NPSS NEWS

ISSUE 1: MARCH 2016

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2016 Real-Time Conference June 6th–10th, in Padova, Italy

This year's Real-Time Conference will take place from June 6th–10th in Padova (Padua), Italy. Held every other year, this conference brings together experts on real-time techniques from the fields of nuclear and particle physics, astrophysics, plasma and nuclear fusion, space science, accelerators, medical imaging, nuclear-power instrumentation, and other radiation instrumentation. We are pleased to offer two interesting short courses taught by outstanding instructors the Sunday before the conference starts (June 5th), one on FPGA and GPU programming by Mariano Ruiz, and one about "Real-time data visualizations and control using modern web technologies" by Stefan Ritt.

Over the years, the Real-Time conference has gained a reputation as a first-rate scientific venue for many different fields of real-time applications. Following a long tradition, there are only plenary talks and poster sessions. Each poster presenter has the opportunity to give a two-minute mini-oral "teaser summary" of the poster. These mini-orals make it easier for attendees to select the posters that most interest them. This is also a great educational opportunity for young participants to present and promote their work in front of a supportive audience.

We selected Padova for its wonderful Italian charm and flair with a number of nice hotels for every taste and budget, its proximity to places such as Venice, but also for its state-of-the-art conference facilities to support a pleasant and high-quality scientific meeting. The conference is hosted by the "Consorzio RFX" under Conference Chair Adriano Luchetta. The conference will be held at the "A. Luciani" Padua Congress Center, which is the most versatile and spacious event venue in Italy's Northeast.

Please visit the conference web site at https://indico.cern.ch/e/rt2016 for further information. Early registration closes April 22nd. We are looking forward to seeing you in Padova.

Adriano Luchetta
General Chair, RT-2016

Martin Purschke
Chair, CANPS Technical Committee

Martin Purschke, chairman of the Computer Applications in Nuclear and Plasma Sciences can be reached by E-mail at purschke@bnl.org.

2016 IEEE Nuclear and Space Radiation Effects Conference, Portland, Oregon July 11th–15th

The 53rd IEEE Nuclear and Space Radiation Effects Conference will be held July 11th–15th, 2016, at the Oregon Convention Center, Portland, Oregon. The conference hotel is the DoubleTree hotel, near the convention center. The General Chair is Robert Reed, Vanderbilt University. The conference will feature a Technical Program consisting of nine sessions of contributed papers (both oral and poster) that describe the latest observations and research results in radiation effects, an up-to-date Short Course, offered on July 11th, a Radiation Effects Data Workshop, and an Industrial Exhibit.

TECHNICAL PROGRAM

The Technical Program Chair is Philippe Paillet, CEA. He and his technical committee will select contributed papers that describe the effects of

CONFERENCES Continued on **PAGE 2**

NSREC Continued from **PAGE 1**

space, terrestrial, or nuclear radiation on electronic and photonic devices, circuits, sensors, materials and systems, as well as semiconductor processing technology and techniques for producing radiation-tolerant devices and integrated circuits.

The Poster Session Chair is Paul Marshall, Consultant, Naval Research Laboratory. The Data Workshop Chair is Bert Vermeire, SpaceMicro.

Robert Reed
General Chair

TECHNICAL SESSION CHAIRS

» **Basic Mechanisms of Radiation Effects:**
Sylvain Girard, University of St-Etienne

» **Dosimetry:**
Mike Trinczek, TRIUMF

» **Hardness Assurance:**
Philippe Adell, NASA JPL

» **Hardening by Design:**
Lawrence Clark, Arizona State University

» **Photonics Devices and ICs:**
Kyle Miller, Ball Aerospace

» **Radiation Effects in Devices and ICs:**
Alessandro Paccagnella, University of Padova

» **Single-Event Effects:**
Mechanisms and Modeling: Mike King, Sandia National Labs

» **Single-Event Effects:**
Transient Characterization: Jeffrey Warner, Naval Research Laboratory

» **Single-Event Effects:**
Devices and ICs: Bharat Bhuva, Vanderbilt University

» **Space and Terrestrial Environments:**
Julien Mekki, CNES

DID YOU KNOW THAT...

What we do not know harms us less than what we think we know, but don't.

Voltaire

ANOTHER HOPE LOST

Now that I am 60, I see why the idea of elder wisdom has passed from currency.

John Updike

AS DO PROGRAMMERS

Simplicity is an acquired taste. Mankind, left free, instinctively, complicates life.

Katherine Fullerton Gerould

2016 IEEE Nuclear Science Symposium and Medical Imaging Conference

23rd Symposium on Room Temperature X-ray and Gamma-ray Semiconductor Detectors

Dear Colleagues,

We are pleased to announce the 2016 IEEE Nuclear Science Symposium and Medical Imaging Conference (2016 NSS/MIC). In addition, and keeping with tradition since 2001, the 23rd Symposium on Room-Temperature X-Ray and Gamma-Ray Semiconductor Detectors (RTSD) will be collocated with the 2016 NSS/MIC. The conference will be held at the Strasbourg Convention Center (Palais de la Musique et des Congrès) in Strasbourg, France. Authors are invited to present their latest developments, describing original, previously unpublished work pertaining to the topics listed on the website.

The IEEE Nuclear Science Symposium (NSS) offers an outstanding educational and networking opportunity for scientists and engineers in the fields of nuclear science, radiation detection, high-energy physics and astrophysics, large-scale research facilities, security, energy, and related instrumentation and software. The scientific program provides a comprehensive review of the latest developments in technology, covering a wide range of applications from radiation instrumentation and new detector materials to complex detector systems for physical sciences. The NSS program consists of plenary, parallel, and poster sessions.

The IEEE Medical Imaging Conference (MIC) is the leading international scientific medical imaging meeting bringing together a broad community interested in the physics, engineering, and mathematical aspects of medical imaging. As the field rapidly evolves towards interdisciplinary, multimodality approaches, the topics covered in the conference range from nuclear medicine (SPECT and PET) to X-ray, CT, optical, MR imaging, and their combination. In parallel, developments in radiotherapy instrumentation and associated treatment and dosimetry protocols, including the combination of imaging and radiation therapy, are continuously gaining ground. The MIC program format consists of oral and poster sessions.

The 21st International Symposium on Room Temperature Semiconductor Detectors (RTSD) represents the largest forum of scientists and engineers developing new semiconductor radiation detectors and imaging arrays. Semiconductor detectors for X-ray, gamma ray, and neutron radiation are increasingly finding applications in diverse fields such as medicine, homeland security, nonproliferation, astrophysics, and environmental remediation. The objective of this symposium is to provide a forum for discussion of the state-of-the-art in the development of wide-band-gap semiconductors for radiation detection, including crystal growth, materials and detector characterization, device fabrication processes, low-noise electronics for readout, and applications.

In addition to this broad portfolio of session topics, various joint NSS, MIC, and RTSD sessions will cover hardware topics of mutual interest to all three communities, and a broad selection of relevant refresher courses and detailed short courses will cover specialized, timely topics. Vendors with products and services related to the NSS, MIC, and RTSD are invited to participate in the Industrial Program which comprises an exhibition, an integrated program of technical seminars, and an Academia-Industry Matching Forum.

Grants to support attendance at the conference and short courses will be available due to the generous support of individuals, agencies, and industrial sponsors. In addition, several IEEE grants such as the Paul Phelps Continuing Education Grants, Valentin T. Jordanov Travel Grants, and the Conference Trainee Grants will also be available. Specific requirements and application details can be found on the conference website: http://www.nss-mic.org/2016.

Maxim Titov,
General Chair, NSS/MIC 2016

Strasbourg is a beautiful location with endless opportunities for dining and entertainment. A truly European location, the home of the Council of Europe and the European Parliament, with a past dating back 2000 years, and with exceptional architectural and cultural patrimony, Strasbourg provides ample opportunities for enjoyment. Being located close to the border of Germany and having flavors of both countries, the city's magnificent Cathedral, "La Petite France" – the typical quarter loved by tourists, and its UNESCO World Heritage Site - Grande-Ile, as well as the Alsace region, are among the many attractions not to be missed by conference participants.

I know that I speak for the entire organizing committee when I say that we look forward to your contributions and participation in the 2016 NSS/MIC.

Maxim Titov
2016 IEEE NSS/MIC General Chair

Maxim Titov can be reached E-mail at maxim.titov@cea.fr

President's Report

John Verboncouer
IEEE NPSS President

2016 is a new year, and we look forward to our 2016 conferences, new and improved publications, and our new AdCom members and technical committee chairs elected last autumn.

CONFERENCES

Upcoming NPSS conferences for 2016 include the Symposium on Radiation Measurements and Applications (SORMA), to be held 22nd–27th May 2016 in Berkeley, CA USA. SORMA will focus on homeland security and national security applications. For more information on SORMA, see http://sormawest.org/. The 20th Real-Time Conference (RT2016) will be in Padova, Italy 4th–10th June 2016. RT2016 comprises applications of Real-Time techniques in fields ranging from plasma and nuclear fusion to nuclear physics and astrophysics, space science, accelerators, medical physics, nuclear power instrumentation, and other types of radiation instrumentation. You can learn more about RT2016 from the cover story or go to https://indico.cern.ch/event/390748/. Next up is the International Conference on Plasma Science (ICOPS), held 19th–23rd June 2016 in Banff, Alberta, Canada. The ICOPS meeting includes basic plasma physics, strongly coupled plasmas, biomedical plasmas, plasma-microwave interactions, microwave devices, pulsed power, fusion, beams, and many other topics. You can learn more about the ICOPS conference at http://ece.engineering.ualberta.ca/en/icops2016/Home.aspx. The International Power Modulator and High Voltage Conference will be held in San Francisco 6th–8th July 2016, sponsored by the Dielectrics and Electrical Insulation Society (DEIS). You can learn more about the IPMHVC at http://www.ipmhvc.com/2016/. The 2016 Nuclear and Space Radiation Effects Conference (NSREC) will be held 11th–15th July 2016 in Portland OR. You can learn more about the NSREC under the CONFERENCES section of this Newsletter or at http://www.nsrec.com/. The 6th Euro-Asian Pulsed Power Conference (EAPPC) will be held 18th–22nd September 2016 in Estoril, Lisbon, Portugal. You can find more information about the EAPPC at http://eappc-beams2016.org/. The 2016 North American Particle Accelerator Conference will be held in Chicago, IL USA from the 9th–14th October 2016, focusing on accelerator science and technology. Currently a temporary web site provides some basic information about the conference: http://napac2016.aps.anl.gov/ComingSoon.html. Finally, the largest NPSS meeting is the Nuclear Science Symposium and Medical Imaging Conference (NSS-MIC), which will be held in Strasbourg, France. You can find more details at CONFERENCES or online at the temporary web site http://napac2016.aps.anl.gov/ComingSoon.html.

PUBLICATIONS

Hopefully many of you have noticed the improvements in *IEEE Transactions on Nuclear Science* (TNS) and *IEEE Transactions on Plasma Science* (TPS). Both now have monthly announcements including a number of articles temporarily made available at no charge, and now neither has page charges. The editors are also seeking review articles for both TNS and TPS. The *IEEE Transactions on Medical Imaging* (TMI) remains robust. The *IEEE Transactions on*

NUCLEAR & PLASMA SCIENCES SOCIETY NEWS

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Radiation and Plasma Medical Science (TRPMS) Phase II proposal has been approved by the Technical Activities Board (TAB) that oversees the IEEE Societies and Councils, and by the IEEE Board of Directors, with the help of our partner, the Engineering in Medicine and Biology Society (EMBS). The next steps will include putting together the Steering Committee, and building an editing team including an inaugural editor-in-chief. The journal should publish its first issue a year from now.

IEEE CONSTITUTIONAL AMENDMENT

Controversy continues to rage around the initiative within the IEEE Board of Directors to improve its operational efficiency and strategy by reorganizing IEEE. An attempt last June at a Constitutional amendment, at a Constitutional amendment, that we weren't aware of until the spring, was withdrawn before going out to the membership for vote. At the Nov. 2015 Directors meeting, the Board approved moving forward a different proposed revision to the IEEE Constitution. This latest revision, developed by the IEEE 2030 Committee which consists of select Directors, was described to the Society Presidents several weeks in advance for comment and discussion. The proposed amendment can be viewed here: https://www.ieee.org/documents/constitution_approved_amendment_changes_election.pdf

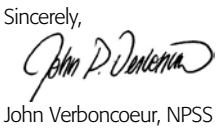
The primary gist is is to separate the Board of Directors role from the Delegate to the Assembly role. In implementation this could mean a much smaller board with less complete geographic and/or Society/Council representation. The details of what this will really mean will be developed in separate Bylaws, which have not yet been articulated, as was the problem with the original attempted Constitutional amendment last summer. This is designed to solve the underlying problem that many on the Board lack experience in areas they are asked to debate and vote on, and that the size of the body leads to inefficient use of time in Board meetings. While many of these issues appear to me (and many others) to be addressable by better leadership, and vetting and education of Board members, the proposed amendment could also make that path easier. I have two key concerns about this amendment as presently constructed:

1. It relies on unarticulated bylaws. Before supporting the amendment, I would insist on seeing and understanding the bylaws through which it will be implemented. These could range from beneficial to changing the very nature of the IEEE by removing volunteer control.

2. The present reorganization shown by the IEEE 2030 Committee separates the strategy part of IEEE (as a separate committee from the proposed Executive Board), effectively demoting the Technical Activities Board (TAB), and hence all societies and councils, one level in IEEE. This is especially odd since TAB generate about 80% of all IEEE revenues, directly or indirectly.

Next, the Board has until early summer to define the bylaws through which this will operate. Assuming the Board chooses to move forward with the Amendment, they would put it on the ballot next September, where it must receive 2/3 affirmative vote by at least 10% of the membership. Alternatively, they could choose to pull the amendment from the ballot in the June meeting. Stay tuned and we will continue this discussion in the next NPSS Newsletter, we will keep you informed as this develops, and try to explain what we understand to be the implications.

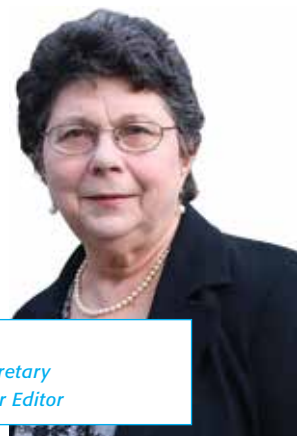
Sincerely,



John Verboncoeur, NPSS President

John Verboncoeur, IEEE NPSS President, can be reached at johnv@msu.edu

Secretary's Report



Albe Larsen
IEEE NPSS Secretary and Newsletter Editor

The IEEE NPSS AdCom held its annual meeting in San Diego, CA at the Town and Country Hotel following the 2015 NSS/MIC and the RTSD Workshop. Our newly elected AdCom members and new Technical Committee chairs were introduced in the December newsletter. To learn more about them, see their brief biographies below. Serving your technical community on AdCom or by being involved in your conferences is a rewarding experience. Candidates for 2016 positions on AdCom are being sought now. Contact your TC chair if you are interested in running.

At the November meeting year-end reports were given by many of our technical and functional committee chairpersons and by our liaisons to other IEEE and relevant non-IEEE activities. Due to extreme care by conference organizers, our conferences are, even in these marginal economic times with heavy governmental travel restrictions impacting national labs world-wide as well as academic researchers, doing well. This has taken vigilance and major budget adjustments in many cases to ensure that conferences weren't large loss centers. Most have reached breakeven or a bit better. Our publications also continue to do well and we are pleased that by this time next year we expect our new journal, *IEEE Transactions on Radiation and Plasma Medical Science* (TRPMS), to have issued at least its inaugural volume. Watch for it! This is an exciting time for our MIC and Plasma Medicine communities.

ADCOM ACTIONS

» The Fusion TC requests that the Princeton Plasma Physics Lab be allowed to be a technical cosponsor of the 2017 Symposium on Fusion Technology to be held in Shanghai. While this motion carried, it has subsequently been disallowed by powers beyond NPSS control.

» FinCom moves that NPSS donate $15,000 to the IEEE Foundation in support of the IEEE History Center to update the history of IEEE from 1984 to the present. Motion carried.

» FinCom moves that NPSS support the National Council on Radiation Protection (NCRP) at the annual rate of $3000. Approved. Randy Brill (Vanderbilt) will serve as our NCRP liaison for 2015 and for as long as feasible.

» FinCom moves that the T-RPMS subscription will be added to the NPSS Membership benefits beginning in 2017 as shown in the table below:

The current journal pricing is unchanged.
The motion carried.

» AdCom moves that NPSS support Young-Professionals functions held at NPSS-sponsored conferences to a total of up to $5,000 per conference to cover costs related to these functions. Motion passed.

» The Awards Committee moved that AdCom endorse the establishment of a new NPSS award in honor of Glenn Knoll to be funded in part by a donation by Gladys Knoll to the IEEE Foundation.

» A motion to consider an NPSS donation to the new award fund was tabled.

AdCom will hold a retreat and its first 2016 meeting at La Fonda Hotel, Santa Fe, NM on March 11th and 12th, respectively. Its second meeting will be held in Portland, OR on Saturday, July 16th.

	ELECTRONIC ONLY MEMBER TYPE		PAPER ONLY MEMBER TYPE		ELECTRONIC & PAPER MEMBER TYPE	
	FULL	STUDENT	FULL	STUDENT	FULL	STUDENT
TNS	0	0	$70	$35	N/A	N/A
TPS	0	0	$70	$35	N/A	N/A
TMI	$53	$27	$74	$37	$89	$45
T-RPMS	0	0	$70	$35	$35	N/A

New AdCom Members

Monica Blank

Monica Blank
AdCom Class of 2019, Plasma Science and Applications

Monica Blank received the B.S. degree (Electrical Engineering) from the Catholic University of America, Washington, D.C. in 1988, and the M.S. and Ph.D. degrees (Electrical Engineering) in 1991 and 1994, respectively, from the Massachusetts Institute of Technology, Cambridge, MA. In 1994 she joined the Vacuum Electronics Branch of the Naval Research Laboratory, where she was responsible for the design and demonstration of high-power millimeter-wave vacuum electronic devices for radar applications. In 1999 she joined the gyrotron team at Communications and Power Industries (formerly Varian) where she continues her work on high-power millimeter-wave gyrotron amplifiers and oscillators. Dr. Blank has received several professional awards, including the 1998 Alan Berman Publication Award at the Naval Research Laboratory, the Robert L. Woods Award for Excellence in Vacuum Electronics Technology in 1999, and an R&D 100 Award in 2015. Dr. Blank has previously served three terms on the IEEE Plasma Science and Applications Executive Committee, and was a Senior Editor for the *IEEE Transactions on Plasma Science* from 2009–2015.

Ralf Engels

Ralf Engels (M´ 98, SM´12) is a member of the detector group at the Central Institute of Engineering, Electronics and Analytics, Electronic Systems (ZEA-2) of the Forschungszentrum Jülich. His basic fields of research are the development, construction, and operation of advanced detector systems for thermal neutrons. After his study in electronic design at the Aachen University of Applied Sciences, he wrote his diploma thesis in the detector group (1994) followed by the Ph.D. (2012) at Albert-Ludwigs-Universität Freiburg.

He worked as staff engineer in this group and contributed to projects in other departments. In addition to the neutron detector developments, he was also involved in designs for biological detector systems and medical detector systems such as the TierPET (Animal PET) system. He has close collaborations with companies and universities working in the nuclear instrumentation field. His other activities include the design of detector readout electronics and DAQ systems.

From 2004–2014, he has been head of the "Neutron- and Gamma-Detector" group and now he is project manager for neutron detectors. Recently, he was in charge of the development of alternatives for neutron ^{3}He detectors. A new technology, built for the Six Anvil Press for High Pressure Radiography and Diffraction (SAPHIR) based on wave-length-shifting fiber technology, was delivered for setup at the research reactor FRM-II in Munich. Today he is working on a new high-rate, pixelated detector to be installed at the European Spallation Source (ESS) in Lund.

He has been interested in IEEE activities for many years and has attended the IEEE Nuclear Science Symposium and Medical Imaging Conference since 1995. The IEEE/NPSS has been successful in bringing people together from different scientific areas and different countries. In helping to achieve this goal, he served as Conference Coordinator in 2008, Dresden, Germany, Treasurer for 2010 Knoxville, and Treasurer for 2011 Valencia, Spain, the Workshop Chairman for 2011 conference, Anaheim, 2013 as Co Local Arrangements Chair in Seoul, Korea, Conference Coordinator in San Diego, 2015, and has been selected as the General Chair Deputy in 2017 Atlanta, USA. He has served twice on the RISC committee. In 2012 and 2013, he was Joint Oversight Subcommittee (JOS) Chairman and member of the committee

Ralf Engels,
Assistant Treasurer

as past chair until end of 2015. Beginning this year, he was appointed Assistant NPSS Treasurer.

In his spare time, he enjoys family outings with his wife and two children.

Paul Marsden

Paul Marsden is based in (what is now) the Division of Imaging Sciences and Biomedical Engineering, King's College London, where he is Professor of PET Physics and Scientific Director of the King's College London PET Imaging Centre. He has been involved

NEW ADCOM MEMBERS Continued on **PAGE 4**

New AdCom Members

Continued from **PAGE 3**

Paul Marsden
Chair, Nuclear Medical and Imaging Technical Committee

in PET imaging for most of his career since obtaining a Ph.D. in the development of multiwire proportional chambers for PET from the Institute of Cancer Research, University of London in 1987.

His research activities have concerned most of the technical aspects of PET imaging from the development of cyclotron targets and prototype PET-MR systems, through to image reconstruction and data analysis. Paul's current research is focussed on novel applications of PET-MRI systems, and development of the imaging techniques such as motion correction and accurate quantification needed to perform these. Being based in a large medical school provides many opportunities for multidisciplinary collaborations and the need to develop methodology and data analysis techniques for new radiotracers and research PET studies in oncology, cardiology and neuropsychiatry.

In addition to giving many formal courses in medical physics and biomedical engineering to undergraduate and graduate students, Paul has been involved in the organisation of numerous short courses and workshops and is a regular contributor to the annual NSS/MIC conference. He is a member of the organising committee for the 2019 NSS/MIC meeting which will take place in Manchester, UK.

Andreas Neuber

Dr. Andreas A. Neuber, PE, is the distinguished P.W. Horn Professor and the AT&T Professor of Electrical and Computer Engineering at Texas Tech University. He also serves as Co-Director of the Center for Pulsed Power and Power Electronics. Dr. Neuber received his diploma in physics and Dr.-Eng. in mechanical engineering from the Darmstadt University of Technology, Germany in 1990 and 1996, respectively. He has authored 114 peer-reviewed journal articles and more than 200 conference proceedings papers. His current research interests are in high-power switching, high-power microwaves, unipolar surface flashover physics, and explosive-driven pulsed power. Dr. Neuber has served in various capacities on the organizing committees of numerous international conferences,

Andreas Neuber
Chair, Pulsed Power Science and Technology Committtee

including Technical Program Co-chairman of the 2002 Power Modulator Conference and Technical Program Chair of the 2003 IEEE International Pulsed Power Conference. He was a Guest Editor of the *IEEE Transactions on Plasma Science* for the 2005 and 2011 Special Issue on Power Modulators and Repetitive Pulsed Power, and has served as an external readiness review panel member for the U.S. Department of Energy. Dr. Neuber is a Fellow of the IEEE and has received the 2010 IEEE Dunbar award for continuing contributions to high voltage research, technology, and engineering education.

Bryan V. Oliver

Bryan Oliver
AdCom Class of 2019, Pulsed Power

Bryan V. Oliver was born and raised in Berkeley, California USA. He received the B.S. degree in physics from the University of California at San Diego (UCSD) in 1988 and the M.S. and Ph.D. degrees in theoretical plasma physics from Cornell University, Ithaca, NY, in 1991 and 1994, respectively.

Dr. Oliver is a Deputy Director in the Radiation and Electrical Sciences Center at Sandia National Laboratories where he leads the Radiation Effects Sciences and Applications Group. His primary areas of expertise are in theory and simulation of intense electron and ion beam generation and propagation, MHD and electron Hall MHD (EHMHD), Z-pinches, X-ray radiography, Radiation Effects and intense Electromagnetic Pulse (EMP). He leads the Sandia effort to develop and apply intense radiation sources for use in the study of radiation effects on devices, circuits and components in hostile radiation environments. This includes the development of large-scale radiation transport and plasma simulation codes as well as high radiation experimental platforms.

Dr. Oliver is a member of the American Physical Society and the Institute for Electronics and Electrical Engineers and serves on the IEEE Pulsed-Power Sciences and Technology Committee, the Plasma Science and Applications committee and the International High-Power Particle Beams committee.

Ronald Schrimpf

Ron Schrimpf received B.E.E. (1981), M.S.E.E. (1984), and Ph.D. (1986) degrees from the University of Minnesota. He was a faculty member at the University of Arizona from 1986-1996, where he served as Assistant Professor, Associate Professor, and Professor. Ron has been at Vanderbilt University since 1996, where he serves as the Orrin Henry Ingram Professor of Engineering and Director of the Institute for Space and Defense Electronics. Ron has been involved with NSREC since 1987, serving as General Chair, Technical Chair, Awards Chair, Short Course Chair, Short Course Speaker, Session Chair, and Guest Editor. He also served as Chairman of the Radiation Effects Steering Group. At Vanderbilt, Ron has received the Chancellor's Cup, the Harvey Branscomb Distinguished Professorship Award, the School of Engineering Outstanding Teaching Award, and the Chancellor's Award for Research.

Ronald Schrimpf
AdCom Class of 2019, Radiation Effects

Ron received the IEEE NPSS Early Achievement Award in1996 and was elected a Fellow of the IEEE in 2000. He has received five Outstanding Paper Awards at NSREC and two at RADECS. Ron was an Invited Professor at the Université Montpellier II, France, in 2000. He has published approximately 500 papers in refereed journals, with many of these appearing in the *IEEE Transactions on Nuclear Science*.

Albe Larsen, IEEE NPSS Secretary and Newsletter Editor, can be reached by E-mail at a.m.larsen@ieee.org.

Technical Committees

NUCLEAR MEDICAL AND IMAGING SCIENCES

Paul Marsden
Chair, Nuslear Medical and Imaging Technical Committee

The 2015 IEEE NPSS Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) was held at the Town and Country Resort in San Diego from the Saturday 31st of October to Sunday the 8th of November. The meeting was a great success—out of a total of 518 abstracts that were submitted to the MIC program, 104 and 359 were accepted for oral and poster presentations respectively representing a rejection rate of 11%. Joint sessions, including NSS-MIC, NSS-RTSD, NSS-MIC-RTSD sessions, were organized from the Tuesday through to Thursday. A program of short courses included in the first half of the week, and a series of early morning refresher courses providing an up-to date-review of topical subjects prior to the relevant sessions were also very well received. I would like to congratulate Adam Alessio (MIC Program Chair), Lawrence MacDonald (MIC Program Deputy Chair) and everyone else involved for providing an excellent program and a very enjoyable meeting.

At this year's meeting we honored the work of two of our colleagues. Mike King from the University of Massachusetts received the Edward J. Hoffman Medical Imaging Scientist Award "for contributions to clinical nuclear medicine imaging, especially compensation for realistic physical effects and motion in image reconstruction, emission and transmission imaging geometries, and task-based evaluation methods." Se Young Chun from UNIST, Korea received the Bruce Hasegawa Medical Imaging Conference Young Investigator Award "for contributions to image reconstruction methods in the presence of object motion." I extend my congratulations to both of them for their success.

I would like to take this opportunity to encourage all of you to think of worthy colleagues you can nominate for the two awards above. (the deadline is 15th of July – see http://ewh.ieee.org/soc/nps/nmisc/MICAwards.html). Please send your nominations to the NMISC Awards subcommittee chair Glenn Wells (gwells@ottawaheart.ca). Also every year there are four other NPSS awards for which you can all nominate eligible candidates from our community (details on the awards and associated nomination procedures can be found in http://ewh.ieee.org/soc/nps/awards.htm).

Preparations are ongoing for this year's 2016 IEEE NSS/MIC meeting in Strasbourg, France running from 29th October to 6th November. Maxim Titov is the General Chair for the meeting, while Dimitris Visvikis and Suleman Surti will serve as the MIC Program Chair and Deputy Program Chair respectively. For more details please see http://2016.nss-mic.org. The 2017 IEEE NSS/MIC will be held in Atlanta, USA with John Aarsvold as General Chair, Lars Furenlid as MIC Chair and Matthew Kupinski Deputy MIC Chair. In 2018 the meeting will be in Sydney, Australia with Anatoly Rozenfeld as general chair, Steve Meikle as MIC Chair and Taiga Yamaya as Deputy MIC Chair. Looking further ahead, the site for the 2019 IEEE NSS/MIC has also now been chosen and the meeting will be held in Manchester, UK.

Five newly elected Council members start their three-year term from 01 Jan 2016. These are Roger Fulton (Sydney, Australia), William F. Jones (SIEMENS, Knoxville, US), Tom Lewellen (U Washington, Seattle, US), Emilie Roncali (UC Davis, California, US) and Seiichi Yamamoto (Nagoya University, Japan). I would like to welcome you all to the Council and look forward to your participation and to working with you all!

I encourage all of you to volunteer as candidates for being Council members and help in serving the NMISTC membership by gaining experience on matters associated with our community as well as the running of the MIC meeting. Five individuals are elected each year for a three-year term—more detailed information can be found on the NMISC webpage (http://ewh.ieee.org/soc/nps/nmisc/).

During the NMISC annual meeting in San Diego we also had an election for a new vice-chair and I am happy to announce that Jae Sung Lee (Seoul National University, Korea) has started his two-year term as NMISC vice-chair from 01 Jan 2016, so congratulation Jae Sung. I have now taken over from Dimitris Visvikis as chair. Dimitris proved extremely dynamic in this role and I would like to thank him for all his hard work. I am sure he will continue to provide invaluable guidance to me and the rest of the council over the next two years.

Paul Marsden can be reached at the Division of Imaging Sciences and Biomedical Engineering, King's College London, St Thomas' Hospital, London, SE1 7EH, UK; Phone: +44 (0)20 718 53208; E-mail: paul.marsden@kcl.ac.uk

BETTER THAN STICKING IT OUT

I don't deserve any credit for turning the other cheek as my tongue is always in it.

Flannery O'Connor

NOT ALWAYS!

The 'silly question' is the first intimation of some totally new development.

Alfred North Whitehead

MORE EXPERIENCE WITH THE LATTER

It's just as difficult to overcome success as it is to overcome failure

William Walton

PULSED POWER SCIENCE AND TECHNOLOGY

Inaugural PPST Elections Call for Nominations

The Pulsed Power Science and Technology (PPST) Committee of the Nuclear and Plasma Sciences Society (NPSS) invites nominations for election to its Committee from the Pulsed Power Science and Technology Community. The PPST Committee, founded in 1994, is transitioning to a fully elected Committee with these 2016 elections, leading to full implementation by 2019. This year, four out of the sixteen members will be elected for a 4-year term. Qualified nominees are members of the Pulsed Power Community who are either members in any grade of the IEEE NPSS or must have submitted an application for membership in IEEE NPSS at the time of nomination.

The PPST Committee represents the interests of the pulsed power community in the understanding, development and application of pulsed power to a variety of fields including but not limited to plasma physics, nuclear science, high power RF, and life sciences. As such, one of the primary responsibilities of this Committee is to organize, conduct and encourage participation in the IEEE International Pulsed Power Conference. The Committee shall meet at least twice a year. Committee members are expected to attend all meetings. The constitution & bylaws for PPST may be found at the following link. http://ieee-npss.org/wp-content/uploads/2014/03/PPST_Constitution_July-19-2014.pdf

Individuals making a nomination must determine in advance that the nominee is willing to serve if elected. Valid nominations must include the name, address, e-mail address, and phone number of the nominee, as well as a short biography and brief statement (less than 200 words each) why the nominee wishes to serve on the Committee.

Nominators must be members of the IEEE NPSS Pulsed Power Community at the time of submittal of the nomination. Self-nominations are permitted.

Nominations shall be submitted to the PPST Chair or the Secretary in writing by June 1st, 2016. Please e-mail your nomination to:

Andreas Neuber
Chair, IEEE NPSS PPS&T Committee
a.neuber.dr@ieee.org

David Wetz
Secretary, IEEE NPSS PPS&T Committee
wetz@uta.edu

Ballots shall be distributed to the members of the Voting Community on July 31st , 2016 to fill the four member-at-large vacancies. The Voting Community consists of persons who are IEEE NPSS members at the time of ballot distribution and who have a vested interest in Pulsed Power Science & Technology as witnessed, for instance, by past participation in the IEEE International Pulsed Power Conferences. Individuals will be selected by a majority vote.

Andreas Neuber
Chair, Pulsed Power Science and Technology Committtee

Andreas Neuber, Chair of the Pulsed Power Science and Technology Committee can be reached at Texas Tech University, Department of Electrical and Computer Engineering, Box 43102, Lubbock, TX 79409; Phone: +1 806 834-8270; E-mail: a.neuber@ieee.org.

Functional Committees

AWARDS

Class of 2016 NPSS Fellows

The IEEE offers Institute Awards, and most Societies and Society Technical Committees also offer awards. Elevation to IEEE Fellow is a prestigious honor awarded each year to no more than 0.1% of the full IEEE membership by the Institute's Board of Directors. Nominations are made from among Senior Members. Nominees must be supported by at least six Fellows. After being reviewed and ranked by the appropriate IEEE Society, the nominations are forwarded to the Institute's Fellow Committee who then recommend a list of candidates to the IEEE Board of Directors for their consideration. The Nuclear and Plasma Sciences Society is justifiably proud of its Fellows. We present here the Class of 2016 Fellows, and wish them each our heartfelt congratulations. Editor's note.

Bruce Carlsten

Bruce Carlsten is an accelerator physicist and RF engineer at the Los Alamos National Laboratory (LANL). He received a B.S. in Physics and a B.A. in Mathematics from UCLA in 1979, and an M.S., Degree of Engineer, and Ph.D. in Electrical Engineering from Stanford University in 1980, 1982, and 1985, respectively. He joined LANL in 1982 and since then has worked on a variety of high-power accelerator and RF source projects. He was a pioneer in the development of RF photoinjectors and is credited with the discovery of the emittance compensation technique which has allowed photoinjectors to generate exceptionally bright electron beams. He was also a pioneer in the development of bunch compressors, including

Bruce Carlsten
IEEE Fellow, Class of 2016

early research in the effects of coherent synchrotron radiation. He built and commissioned two beam-physics research accelerators at Los Alamos (SPA and THOR). He led early research in annular relativistic klystron amplifier physics, in the generation and transport of high-aspect-ratio elliptical beams, and in planar slow-wave structures for high-power, high-bandwidth RF amplification at W-band. He led LANL's High-Power Electrodynamics Group from 2005 to 2012 and is now an R&D Engineer focusing on novel Free-Electron Laser and W-band RF source technologies as well as novel synthetic aperture radar (SAR) imaging schemes.

Dr. Carlsten is also a Fellow of the Los Alamos National Laboratory and of the American Physical Society. He is a member on the High Energy Physics Advisory Panel (HEPAP) and of the Advisory Board for the Air Force Office of Scientific Research MURI on Transformational Electromagnetics. He is a Member-at-Large of both the Executive Committee of the Division of Physics of Beams of the American Physical Society and of the IEEE Particle Accelerator Science and Technology Technical Committee, and is on the Editorial Board of *Physical Review Special Topics–Accelerators and Beams*.

Citation: *For contributions to high-brightness electron beams and vacuum electron devices*

Georges El Fakhri

Georges El Fakhri is a Professor of Radiology at Harvard Medical School and the founding Director of the Gordon Center for Medical Imaging (GCMI). He also directs the Massachusetts General Hospital (MGH) PET Core, and is Co-Director of the Division of Nuclear Medicine and Molecular Imaging. Dr. El Fakhri is an internationally recognized expert in quantitative SPECT, PET-CT, and PET-MR. He has pioneered novel approaches to compensate for many of the physical factors affecting quantitative SPECT, PET/CT and PET/MR and objectively assessing the achieved improvement in image quality, specifically in PET oncologic, neurologic and cardiac imaging as well as in the development of novel approaches to quantitative cardiac and brain modeling. In SPECT/MR his pioneering work has identified the relative role of different brain structures (e.g., entorhinal cortex, anterior cingulate) in the early onset of Alzheimer's disease in large cohorts of patients followed over a decade with perfusion SPECT and structural MRI. Recently, Dr El Fakhri's Lab pioneered some of the early dopamine displacement studies with PET and more recently mapping neurotransmission (e.g., dopamine, serotonin) in normal and severely depressed subjects. He has also pioneered the use of in-room PET for monitoring proton therapy and assessing changes in O-15 washout through kinetic modeling. In the heart, Dr. El Fakhri developed the early kinetic modeling, parametric imaging and quantitative framework for Rb-82 imaging and validated measured absolute myocardial blood. Recent work includes the development of novel approaches to mapping mitochondrial complex I and membrane potential non invasively in the heart as well as developing synergistic approaches in PET/MR for motion compensation, anatomical priors, PET/fMRI and PET/MRS.

Georges El Fakhri
IEEE Fellow, Class of 2016

Citation: *For contributions to biological imaging.*

Stuart Kleinfelder

Stuart Kleinfelder has made many contributions to integrated instrumentation and systems for High Energy Physics, Nuclear Science and Particle Astrophysics. He developed the first custom CMOS circuit for such applications, used in CDF's silicon vertex detector at the Fermi National Accelerator Laboratory. He invented the Switched Capacitor Array technique of compact, low-power transient waveform acquisition circuits. In the early 1990s these SCAs achieved 11–13 bits of dynamic range and up to 5-GHz acquisition rates, far exceeding the ADCs of the day while using ten times less power. Today, the basic SCA technique is a ubiquitous tool used in a great many experiments around the world. For example, one of his versions became the electronic heart of over 5,000 Digital Optical Modules comprising the world's largest neutrino detector: the IceCube experiment in Antarctica.

Stuart Kleinfelder
IEEE Fellow, Class of 2016

He has made numerous other contributions, including the early use and optimization of image sensors for cryogenic electron microscopy and other charged-particle imaging applications, an award-winning time-to-digital converter, and integrated readout electronics for the successful Advanced Composition Explorer satellite. He spearheaded a collaboration that created the first digital camera with complete per-pixel analog to digital conversion. Because of its massively-parallel nature, the device pushed frame rates higher by an order of magnitude. The IEEE's Solid State Circuits Society lauded this Digital Pixel Sensor work as one of "70 outstanding ideas spanning 50 years of solid-state circuits

Jane Lehr
Chair, NPSS Fellows Committee

history."

Dr. Kleinfelder is a Professor of Electrical Engineering and Computer Science at the University of California, Irvine, CA, U.S.A. He received the Ph.D. degree from Stanford University in 2001 and has authored and co-authored over 140 papers.

Citation: *For contributions to sensors and instrumentation for high-speed imaging applications.*

Vladimir Kolobov

Vladimir Kolobov is a Technical Fellow and Manager of Plasma Technologies at CFD Research Corporation in Huntsville, AL, USA. He obtained his Ph.D. in 1989 from St. Petersburg University in Russia. He was a visiting scientist at Université P. Sabatier, in Toulouse, France, the University of Wisconsin in Madison, and the University of Houston. SInce joining CFDRC in 1997, he has been responsible for the development of computational tools for a broad range of applications from material processing to aerospace and nanoscience. Dr. Kolobov was a key architect of the first commercial software, CFD-ACE+Plasma, for simulations of plasma devices and processes, and Unified Flow Solver for multiscale kinetic-fluid simulations of gas flows and partially ionized plasmas. He was Principal Investigator for several successful SBIR/STTR projects funded by NSF, AFRL, NASA, AFOSR, DARPA and Dept. of Commerce, as well as a PI and Project Manager for numerous industrial projects from GE, Samsung, TEL, Panasonic, MKS Instruments, ABB, Inficon, and other companies. His work promoted widespread use of computer simulations in modern plasma technologies. Dr.

Vladimir Kolobov
IEEE Fellow, Class of 2016

2016 NPSS Fellows Continued on **PAGE 6**

Functional Committees Continued from **PAGE 5**

Kolobov has made unique contributions to the advancements of plasma science and its industrial applications. He has developed a kinetic theory of glow discharges (in collaboration with Lev Tsendin) that explained the complicated structure of the cathode region and the nature of electric field reversals therein. He has developed a kinetic theory of low-pressure inductively coupled plasma that describe the collisionless electron heating and formation of electron energy distribution function under conditions of the anomalous skin effect. He is the author of over 60 journal articles and numerous conference presentations. Dr. Kolobov is a recipient of the 2015 IEEE Region 3 Outstanding Engineer Award for distinctive contributions to plasma science through advances in theory and through the development of computational tools.

Citation: *For contributions to theory, simulation and software development for industrial plasma.*

Stefan Ritt

Stefan Ritt received his Ph.D. in physics from the University of Karlsruhe, Germany in 1993. He is currently head of the muon physics group at Paul Scherer Institute (PSI), Switzerland, where he works in the lab's particle physics program involving experiments with muons and pions.

Among Dr. Ritt's many recognized contributions to such areas as the MIDAS data acquisition system and the Elog electronic logbook, the one with the most outstanding impact is his design of the switched capacitor array chip, named "Domino Ring Sampler" (DRS). This chip has had a major impact on instrumentation design in High Energy, Nuclear and Particle physics, as well as Medical

Stefan Ritt
IEEE Fellow, Class of 2016

Imaging and diagnostics. The current version of the chip, DRS4, is capable of digitizing electrical signals with eight channels simultaneously with a sampling rate of five billion samples per second and 12 bits of resolution, at a power requirement of only 30 mW per channel, outperforming any commercial analog-to-digital converter. A novel timing calibration has been developed recently with researchers from the University of Tübingen, Germany, which allows the chip to measure time differences between two signals at an accuracy better than one picosecond, which is currently the record for chips of this kind. The chip is therefore an enabling technology for many experiments such as the MEG experiment at PSI, which utilizes more than 3000 channels. The chip has been distributed through PSI's technology-transfer program to more than 200 groups worldwide, including the Cherenkov Telescope Array (CTA), which is the next generation of ground-based, very-high-energy gamma ray observatories.

Dr. Ritt has been an active member of IEEE for many years. He is currently the NPSS vice president / president-elect.

Citation: *For the development of the Domino Ring Sampler series of chips.*

2015 IEEE Nuclear and Space Radiation Effects Conference Awards

It is a longstanding tradition of the IEEE Nuclear and Space Radiation Effects Conference to honor the Outstanding Conference Paper and the Outstanding Data Workshop Presentation. In recent years recognition has also been given to the best paper presented and first-authored by an IEEE Student Member. The awards process not only rewards authors for particularly high quality and important work, but also encourages all authors to produce presentations and manuscripts of high technical quality, clarity of presentation, and significance to the community.

Although there were a number of strong candidates for the Outstanding Conference Paper, two papers stood out due to their high scores across committee members. When two papers stand out from the other papers, a Meritorious Paper Award can be given in addition to the Outstanding Conference Paper Award. This was the case this year.

IT IS OUR PLEASURE TO ANNOUNCE THE FOLLOWING 2015 NSREC AWARD WINNERS:

OUTSTANDING CONFERENCE PAPER

"The Contribution of Low-energy Protons to the Total on-Orbit SEU Rate," by *N. A. Dodds, M. J. Martinez, P. E. Dodd, M. R. Shaneyfelt, F. W. Sexton, J. D. Black, D. S. Lee, S. E. Swanson, B. L. Bhuva, K. M. Warren, R. A. Reed, J. Trippe, B. D. Sierawski, R. A. Weller, N. Mahatme, N. J. Gaspard, T. Assis, R. Austin, S. L. Weeden-Wright, L. W. Massengill, G. Swift, M. Wirthlin, M. Cannon, R. Liu, L. Chen, A. T. Kelly, P. W. Marshall, M. Trinczek, E. W. Blackmore, S.-J. Wen, R. Wong, B. Narasimham, J. A. Pellish, and H. Puchner*.

MERITORIOUS CONFERENCE PAPER

"RHA Implications of Proton on Gold-Plated Package Structures in SEE Evaluations," by *T. L. Turflinger, D. A. Clymer, L. W. Mason, S. Stone, J. George, M. Savage, R. Koga, E. Beach, and K. Huntington*.

OUTSTANDING STUDENT PAPER

"Effects of Applied Bias and High Field Stress on the Radiation Response of GaN/AlGaN HEMTs," by *J. Chen, Y. S. Puzyrev, R. Jiang, E. X. Zhang, M. W. McCurdy, D. M. Fleetwood, R. D. Schrimpf, S. T. Pantelides, A. R. Arehart, S. A. Ringel, P. Saunier, and C. Lee*.

OUTSTANDING DATA WORKSHOP—CO-WINNERS

"2015 Compendium of Recent Test Results of Single Event Effects Conducted by the Jet Propulsion Laboratory's Radiation Effects Group," by *G. R. Allen, L. Z. Scheick, F. Irom, S. M. Guertin, P. C. Adell, M. Amrbar, and S. Vartanian*

"Radiation Effects Evaluation of a Commercial 180 nm Ferroelectric Memory Technology for Harsh Environments," by B. A. Dahl, J. Cruz-Colon, R. Baumann, S. Khan, J. Rodriguez, T. San, and J. Rodriguez.

Teresa Farris
RE Vice Chair-person of Publicity

Nathaniel Dodd
NSREC Outstanding Paper Award Recipient

CHAPTERS AND LOCAL ACTIVITIES

Chapters are local units of the IEEE that are established in Sections, but are affiliated with one or more IEEE Societies. Student branch chapters are formed within IEEE student branches at colleges, universities, or technical institutes, and are also affiliated with IEEE Societies. Chapters of both types sponsor local activities, including workshops, seminars, guest lectures, and social gatherings, and provide networking and leadership training opportunities for their members. The NPSS has an active chapters program, with 22 chapters and joint chapters around the world, including two student branch chapters. Their locations are shown by IEEE Region in the accompanying map. Two new NPSS chapters were formed in 2015. The first, a student branch chapter, was established at the Vellore Institute of Technology in Tamil Nadu, India on February 23rd, 2015. Its cofounders, Pranjal Jain and Khushbu Agrawal, were the first recipients of the newly established NPSS Chapter Founder's plaque, which was presented via video recording by the NPSS President, John Verboncoeur. The second new chapter was formed on June 4th, 2015 in the Southeastern Michigan Section. Its founder, David Trescott, also received an NPSS Chapter Founder's plaque. He was assisted by Kimball Williams of the Section, and by NPSS members at the University of Michigan and Michigan State University. A list of the current NPSS chapters can be found on our chapters webpage http://ieee-npss.org/chapters/. The NPSS provides support for its chapters through its Distinguished Lecturers program, and can also provide direct financial assistance to support chapter activities.

Steve Gold
Chapters and Local Activities Chair

If you need additional information, or are interested in establishing a new NPSS chapter anywhere in the world, please contact Steve Gold, the NPSS Chapter Coordinator, at steeve@ieee.org.

PUBLICATIONS COMMITTEE

TRPMS

As mentioned in earlier Newsletters, NPSS has proposed a new journal, the *IEEE Transactions on Radiation and Plasma Medical Sciences* (TRPMS). This journal has now received final approval from the IEEE Technical Activities Board. It is cosponsored by the Engineering in Medicine and Biology Society. Current plans are for the first issue to be published in January 2017.

Paul Dressendorfer
Publications Committee Chair

The scope of the *IEEE TRPMS* encompasses technology and application areas related to radiation- and plasma-based medical sciences. These areas include radiation detectors for medical and biological applications; imaging system design/optimization/performance; therapy-related system design/optimization/performance; radiation-application-based image reconstruction, data analysis and image processing; medical radiation therapy applications; clinical/preclinical evaluation of imaging and therapy systems, plasma applications in medicine and biology; simulations for imaging and therapy applications. Educational material such as technical/clinical review papers covering the above subjects of interest is also included.

The objective of this journal is to create a unique publication related to the application of radiation and plasma sciences within the medical field. TRPMS aims at combining the larger and well established field of radiation medical applications with the upcoming plasma medical sciences domain, providing a unique venue for the publication of radiation- and plasma-based medical sciences. No such journal exists today either within IEEE or other publishers.

Both of the current NPSS publications, the *IEEE Transactions on Nuclear Science (TNS)* and the *IEEE Transactions on Plasma Science (TPS)*, publish papers with medical sciences content. These journals are general in scope and have very broad coverage; thus the medically related papers have typically not received appropriate visibility, nor are they indexed by PubMed. The intent is for that content to transition to the new journal *TRPMS*. We believe that the new journal will be a much better venue for this work. Since we hope to have *TRPMS* indexed by PubMed as soon as possible, it will also provide much wider exposure within the medical community.

For further information on this journal, or if you are interested in serving on its Editorial Board, please contact Paul Dressendorfer at p.dressendorfer@ieee.org.

HENCE, OUR LOSS

Under democracy one party always devotes its energies to trying to prove that the other party is unfit to rule and both commonly succeed and are right.

H. L. Mencken

ALAS, THE IMMOVABLE OBJECT

Love is an irresistible desire to be irresistibly desired.

Robert Frost

PERHAPS, BUT OVER A LONG TIME…

In the rotation of crops there was a recognized season for wild oats, but they were not sown more than once.

Edith Wharton

SOMETHING TO CHEW ON

Age and youth have the same appetites, but not the same teeth.

Magdalena Samozwaniec

Functional Committees

Continued from **PAGE 6**

HIGHLIGHTED CONTENT IN TNS AND TPS

We have instituted broadcast emails when an issue of the *Transactions on Nuclear Science (TNS)* or of the *Transactions on Plasma Science (TPS)* is published. These emails highlight articles in that issue that the editorial team has identified as likely to be of broad interest to the community. The highlighted articles are made available in their entirety to readers free of charge (no subscription required to read the complete article), typically for a limited time. Following the summary of those highlighted articles is the full Table of Contents for the current issue of the journal. Highlighted links in the Table of Contents will take you directly to each article in IEEE Xplore. We hope that recipients find the emails a useful tool to help identify new content of interest in the journals.

If you are not receiving either of these emails and would like to be added to the email list, please send a note asking to subscribe to the email blast for the publication you are interested in. That email should be sent to tns-editor@ieee.org for subscription to the *TNS* email blast, and to tps-editor@ieee.org for the *TPS* email blast.

TOUGH REQUIREMENT

All you have to do on television is to be yourself, provided, that is, you have a self to be.

Clive James

TRANSACTIONS ON PLASMA SCIENCE UPCOMING SPECIAL ISSUES

» March 2016 *Special Issue of Selected Papers from SOFE '15* — Guest Editors: Jean Paul Allain (University of Illinois, Urbana IL USA), David Ruzic (University of Illinois, Urbana IL USA), Martin Nieto (CICATA Queretaro, Instituto Politecnico Nacional, Queretaro, Mexico), Larry Baylor (Oak Ridge National Laboratory, Oak Ridge TN USA) — Status: Submission deadline passed, to be published March 2016

» April 2016 Special Issue on *Dusty Plasmas* — Guest Editors: Jeremiah Williams (Wittenberg College, Wittenburg, Ohio USA), Uwe Konopka (Auburn University, Auburn Alabama USA), Edward Thomas, Jr. (Auburn University, Auburn Alabama USA), and Markus Thoma (Justus-Liebig-University Giessen, Giessen Germany) — Status: Submission deadline passed, to be published April 2016

» April 2016 Special Issue on *Plenary and Invited papers from ICOPS-2015* – Co-Guest Editors: Brent Jones (Sandia National Laboratories, Albuquerque NM USA) and Tao Shao (Institute of Electrical Engineering, Beijing, P. R. China) — Status: Submission deadline passed, to be published April 2016

» August 2016 Special Issue on *High Power Microwave Generation* — Guest Editors: Rebecca Seviour (Huddersfield University, UK), Lay-Kee "Ricky" Ang (Singapore University of Technology and Design, Singapore), Sameer Hemmady (University of New Mexico, Albuquerque NM USA), Theodore Grabowski (Air Force Research Laboratory, Directed Energy Directorate, Kirtland AFB, NM, USA), and John Jelonnek (Karlsruhe Institute of Technology, Institute for Pulsed Power and Microwave Technology (IHM), Karlsruhe, Germany) — Status: Submission deadline passed, to be published August 2016

» October 2016 Special Issue on *Pulsed Power Science and Technology* — Guest Editors: David Wetz (University of Texas – Arlington, Arlington, TX USA), Stephen Bayne (Texas Tech University, Lubbock, TX USA), Jose Rossi (National Institute for Space Research – INPE, Sao Jose dos Campos, SP Brazil) & Haiyun Luo (Tsinghua University, Beijing, China) — Status: Submission deadline passed, to be published October 2016

» November 2016 Special Issue on *Atmospheric Pressure Plasmas and their Applications* — Guest Editors: Tao Shao (Institute of Electrical Engineering, Beijing, P. R. China), Jie Zhuang (Leibniz-Institute for Plasma Science and Technology, Greifswald, Germany), Timo Gans (University of York, York, UK) and Sarita Prasad (University of New Mexico, Albuquerque, NM, USA) — Status: Submission deadline 01 February 2016

» December 2016 Special Issue of *The 9th Asia-Pacific International Symposium on the Basics and Applications of Plasma Technology (APSPT-9), and The 28th Symposium on Plasma Science for Materials (SPSM-28)* — Guest Editors: Hiroshi Akatsuka (Tokyo Institute of Technology, Tokyo, Japan), Kungen Teii (Kyushu University, Fukuoka, Japan), Jong-Shinn Wu (National Chiao Tung University, Hsinchu, Taiwan), and Koichi Takaki (Iwate University, Morioka, Japan) – Submission deadline 31 March 2016

» December 2016 Special Issue on *Plasma Assisted Technologies* – Guest Editors: Igor Matveev (Applied Plasma Technologies, Falls Church VA USA) & Tim Ombrello (Air Force Research Laboratory, Wright Patterson AFB OH USA) — Status: Submission deadline 01 April 2016

Liaison Reports

EAB Education Liaison Report

Edl Schamiloglu
EAB Liaison

IEEE EXHIBITS PROGRAM STRATEGIC SUMMIT

Since 2010 the Educational Activities Board (EAB) has explored opportunities to create impact within informal education spaces by developing a variety of hands-on science center exhibits. The goal of these exhibits is to encourage interest in engineering, technology, and computing and associated careers among pre-university students, their teachers, and the public, while heightening visibility of the IEEE brand. These exhibits were developed through two grant-funded initiatives, IEEE E-Scientia and the IEEE Low-Cost Exhibits Program, which have a presence in Regions 8, 9, and 10. The exhibits developed through these programs have been experienced by tens of thousands of students, educators, and science center guests.

With a grant from the IEEE Life Members Fund, EAB organized a two-day IEEE Exhibits Program Strategic Summit in October 2015 at "Sci-Enza: Hands-on Science" at the University of Pretoria in South Africa. The Summit brought together 31 attendees including IEEE volunteers, educators, and professionals from over a dozen science centers in Regions 1–10 to discuss future strategies for the IEEE Exhibits Program. The participants received a formal welcome by the University of Pretoria's Prof. Sunil Maharaj, Dean, Faculty of Engineering, and Prof. Jean Lubuma, Dean, Faculty of Natural and Agricultural Sciences.

Two panel sessions were held to inform participants about (1) IEEE Experiences in Developing Science Center Exhibits and (2) the Role of Science Centers for Students. The Summit also included case studies and poster sessions focused on current partnerships between IEEE and Science Centers. The partners included the BM Birla Science Centre, Hyderabad, India; Espacio Ciencia, Montevideo, Uruguay; Sci-Enza: Hands-On Science!, Pretoria, South Africa; Cochin University of Science and Technology, Center for Science in Society (CSiS), Kerala, India; Kenyatta University, Nairobi, Kenya; Shanghai International Sci-Tech Exchange Center (SISEC), Shanghai, China; and Universum, Museo de la Ciencias, Mexico City, Mexico.

The Summit concluded with reports from two breakout groups that featured recommendations on how IEEE can identify and invest resources in an informal education program for the pre-university audience.

EDUCATIONAL ACTIVITIES IN AFRICA

For several years, "IEEE in Africa" has been a consistent part of internal IEEE dialog. There have been an increasing number of projects and initiatives, particularly in university and pre-university education focused on Africa. Future growth possibilities in the engineering and technical community on the continent point to a significant opportunity for IEEE and EAB in Africa over the next several years.

IEEE Presidential delegation visits and IEEE-organized and sponsored events have occurred in several countries in sub-Saharan Africa with a focus on workforce development and engineering education as important elements in the development of a high-tech workforce critical to advancing Africa's growth.

As a result of these discussions, one area that has continually emerged as a primary opportunity for additional work was education. In addition to workforce development and engineering education, EAB recognizes the possibility for IEEE to impact multiple aspects of the engineering ecosystem in sub-Saharan Africa, signaling a global growth opportunity for IEEE. Throughout 2015, EAB has continued its educational programs and initiatives in Africa, and has participated in a wide variety of engagements and events in an effort to enhance educational opportunities in the region.

A program accreditation workshop was held in Lusaka, Zambia on 1st – 2nd June 2015, which brought together more than 40 stakeholders, including key academic, government and industry leaders. Observers from Zimbabwe and Kenya also attended. The workshop concluded with an agreed-upon roadmap and timetable, and the signing of a communiqué between IEEE Educational Activities and The Engineering Institution of Zambia that pledged a mutual effort to continue the process.

CONTINUING AND PROFESSIONAL EDUCATION OPPORTUNITIES

Through collaboration with other areas of Educational Activities and IEEE, and the support of external partners, the Continuing and Professional Education team of volunteers and professional staff continues to create innovative offerings that serve the needs of engineering, computing and technology professionals globally.

IEEEx

Following a successful run of the "Introduction to Cloud Computing" massive, open, online course (MOOC) earlier in the year, which attracted more than 35,000 learners from 180 countries, IEEEx launched a second run of the course on 12th November. More than 17,000 learners from 176 countries participated in the course.

In December, IEEEx will launch "Managing a Multigenerational and Diverse Workforce" in conjunction with the Rutgers University School of Management and Labor Relations. The course teaches managers and employers how to effectively lead their human capital under the "new normal" demographic and global trends shaping labor markets.

To learn more about IEEEx, and to enroll in a future course, visit www.ieeex.org.

IEEE COURSES

Following a successful migration onto the IEEE Xplore platform earlier this year, IEEE Courses has aggressively expanded in recent months. For example, there were over 6,000 courses launched in July 2015 – a dramatic increase from the previous monthly average of less than 500 course launches.

Analytics demonstrate that topics such as cloud computing, software engineering and transportation continue to be in demand. In addition, the Continuing and Professional Education team is developing courses on other hot topics, including big data, the internet of things and cyber security.

To discover the new IEEE Courses interface, and to access content, visit http://ieeexplore.ieee.org/courses/home.

Learn about the latest developments in the EAB by visiting http://www.ieee.org/education_careers/education/eab/42177099

Edl Schamiloglu, the NPSS liaison to the Educational Activities Board (EAB) can be reached by E-mail at edls@unm.edu.

AHEAD OF HIS TIME

War must be made as deadly to the civilian population back home as it is for the troops in the front lines. Let the sword of Damocles hang over every head, gentlemen, and you will witness a miracle – all wars will be stopped instantly if the weapon is called bacteriology.

Alfred Nobel

US TOO!

What politics has become requires a level of tolerance for triviality and artifice and nonsense that I find I have in short supply.

Al Gore

AND REMEMBER TOO

Sobriety's a real turn-on for me. You can see what you are doing.

Peter O'Toole

LIAISON REPORTS Continued on **PAGE 8**

Liaison Reports

Continued from **PAGE 7**

Mumbai meeting with participants from several partner and potential partner enterprises;. From left, Prashant Gupta (Tata Power), Paras Loomba (Global Himalayan Expeditions), Albe Larsen, Farid Khan, Ray Larsen, Sameer Nair (Gran Oorja), Sanjay Patki (ERDA), Mr. Mridul Pratihar, Mr. K.K. Chatterjee, Dr. Ranjan Sen ((Seva Bharati) and Ms. Rashmi Naik (CSR Links)

Smart Village Returns to India

In January 2016 Ray and Albe Larsen were invited to attend the Third International Conference on Renewable Energy Use (ICREU)at the Coimbatore Institute of Technology (CIT), Coimbatore, Tamil Nadu, India where Ray was the Chief Guest Speaker tasked with officially opening the conference, giving a keynote address on IEEE Smart Village's Energy, Education and Empowerment business model and running a half-day Smart Village workshop to teach students and delegates about Smart Village principles of creating and supporting sustainable businesses in remote off-grid or energy-impoverished areas. The students were particularly keen to learn about the program and many of them were already involved in charitable rather than business-model projects, but were eager to see the benefits of the Smart Village approach. In addition several students were keen to learn all they could about Ray's career in accelerator instrumentation, control and pulsed power systems and Albe's in magnetic confinement fusion. A particular highlight of the event was meeting Dr. Rama Ramakumar, a professor at Oklahoma State University, an early advocate of renewable energy who extended the invitation; his colleague at OSU Dr. Sunderesh S. Heregu, and our very gracious host Dr. E. Chandira Sekaran, Organizing Secretary (ICREU 2016), Associate Professor of Electrical Engineering at CIT which is reputed to be a top engineering university in India modeled after MIT.

Following the Coimbatore Conference, the Larsens along with Farid Khan, our Smart Village consultant for Southeast Asia, traveled to Bangalore to meet with Director of IEEE India Operations Harish Mysore and his impressive staff at their headquarters specifically to continue a discussion started in October 2015 to establish a satellite IEEE Smart Village India with IEEE India playing a key role in organizing and supporting the all-volunteer operation just as in the U.S. model. This collaboration also requires IEEE Foundation cooperation via the India office in order to move donated funds from the U.S. for new initiatives in India as well as to raise new funds in-country.

The trip concluded with an intense one-day meeting in Mumbai with potential partners from India's Energy Research and Development Agency (ERDA), Gram Ooorja, a for-profit already involved in village electrification; the TATA renewable energy program Director; CSR Links, a company that helps companies and fund seekers make matches to spend the Corporate Social Responsibility (CSR) funds mandated as 2% of profit for companies above a certain size to invest in India's social needs and others including Smart Village partner Global Himalayan Expeditions, and our colleague Farid Khan who is working to identify partners and villages as the first sites for Smart-Village initiated entrepreneurial businesses in rural India; and Ranjan Sen of Seva Bharati in Kolkata, a society for education, integrated area development and social change. The meeting was organized by ERDA President Sanjay Patki, who also graciously organized a similar smaller meeting in July 2015. The purpose was to hear presentations from all parties and then discuss IEEE Smart Village collaboration with all the attendees in various roles including supporting ongoing and new initiatives in UP, Gujarat, Maharashtra, Hyderabad and Kolkata; accessing CSR Funds; and collaborating with ERDA on product development, manufacturing engineering and formal qualification of ISV products for the India market and beyond. Our partner from Global Himalayan Expeditions presented four new products they have developed for remote villages which are candidates for ERDA qualification, along with a new Universal Portable Battery Kit design by a combination of partners in France, Bangladesh and the University of Arizona.

Overall this very fruitful trip will help develop and solidify partnerships to move the IEEE India program forward, a major objective of IEEE Smart Village for 2016.

Ray Larsen and Chandire Sekaran chat while ICREU treasurer, Dr. S.R. Sivarasu works.

IEEE India staff at Smart Village seminar

Professor Rama Ramakumar lights one of the candles opening the 2016 ICREU in Coimbatore, India

D. S. Vasantharathna, cochair of ICREU welcomes attendees

Chandira Sekaran and Rama Ramakumar

Paras Loomba, founder and CEO of Global Himalayan Expeditions, shows new DC products at Mumbai meeting while Farid Khan holds new LED light bulb

Dinner at the Ramakumars' ancestral home with Dr. Prabhakar Ramakumar, Secretary of CIT, the Larsens, Rama Ramakumar and Sunderesh Heregu of Oklahoma State University

Article

Plasma Medicine: Anecdotes From Behind the Scene

By Mounir Laroussi

This is not a technical paper about "Plasma Medicine." A few years ago I did publish a technical write-up in this newsletter about the field [1], but this time I am writing this article to answer a question that I get asked quite frequently: How did you get into doing research on the biomedical applications of plasma? Or sometimes it is phrased more like this: what drove you into using plasma for biological applications? The short answer is necessity, but this would shed very little light on the subject. So, let me give the particularly interested reader the longer version of the answer.

In 1994 I was finishing a post-doctoral project for Prof. Igor Alexeff at the University of Tennessee (my alma mater). That project was about studying the dielectric strength of an insulator that was used to coat high-voltage wires used in television sets produced by a certain company. This insulator kept failing and the company wanted to know why and how. The Electrical Engineering Department Chair (the academic department where Prof. Alexeff and I worked) liked me and saw some potential in me so he decided to convert my appointment from post-doc research associate to research assistant professor, an appointment backed and supported by Prof. Alexeff. I was very pleased of course, but this meant that I could no longer count on being solely supported by a senior professor but I needed to generate my own research and attract external research funding of my own. As many readers will know, that is a lot of pressure. So, for several weeks I kept asking myself what research topic should I tackle to kick start my "independent" research endeavors. One thing I was sure about: I wanted my research to be different and unique, but what? I had no idea. There were many interesting things I could think of but none would be quite unique.

A couple of years before (around 1991/1992) I was involved in designing and testing a dielectric barrier discharge that generated a diffuse large-volume, atmospheric pressure plasma, which we then used to treat the surfaces of materials such as plastics or cloth, mainly to render them more hydrophilic [2]. In the early and mid-1990s this line of research was novel and attracted the attention of the plasma physics community which was reeling from budget cuts in the nuclear fusion program and looking for other applications of plasma that would bear fruits in the short- term. Anyway, I thought that picking up such topic would be a great option for my independent research, but I needed to come up with a "new twist," a new avenue where such nonequilibrium plasmas might be applied. Then, one night it all suddenly came to me as if someone whispered in my ear what to do. I was putting my two young kids to bed, which I did every evening: I would turn off the light and sit on the edge of the bed until they fell asleep. That night, in August/September 1994 I was going through the same routine when my imagination started to slowly drift, aided by the darkness and silence of my kids' bedroom. My thoughts went like this: when we expose a surface to plasma we modify the structure of that surface at the molecular level. Surfaces are usually contaminated with microorganisms which are ubiquitous. I wondered what happened to the microorganisms that were surely everywhere on the surface under treatment. I resolved myself to find out. By then my kids were sound asleep, so I slowly slipped out of the bedroom, already working out plans in my head for my next move.

My knowledge in biology was quite limited. In fact I had not dealt with biology since high school. Therefore, my immediate move was to find a biologist who would be willing to help me. The University of Tennessee had an excellent center for environmental biotechnology under the direction of Prof. Gary Saylor, a prominent scientist in this field. So, the next day I stopped by the center (which was located off the main campus at the time) and met with Prof. Saylor. After explaining to him what I wanted to do, he thanked me for sharing my interesting ideas and told me that he would be in touch. A week passed, two weeks, a month, then two months and I did not hear back from Prof. Saylor. I thought that maybe he was not interested after all and maybe I should look for someone else to help me with my plans. Then, about three months after our meeting, I was in my office when I heard a knock on the door. A student entered my office and informed me that she was Prof. Saylor's graduate student and she was ready to offer me any help I needed with my experiments. To make a long story short, we exposed a bacterial culture to plasma (under low temperature and atmospheric pressure conditions) and found out that a few minutes' exposure killed all the bacterial cells. I knew then that I was on to something special. I wrote up my results and submitted them to the *IEEE Transactions on Plasma Science*. The paper was published in the June issue, 1996 [3]. Not long after the paper came out I got a phone call from none other than Prof. S. S. Block, who was then Emeritus Professor at the University of Florida. Prof. Block was known as the man "who wrote the book on sterilization and preservation" [4]. I could not believe that Prof. Block knew about my work and that he found it worthy of a phone call (I never did meet Prof. Block in person). I remember feeling so honored and thinking that I had to continue pursuing this line of research: I proved that plasma can kill bacteria but I still needed to figure out how and what it would do to other types of cells, such as human cells. But to do all this I needed money, funding from someone and I knew exactly who that would be.

Dr. Robert J. Barker (Bob) was a program manager at the Physics and Electronics Directorate of AFOSR. I met him a few years before as he funded my Ph.D. rese arch work. I contacted Bob and told him about the new work I was doing and informed him about the paper that I just published in the TPS on the subject matter. To my great surprise, Bob's reaction was almost instantaneous. He basically told me right then that he was very impressed with my idea and that he would do his best to find some money to fund such work. I already had an inkling that Bob was a visionary kind of guy (that is why I contacted him in the first place), but I could not believe that he would be so quick to take action and support this "not yet fully proven concept." But later, as I came to know Bob better, I realized that he was willing to take some risks if he believed in an idea and in the investigator proposing it. As he promised, Bob funded me (and few others) in 1997 to investigate the concept of using low-temperature, atmospheric-pressure plasmas for decontamination of media. The ultimate goal was to use plasma in forward-deployed field hospitals to decontaminate the wounds of soldiers and facilitate wound healing. Another goal was to decontaminate media and surfaces from biological and chemical contaminants including biological warfare agents. At this juncture, it is important to mention that Bob's timely support was critical in allowing this kind of research to advance as, frankly, the plasma-physics community at the time was rather hesitant to delve into biomedical research and therefore support would have been very hard to come by. In 2010, during the 37th IEEE International Conference on Plasma Science (ICOPS) I had the pleasure to present Bob with a plaque recognizing his crucial support to the nascent field of the biomedical applications of plasmas (see Fig. 1 above).

Fig. 1 Mounir (left) giving Bob Barker a plaque recognizing his early and crucial support to plasma medicine. ICOPS 2010, Norfolk, VA June, 2010.

In 2002, I was a researcher at the Applied Research Center of Old Dominion University (ODU). One day, the phone rang and on the other end of the line was Dr. Asoka Mendis, a well-respected astrophysics researcher at the University of California, San Diego. Dr. Mendis, whom I did not know at the time, told me that he read my work on the inactivation of bacteria by plasma and that he developed a model explaining my experimental observations, based on dusty plasma concepts. I was intrigued and, to make another long story short, Dr. Mendis (with his collaborator, Dr. Marlene Rosenberg) and myself collaborated on a paper that was published in 2003 in the *New Journal of Physics* (Institute of Physics, IOP) [5]. This paper got more than 2000 downloads in the first week it appeared online. It was later featured as one of the top papers published by IOP in that decade. Dr. Mendis (Asoka) and I became colleagues and through him I got to meet Prof. Gregor Morfill (Greg) of the Max-Planck Institute in Garching, Germany. Greg was a member of the editorial board of the *New Journal of Physics*. He was very impressed by our 2003 paper and thought that plasma could have a great future in biology and medicine. In 2008, both Greg and Asoka invited me to attend a conference they regularly helped organize on dusty plasma, and to deliver a talk on the biomedical applications of plasma. I accepted the invitation, and it helped that the conference was to be located in the Azores, fantastic Portuguese islands in the middle of the Atlantic Ocean. Figure 2 above (left picture) shows Asoka and me in the Azores during a field trip the conference organized to show us the thermal/volcanic activity that the Azores islands are known for. On a side note, at this conference I got to meet the famous plasma physicist, Prof. Padma Shukla (Ruhr University, Bochum). We developed a friendship that lasted until his sudden and unexpected death in January 2013 while he was in India to receive the highest honor from the Indian government. Following my talk Prof. Shukla told me that he was very enthusiastic about the possibility of plasma being used for biomedical applications. Below, to the right, is my picture with Prof. Shukla.

Fig. 2 Azores 2008. Left picture: Asoka Mendis (right) and I; Right picture: Padma Shukla and I.

Since the mid-2000s Greg Morfill had been taking the application of plasma in biology and medicine seriously and introduced it to his research group at the Max-Planck Institute. In 2009 he started organizing a workshop on the topic, held at the beautiful Ringberg castle in Bavaria. The workshop was attended by a network of labs selected by Greg from Russia, Europe, and the U.S. (my lab at ODU and that of Prof. David Graves, UC Berkeley). I attended two of these workshops which were fantastic opportunities to meet like-minded people and exchange ideas. It is important here to mention that Greg's group conducted the first-ever clinical trial on wound healing by direct plasma exposure in 2010. Prior to these trials, around 2007–2008, my group at ODU did some proof-of-principal experiments on wound healing using a multicellular organism, planaria, flatworm Dugesia tigrina species (work funded by AFOSR) [6]. In this work we showed that under low doses plasma does not have cytotoxic effects and allowed the wounds to heal and the worm to regrow its cut tail. However, it was Greg's group in Munich which applied plasma on human subjects for wound healing purposes for the first time, in 2010. These trials were conducted in Munich Schwabing hospital under the supervision of dermatologists Dr. Georg Isbary and Dr. Wilhelm Stolz [7]. The results of these trials were also a topic of a chapter of a book that Greg and I collaborated on. This was the first book ever to be dedicated entirely to the topic of plasma medicine and was published by Cambridge University Press in 2012 [8]. It is of note to also mention here that since 2012/2013 another German group at INP Greifswald (under the leadership of Prof. K-D Weltmann) has been conducting their own clinical trials on wound-healing using their own plasma device. As was the case for the Munich-based group, the trials conducted by INP have produced promising results. INP was also successful in getting their plasma generator certified as a medical device, which is a noteworthy milestone.

Parallel to Greg Morfill's Munich workshop I organized special sessions on plasma medicine at a medical conference known as NextMed which was held biennielly in Orange County, California. This conference is mainly attended by medical practitioners interested in cutting-edge technologies that can be introduced to the healthcare arena. Figure 3 on page 10 is a picture taken at a panel discussion during NextMed 2011. I am on the far right (foreground) and next to me is Greg Morfill. Next to Greg is Prof. Alexander Fridman (Alex) of Drexel University. Alex founded the Drexel Plasma Institute (DPI) in 2002 and by 2003 started

PLASMA MEDICINE Continued on **PAGE 10**

Plasma Medicine

Continued from **PAGE 9**

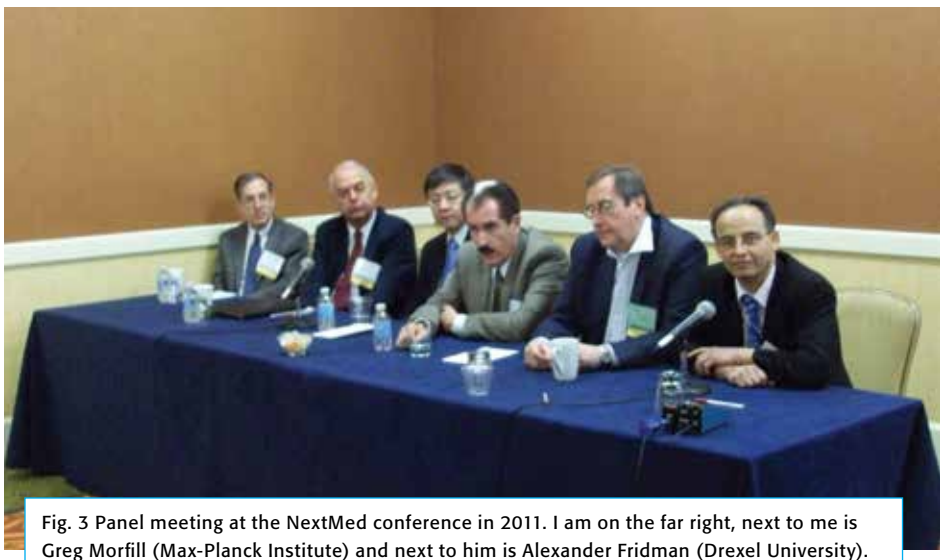


Fig. 3 Panel meeting at the NextMed conference in 2011. I am on the far right, next to me is Greg Morfill (Max-Planck Institute) and next to him is Alexander Fridman (Drexel University). To the far left is Mark Kushner (University of Michigan).

engaging in research on the biomedical applications of low-temperature plasma. In 2007 Alex and his group coined the short and catchy term "Plasma Medicine" to replace the long term that was used until then which was the "Biomedical Applications of Nonthermal Plasma." In 2008 Alex and I guest-edited the first journal special issue with the specific title "Plasma Medicine" [9]. Also of importance is that in 2007, DPI organized the first International Conference on Plasma Medicine (ICPM) that is dedicated entirely to the field of plasma medicine. Since the late 1990s and early 2000s the topic of the biological and medical applications of nonthermal plasma became increasingly part of many important and well-established plasma conferences (ICOPS, GEC, ISPC, ICPIG,…), but did not have its own dedicated conference until the establishment of ICPM in 2007.

To conclude, the above has hopefully given the interested reader a general idea about the advent of plasma medicine with interesting anecdotes of how various individuals played their role to shape the events that helped plasma-medicine research take root. Today a global community of researchers is engaged in this field. Applications ranging from sterilization/decontamination, wound healing, and dentistry are actively pursued by many laboratories in academia and industry. In addition to the experimental work, modeling work on plasma-cell and plasma-tissue interactions has also been attempted recently by Prof. Mark Kushner's group at the University of Michigan, Prof. David Graves' group at UC Berkeley, and Prof. Annemie Bogaerts' group at the University of Antwerp, Belgium. Most importantly and since the mid-2000s, low-temperature plasma has been under investigation as a possible cancer therapy. Many groundbreaking experiments conducted by various research groups showed that plasma kills cancer cells in a selective manner [10] – [18]. A nonexhaustive list of prominent centers/institutes/universities presently engaged in cancer research is: Nagoya University (Japan), INP Greifswald (Germany); Technical University of Munich (Germany); University of Antwerp (Belgium); Kwangwoon University (South Korea); University of Orleans, GREMI (France); University of Toulouse, LAPLACE (France); University of Paris XI and Ecole Polytechnique (France); University of Bologna (Italy); HuaZhong University (China), The University of York (UK); Queens University (N. Ireland); CSRIO (Australia); University of South Australia, Adelaide; George Washington University (USA); Jefferson University (USA); Drexel University (USA); Old Dominion University (USA); and University of California, Berkeley (USA). The literature also shows that some research activities on the subject are going on in Russia, the Middle East, and North Africa. Recognizing the importance of this work, Prof. Michael Keidar (George Washington University) and I (Old Dominion University) organized the first International Workshop of Plasma for Cancer Treatment (IWPCT) in March 2014. Since then this yearly workshop is becoming the main venue where researchers from around the world who are active in this topic meet, exchange ideas and build collaborations.

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