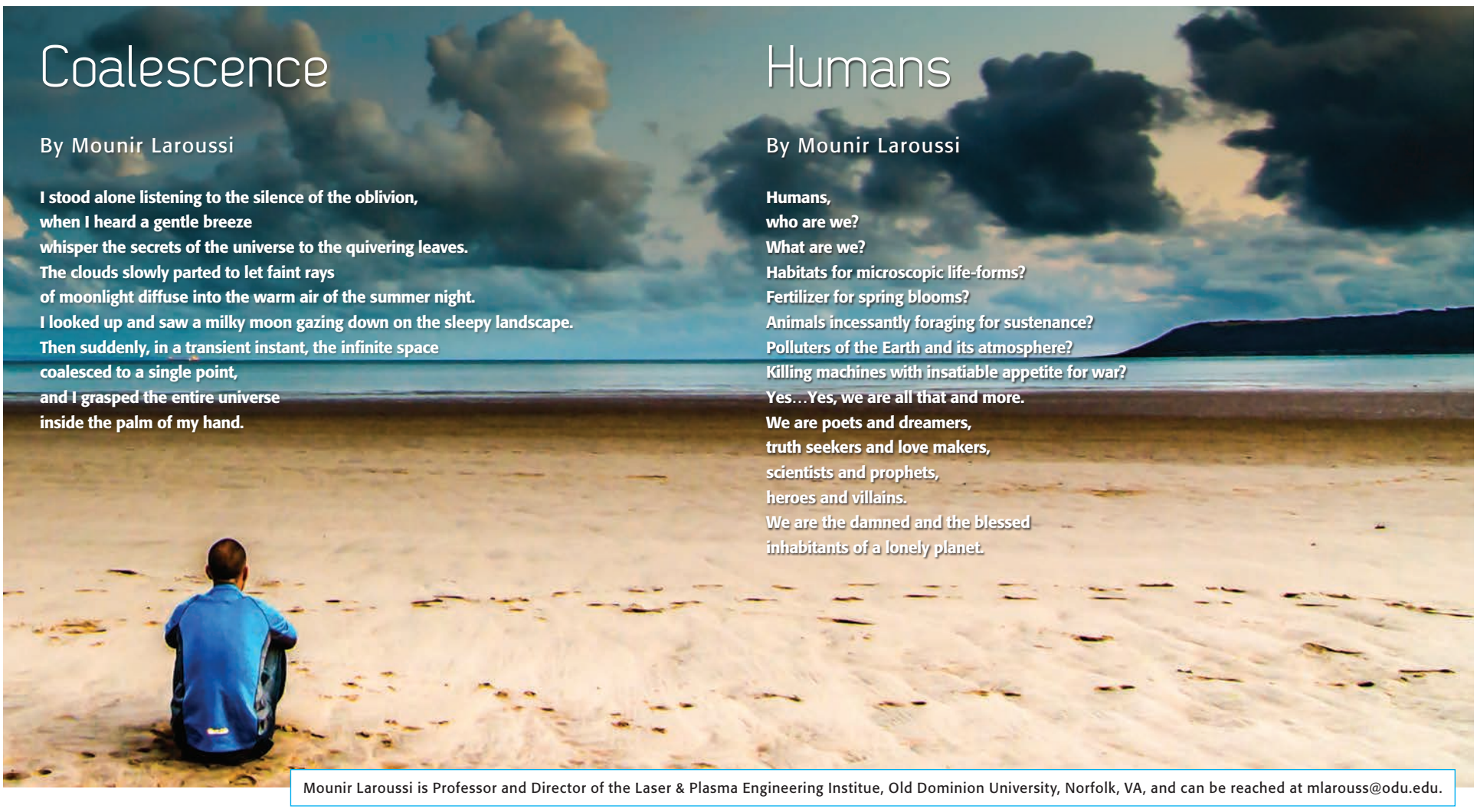
From left, Albe Larsen, Farid Khan, Tamil Nadu Energy Secretary's aide, Dan Wessner and Shiraz Ahmed at Tamil Nadu government offices

Dr. R.A. Mashelkar, Dr Michael Lightner, Anthony Lobo and Ray Larsen at closing plenary session

GOLDEN RATIO

People are lucky and unlucky not according to what they get absolutely, but according to the ratio between what they have and what they have been led to expect.

Samuel Butler



Coalescence

By Mounir Laroussi

I stood alone listening to the silence of the oblivion,
when I heard a gentle breeze
whisper the secrets of the universe to the quivering leaves.
The clouds slowly parted to let faint rays
of moonlight diffuse into the warm air of the summer night.
I looked up and saw a milky moon gazing down on the sleepy landscape.
Then suddenly, in a transient instant, the infinite space
coalesced to a single point,
and I grasped the entire universe
inside the palm of my hand.

Humans

By Mounir Laroussi

Humans,
who are we?
What are we?
Habitats for microscopic life-forms?
Fertilizer for spring blooms?
Animals incessantly foraging for sustenance?
Polluters of the Earth and its atmosphere?
Killing machines with insatiable appetite for war?
Yes…Yes, we are all that and more.
We are poets and dreamers,
truth seekers and love makers,
scientists and prophets,
heroes and villains.
We are the damned and the blessed
inhabitants of a lonely planet.

Mounir Laroussi is Professor and Director of the Laser & Plasma Engineering Institue, Old Dominion University, Norfolk, VA, and can be reached at mlarouss@odu.edu.

Article

Recent Progress in Fusion-Relevant Magnetized Plasma Formation

Matthew Domonkos
Author

Fusion collision cross sections for deuterium and deuterium-tritium require 1-100 keV ion temperatures to produce meaningful thermonuclear reaction rates. The thermal energy of multi-keV ions corresponds to the ion kinetic energy for deuterons or tritons traveling on the order of 2000 km/s, speed that has been observed for aluminum and tungsten plasmas [1] in the plasma flow switch (PFS), a special variant of coaxial plasma gun [2]. The use of similar technology for ultrahigh speed plasma flows (UHSPF) of deuterium/tritium has therefore been proposed [3] and studied.

The UHSPF is illustrated in Figure 1 [4]. A small mass (~1 mg) of deuterium is injected into the coaxial current feed upstream of a comparatively massive (~1 g) armature. The current feed incorporates UV baffling to isolate the insulator interface between the pulsed power supply and the UHSPF, preventing re-strike on the insulator, and an insulating surface in the upstream section pushes current conduction to the armature. Driven by Shiva Star [5], the PFS armature, consisting of an aluminum wire array and a polycarbonate foil, reached approximately 70 km/s [2]. The axial density distribution in the armature drops off rapidly upstream, leaving a very low-density plasma tail in a high magnetic field region. In the absence of a load to which to transfer the stored magnetic energy, the flow of the low-density plasma becomes very supersonic, with most of the current remaining near the end of the center conductor, while the rest is distributed to lower values of magnetic field downstream as the flow attains speeds comparable to the initial Alfven speed [1]. By stagnating this plasma, the kinetic energy is converted to multi-keV ion temperature, suitable for fusion reactions. The UHSPF concept is completed by a solid liner implosion which compresses the stagnated plasma, thereby achieving appreciable thermonuclear fusion yield.

The primary challenges for the development of the UHSPF include substitution of deuterium (D_2) or deuterium-tritium (D_2-T_2) for the very low-density aluminum or tungsten plasma [1] and compression of the resulting flow (after stagnation) to much higher densities by liner implosion [3]. The work presented here addresses the former challenge, namely producing the magnetized plasma.

The first phase of this research concentrated on extension of the earlier work [1, 2], achieving a 550 km/s plasma flow which convected a small fraction of the total magnetic field. In an attempt to bring closer fidelity between the numerical simulations and the experiments, low density CH_2 foam was employed for the armature. A series of low energy shots were conducted and demonstrated that the hardware assembled for this investigation was unlikely to forestall breakdown in the injected gas as required by Turchi et al. [3]. Nevertheless, two experiments were conducted to evaluate performance with foam armatures. Some of the results are captured in Figure 2 [4]. The top section presents the current distribution upstream of the armature, showing an initial axial distribution of current. The center plot indicates that the armature expanded axially, reducing the current density available to propel the armature. Despite the non-ideal armature motion, the magnetic flux observed in the compression region of the load (lower plot) was more than twice that for any prior experiment, indicating progress toward the objective of a magnetized plasma compression device.

Two major areas for improvement in the generation of magnetized plasmas using this technique remain: 1. Improved flux trapping in the D_2 and 2. Improved current concentration in the plasma flow switch armature.

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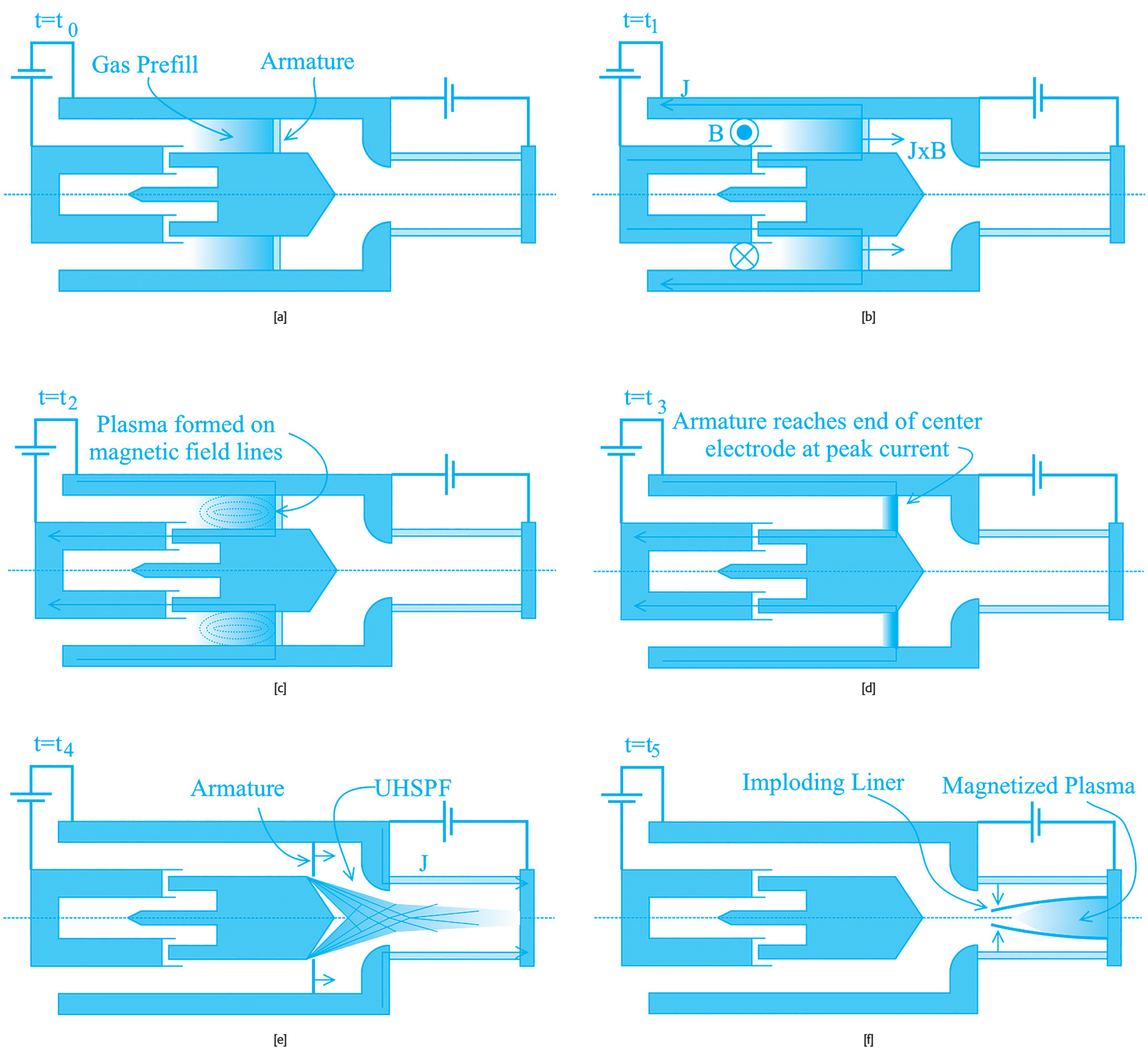

Figure 1-Ultra-high-speed plasma flow schematic. a) Initial condition with static armature and deuterium gas puff injection. b) Start of current. c) Ionization of gas upstream of armature. d) Armature accelerated to the end of the center electrode at peak current. e) Upstream deuterium plasma expands at ultra-high-speed downstream. Liner implosion started or already underway. f) UHSPF stagnates at the end of the device and the imploding liner compresses the plasma [4].

Article

Continued from **PAGE 11**

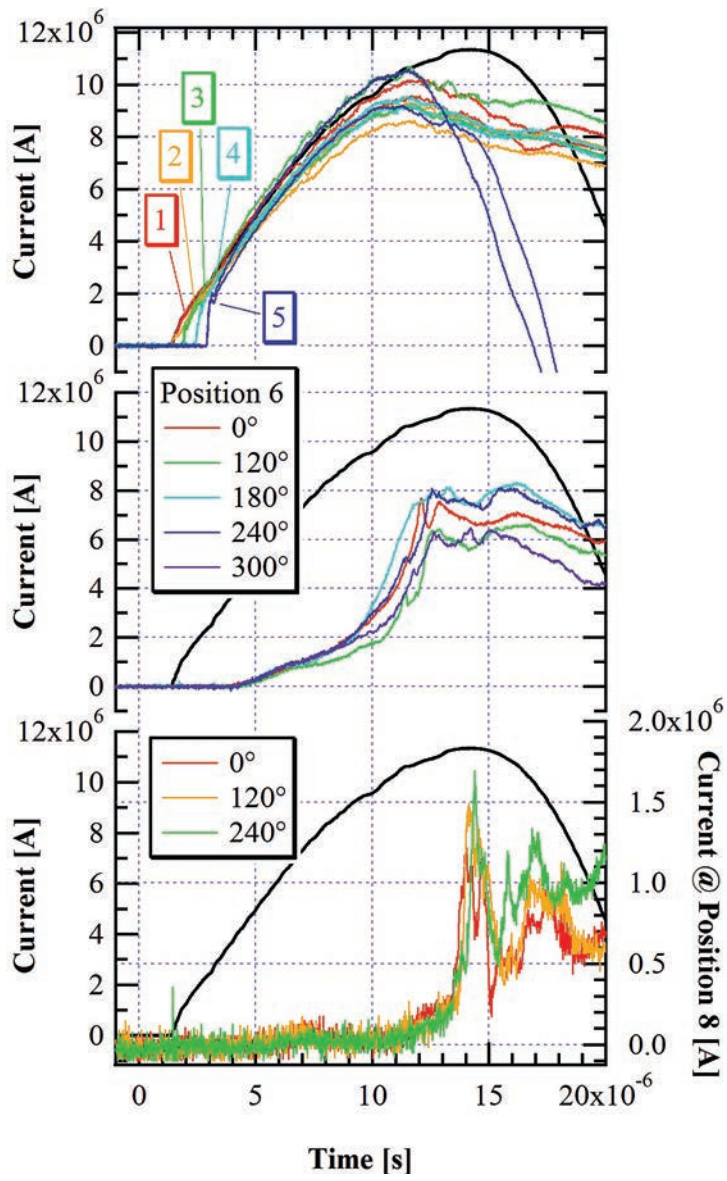

Figure 2 - Magnetic field distribution in UHSPF 7. Numbered traces 1-5 present the field upstream of the armature initial location. The middle graph indicates the radial (insertion depth from outer diameter indicated) and azimuthal variations in the field immediately downstream of the armature initial position. The bottom graph displays the field within the stagnation region. The black traces represent the total UHSPF current for reference [4].

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[4] M.T. Domonkos, and et al., "Experimental Studies of an Ultrahigh Speed Plasma Flow," *IEEE Transactions on Plasma Science*, Vol. 43, No. 1, pp. 374-388; doi: 10.1109/TPS.2014.2360648.

[4] R. E. Reinovsky, W. L. Baker, Y. G. Chen, J. Holmes and E. A. Lopez, "Shiva Star Inductive Pulse Compression System," in 4th IEEE Pulsed Power Conference, Albuquerque, 1983.

BUT TIMES (AND JUDGES) HAVE CHANGED
Judges rule on the basis of law, not public opinion, and they should be totally indifferent to the pressures of the times.
Warren E. Burger

INELASTICITY
Man's mind stretched to a new idea never goes back to its original dimension.
Oliver Wendell Holmes

LET ME EXPLAIN...
Fools give reasons. Wise men never try.
Oscar Hammerstein II

DISAPPOINTMENT
People may expect too much of journalism. Not only do they expect it to be entertaining, they expect it to be true.
Lewis H. Lapham

CHECK THIS
Not everything that can be counted counts, and not everything that counts can be counted.
Albert Einstein

GUNG-HO!
Success is the ability to go from one failure to another with no loss of enthusiasm.
Winston Churchill

NOT ENOUGH PRACTICE
More men become good through practice than by nature.
Democritus (of Abdera)

RETROSPECTIVE
It is fortunate that each generation does not comprehend its own ignorance. We are thus enabled to call our ancestors barbarous
Charles Dudley Warner

AND COSTLY TO HEAT
The house of delusions is cheap to build but drafty to live in.
A.E. Housman

TRY REALISM
Pessimism is only the name that men of weak nerves give to wisdom
Bernard DeVoto

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CONTRIBUTED ARTICLES

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 July 5th, 2015 for publication in the September 2015 Newsletter.

News articles are actively solicited from contributing editors, particularly related to important R&D activities, significant industrial applications, early reports on technical breakthroughs, accomplishments at the big laboratories and similar subjects. The various *Transactions*, of course, deal with formal treatment in depth of technical subjects. News articles should have an element of general interest or contribute to a general understanding of technical problems or fields of technical interest or could be assessments of important ongoing technical endeavors.

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