

NPSS NEWS

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2016 Nuclear and Plasma Sciences Conference Schedule

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20th Real-Time Conference

4–10 June, 2016, Padova, Italy

International Conference on Plasma Sciences

16–23 June, 2016, Banff, Alberta, Canada

Nuclear and Space Radiation Effects Conference

11–15 July, 2016, Portland, Oregon

Particle Accelerator Conference

9–15 October, 2016, Chicago, IL, United States
Cosponsored by APS DPB

Nuclear Science Symposium and Medical Imaging Conference

29 October–6 November, 2016, Strasbourg, France



President's Report

We have had several interesting events since the last issue of NPSS News, including an NPSS election, our NPSS Administrative Committee meeting, an IEEE Smart Village meeting, progress on our new NPSS journal, and a vigorous discussion over the future direction of IEEE.



John Verboncoeur
IEEE NPSS President

The results of our recent NPSS election are summarized elsewhere in this Newsletter, but I would like to take this opportunity to thank all those who offered their services to make our Society better. I congratulate those who have been elected to the AdCom Class of 2019, and look forward to greeting them at our first AdCom meeting in 2016. They are key representatives of their technical communities. For those seeking a way to support their technical community, I encourage you to seek out your conference general and technical program chairs to offer your services to help organize technical sessions and technical areas for conferences, and talk to the Editors-in-Chief, Associate and Senior Editors of your IEEE journals and volunteer to review papers. NPSS always needs energetic, quality volunteers.

A number of actions were taken at the recent NPSS AdCom meeting in Boston MA, USA, following

the 2015 Nuclear and Space Radiation Effects Conference (<http://www.nsrec.com/>). With the confirmation of AdCom, I recently appointed Ralf Engels, of Forschungszentrum Jülich GmbH, to the newly created position of NPSS Assistant Treasurer. He will assist NPSS Treasurer Ron Keyser in the increasing number of financial tasks it takes to run an IEEE society. A budget for the launch of *Transactions on Radiation and Plasmas in Medical Science* was approved, and will provide for services similar to other NPSS journals, including assistance for authors and editors, as well as no page charges.

In July, NPSS humanitarian initiatives guru Ray Larsen invited me to attend the IEEE Smart Village meeting at the IEEE Power and Energy Society (PES) annual General Meeting. We learned of the impressive expansion plans of Smart Village, which is engaged in providing lighting and device charging using Ray's solar charging platform, now looking like a polished commercial product. Short-term plans involve scaling up to 50,000 people, and longer term perhaps to one billion people, which is about the fraction of the world population that does not have access to electric lighting and device charging capacity. The impact on opportunities are real, as many people must travel long distances to charge their cell phones, often the only link to the outside world in rural communities. Electric lighting replaces use of dangerous combustible light sources, and provides educational and productivity opportunities to individuals in rural areas of developing nations.

PES proved gracious hosts, and very much appreciated the partnership of NPSS in this volunteer-driven effort. Look for the solar charging station at the upcoming NSS-MIC, and ask long-time NPSS Secretary Albe Larsen to tell you all about it. Bring your non-NPSS friends who wonder what impact one can have on the world!

We continue to make progress on our new joint NPSS-EMBS (Engineering in Medicine and Biology Society) journal, *Transactions on Radiation and Plasmas in Medical Science* (TRPMS). EMBS is kindly providing their expertise in helping us shepherd TRPMS through the approval system, as well as helping us get through the difficult process of listing the journal contents on PubMed, based on their recent experience. EMBS President Andrew Laine, EMBS Executive Director Laura Wolf, and I will attend the Technical Activities Board (TAB) Financial Committee meeting in New Brunswick in November to make the case for the TRPMS budget.

On 7th October, at the Michigan Institute for Plasma Science and Engineering (MIPSE) Annual Graduate Symposium in Ann Arbor, I had the honor of presenting an NPSS Chapter Founder's plaque to inaugural South Eastern Michigan NPSS Chapter Chair David Trescott, and a Chapter Founder's Certificate to Kimball Williams who led the organization of the effort in his self-described role of agitator. Both of these IEEE members exemplify the quality of our vibrant volunteer community. MIPSE, organized by Prof. Mark Kushner, also hosted Assistant Director of the Office of Science, Fusion Energy Sciences, of the Department of Energy (DOE), Ed Synakowski. Ed talked about transformational events in fusion that led to rethinking of what was possible, as well as discussing DOE priorities.

A vigorous discussion about the future of the IEEE and its leadership structure is ongoing. A number of perspectives are advocated by IEEE volunteers and IEEE staff, which could have profound implications on the way IEEE is run, how decisions are made, and

who makes those decisions. See the accompanying article by NPSS members Peter Clout and Harold Flescher, which provides a brief history, concerns about present reform efforts, and suggestions of where we might focus our efforts to improve the IEEE. With the recent ballot initiative to modify the Constitution withdrawn following concerns that it had not received broad discussion, we will continue to keep the NPSS informed of these efforts so that you can make an informed choice, if a future ballot initiative should be brought forward.

Finally, as I write this in mid-October, we are looking forward to our largest NPSS conference, the Nuclear Science Symposium and Medical Imaging Conference, scheduled for 2nd–7th November, 2015, in San Diego, CA, USA. As always, we look forward to a strong technical program and a companion program to explore the many interesting sights and attractions in the San Diego area. My family always enjoys the air craft carrier maritime museum, in addition to the zoo and beaches, where my then-13 year old took me surfing for the first time in over 30 years. Yes, that was just after we stopped using stone surf boards when fiberglass was invented, in case my students are asking.

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

I HEAR YOU

It is the province of knowledge to speak out and it is the privilege of wisdom to listen.

Oliver Wendell Holmes

Secretary's Report



Albe Larsen
IEEE NPSS Secretary
and Newsletter Editor

Since our next AdCom meeting will be held after this issue goes to press, I will report on the final AdCom meeting of 2015, our official Annual Meeting, in our March Newsletter. We will have met on November 7th, 2015 at the Town and Country Hotel in San Diego. This will be the last meeting of many held at this property over the years. We will also hold Financial Committee and Communication Committee meetings in conjunction with this meeting. And, as our President has noted in his column, it will be the first time that we will have a full Smart Village display. NPSS has been, along with the Power and Energy Society, the original supporters of what was initially the IEEE Community Solutions Initiative and which became IEEE Smart Village when it was adopted as an IEEE Foundation Signature Program a year ago, and when it added a substantive education component to the mix.

This is also the time when we say goodbye, with heartfelt thanks for their years of service, to AdCom members who have completed their elected terms, and to Technical Committee chairs who have also completed either elected or appointed

terms: Kay Chesnut—Radiation Effects; Christine A. Coverdale—Plasma Science and Applications; Mark T. Crawford—Pulsed Power Science and Technology; and John Sethian—Fusion Technology. Retiring TC chairs are: Dimitris Visvikis—Nuclear Medical and Imaging Science and Technology; Marty Shaneyfelt—Radiation Effects; and Juergen Kolb—Pulsed Power Science and Technology.

I would also like to take this opportunity to second John's warm welcome to our newly elected AdCom members, the Class of 2019: Monica Blank—Plasma Science and Applications (PSAC); Bryan Oliver—Pulsed Power Science and Technology (PPST); Ronald Schrimpf—Radiation Effects (RE); and, Christian Bohm, completing a vacated term as Transnational Committee. New TC Chairs will be Paul Marsden—Nuclear Medical and Imaging Sciences; Andreas Neuber—Pulsed Power Science and Technology; and, Allan Johnston, Radiation Effects. Look for the biographies of these individuals in the March 2016 Newsletter.

I strongly recommend that you read the article by Peter Clout and Hal Flescher on the history and possible future of IEEE and also watch for and participate in webinars, questionnaires and elections related to the subject. I, at least, don't want to wake up to find an IEEE that is alien to my needs and interests, simply because I wasn't watchful.

Our next Retreat and AdCom meeting will be held in Santa Fe, NM at the La Fonda Hotel, March 11th and 12th, 2016.

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

Trust Me

**Handsome and lovable,
smart and gregarious,
he stood tall, looking dapper but not too facetious
He wooed and seduced the large crowd
with his swagger and silky voice never too loud.**

**He promised a new era, happy and prosperous,
not politics as usual and no more games.
He said his opponent's ideas are so dangerous.
Follow them and the country will go down in flames.**

**Some years later he stood in front of the crowd again,
told them where he went wrong and how he will change.
"Vote for me," he said, "and I will safely steady this runaway train"
That's what he asked and so they did, isn't that strange.**

Mounir Laroussi

NUCLEAR & PLASMA SCIENCES SOCIETY NEWS

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Technical Committees

COMPUTER APPLICATIONS IN NUCLEAR AND PLASMA SCIENCES

The preparations for the next Real-Time Conference, taking place from June 6th–10th, 2016 in Italy, are underway. We will use the CERN InDiCo system for the entire conference management. The Abstract submission is scheduled to open on January 7th and close on February 14th, 2016. For the first time, we will let abstract submitters designate their abstract as “visa-sensitive.” That will lead to an expedited yes-or-no decision on the abstract, without necessarily deciding the final placement. We hope that this will avoid the visa issues that participants, especially those from China, have experienced in the past, where an accepted abstract is usually required to start the visa application process.

Meanwhile, the initial preparations for the 2018 Real-Time Conference, which will bring the conference back to the East Coast, have started. Jefferson Lab will host the meeting, and the conference chair will be David Abbott. After the initial setup, we have moved the conference venue to Williamsburg, VA, which is a highly attractive location to hold this meeting.

With this issue we are closing out the series of contributions to this newsletter from the student award winners from the last Real-Time Conference in Nara. Last but not least in the series is an article by Yasuyuki Sugiyama from the Osaka University in Japan.

Yasuyuki Sugiyama is a graduate student in the Physics Department of Osaka University. He received the Bachelor of Science and Master of Science degrees from the Osaka University in Japan in 2009 and 2011, respectively. He is working for the KOTO experiment, the rare kaon decay search experiment at J-PARC in Japan. Of particular interest is an extremely rare decay of a KL meson into a pion, neutrino, and antineutrino, a so-called CP-violating process that might help explain the abundance of matter over antimatter observed in the universe. Yasuyuki Sugiyama joined the KOTO collaboration in 2009, and developed its data acquisition system with his collaborators. The experiment saw its first physics beam in 2013.

Find his article towards the end of this newsletter. Also, I would like to thank the four student awardees for their interesting contributions to this newsletter: Marc-André Tétrault, Binxiang Qi, Diego Sanz, and Yasuyuki Sugiyama.



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.

NUCLEAR MEDICAL AND IMAGING SCIENCE AND TECHNOLOGY

The 2015 IEEE NPSS Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) has taken place at the Town and Country Resort in San Diego from the 31st of October to the 8th of November. There were a total of 518 submissions for the MIC with 104 and 359 accepted for oral and poster presentations respectively. Joint sessions, including NSS-MIC, NSS-RTSD, NSS-MIC-RTSD sessions were organized from Tuesday 3rd to

Thursday 5th of November. A short courses program covering different topics of interest in nuclear science and medical imaging was also included from the 31st of October to the 3rd of November. I would like to congratulate the organizing committee for this successful 2015 edition of our NSS/MIC meeting.

The 2016 IEEE NSS/MIC meeting is going back to Europe and will take place in Strasbourg, France from the 29th of October to the 6th of November. Maxim Titov and Patrick Le Du are the General and Deputy General Chairs. Dimitris Visvikis and Suleman Surti will serve as the MIC Program Chair and Deputy Program Chair respectively. The 2017 meeting will take place at the Hyatt Hotel in Atlanta and the General Chair will be John Aarsvold, while in 2018 the meeting will be going for the first time to Australia (Sydney). Finally, the process for the 2019 IEEE NSS/MIC meeting site selection has been completed and will be held for the first time in the UK and more specifically in Manchester.



Dimitris Visvikis
Chair NMISC

The newly elected Council members starting their three-year terms from 1st Jan 2016 are Roger Fulton, William F. Jones, Tom Lewellen, Emilie Roncali and Seiichi Yamamoto. I welcome them and look forward to their significant contribution within the NMISC. I would also like to thank those that did not get elected this year and encourage them as well as others to volunteer in next year's elections by contacting Andrew Goertzen, NMISC Secretary and Chair of the Nominations Subcommittee who is responsible for putting together the list of candidates every year.

This year's winner of the Bruce Hasegawa Medical Imaging Conference Young Investigator award is Se Young Chun, presently an assistant professor at UNIST in South Korea, for contributions to image reconstruction methods in the presence of object motion. The 2015 Edward J. Hoffman Medical Imaging Scientist Award is presented to Mike King, Professor of Radiology at the University of Massachusetts Medical School 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. My warmest congratulations go to both winners. I would like to take this opportunity to encourage you all to nominate worthy colleagues from our community for numerous awards which are available from IEEE and NPSS with deadlines end of January 2016. More details can be found at <http://ieee-npss.org/awards/npss-awards/> and <http://ieee-npss.org/awards/ieee-awards/>.

Finally, this will be my last newsletter as the chair of NMISC. Paul Marsden from King's College in London will be starting his two-year term on the 1st of January 2016. I have thoroughly enjoyed serving our community and contributing to the development of a new journal that will allow regrouping all NPSS activities in the medical domain including different radiation technology and application areas such as medical imaging and radiotherapy as well as plasma-based medical sciences. This journal will be the *IEEE Transactions in Radiation and Plasma Medical Sciences* (TRPMS) and will go live on the 1st of January 2017. I hope you will all help in making it a success.

NEVER MIND

What I do is all that concerns me, not what people think.

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

PULSED POWER SCIENCE AND TECHNOLOGY

The year 2016 is the year when the Pulsed Power Science and Technology (PPST) technical committee is finally implementing the transition to a fully elected committee. Accordingly we are looking for the help and participation of all NPSS members with an interest in Pulsed Power. In particular we are looking for colleagues who are interested in helping to shape the future of the PPST technical committee in the upcoming years including the form and content of the biennial Pulsed Power Conference and our technical cosponsored conferences. If this appeals to you or if you know of someone who is interested in contributing to the Pulsed Power Community in this way, I would like to ask you to consider running for one of the four positions that need to be filled for the term starting in 2017. If you aren't able to run, encourage your colleagues to do so. You will find an official call for nominations in the next newsletter but it's not too early starting to think about it.

After the official call for nominations has gone out in April 2016, we will collect nominations, including self-nominations, until July 1st. Subsequently we will prepare a ballot which will then be distributed by NPSS together with the other annual election material. If you have any questions about the work of the committee, every current and past member of the PPST technical committee will certainly be happy to answer them. (A list of the members of the committee can be found on the NPSS website: <http://ieee-npss.org/>) In fact if you ever wondered what the committee is actually doing, I would like to encourage you to get in touch with us anyway. We always like to hear about ideas and how to better serve the Pulsed Power Community.

Another topic with which I would like to ask for your help is in the nomination of students for the Arthur H. Guenther Award. This is an annual award and we are looking for the nomination of qualified students for the year 2016. More information on the award and on the nomination procedure can again be found on the webpage for our committee. A more detailed call for nominations can also be found elsewhere in this newsletter.



Juergen Kolb
Chair, PPST

In closing, I would like to remind you again of two conferences that are coming up this year and that are of interest to our community. Both of them are therefore technically cosponsored by NPSS. The first meeting is the IEEE International Power Modulator and High Voltage Conference (IPMHVC) which will be held in San Francisco, CA, from July 5th–9th, 2016 at the Palace Hotel. Then later this year the 6th Euro-Asian Pulsed Power Conference (EAPPC) will convene in Estoril, Lisbon, Portugal from September 18th–22nd, 2016 at the Estoril Congress Center. See the NPSS web site for further information.

Juergen Kolb, Chairman of the Pulsed Power Technical Committee can be reached by E-mail at juergen.kolb@inp-greifswald.de.

RADIATION EFFECTS ANNUAL REPORT

The IEEE Radiation Effects Committee (REC) held its annual Open Meeting on July 16th, 2015, at the Marriott Copley Place, Boston, during the 2015 Nuclear and Space Radiation Effects Conference (NSREC). The meeting included presentations from the general chairs of the 2014 through 2016 NSRECs, as well as changes in the Steering Committee following the election of a new Vice Chair and Secretary that was administered by the IEEE in May, 2015.



Allan Johnston
Chair, RESC

Marty Shaneyfelt, Sandia National Laboratories, the outgoing REC Chair, opened the meeting by recognizing the elected and appointed members of the Radiation Effects Steering Group (RESG) who had served the previous three years. These included Dan Fleetwood, Vanderbilt University, Past Chair; Allan Johnston, JPL (ret.), Vice Chair; Pascale Gouker, MIT Lincoln Laboratory, Secretary; Gary Lum, Lockheed Martin, Senior Member-at-Large; Paul Dodd, Sandia National Laboratories, Vice Chair for Publications; Teresa Farris, Cobham, Vice Chair for Publicity; Paul Dressendorfer, Sandia National Laboratories (ret.), Vice Chair for Special Publications; and John Stone, Southwest Research Institute, Vice Chair for Finance. At that point he turned the meeting over to Allan Johnston, who succeeds Marty as RESG Chair.

After recognizing Marty Shaneyfelt, who now becomes Past Chair, Allan introduced the newly elected RESG. Janet Barth, NASA Goddard Space Flight Center (ret.) is the new Vice Chair, and Paul Dodd, Sandia National Laboratory, is the new Secretary.

An election was held during the Open Meeting for a new Member-at-Large for the RESG. Tom Turflinger, Aerospace Corporation, is the newly elected Junior Member-at-Large. He joins Sylvain Girard, Université de Saint-Étienne, and Simone Gerardin, University of Padova, who are serving as Senior Member-at-Large and Member-at-Large, respectively.

Allan announced the general chairs for future NSRE Conferences: Robert Reed, Vanderbilt University, 2015; Véronique Ferlet-Cavrois, ESA-ESTEC, 2016; Ron LaCoe, Aerospace Corporation, 2017; and John Stone, Southwest Research Institute, 2018.

The General Chair of the 2015 Conference, Mike Xapsos, NASA GSFC, summarized statistics and highlights of this year's conference. A total of 484 people registered for the technical sessions, and 287 people attended the short course. There were 80 industrial-exhibits-only registrants, and a total of 163 registered guests.

The technical sessions featured 168 papers that were presented during the four-day conference; 46 oral presentations, 76 poster papers, and 39 poster presentations in the Data Workshop. Four tutorial presentations were given at the Short Course, held on Monday, July 13th. All short-course attendees received electronic copies of the course notes (provided on DVDs and memory sticks). The Industrial Exhibit, which had 54 exhibitors, was well attended.

Technical Committees Continued from PAGE 3

Robert Reed, Vanderbilt University, General Chair of the 2016 Conference, announced that the NSREC will be held at the Oregon Convention Center, in Portland Oregon, July 11th–15th, 2016. Some functions will also take place at the nearby DoubleTree Hotel. The conference will feature a technical program with ten sessions of contributed papers that describe the latest observations and research results in radiation effects. The program will include oral and poster papers, with a separate dedicated poster session where authors of poster papers can discuss their results with attendees. A

Radiation Effects Data Workshop will also be held, as well as an Industrial Exhibit. Attendees will also have the opportunity to participate in a one-day Short Course on Monday, July 11th. The theme for the short course is *Techniques for SEE Modeling and Mitigation in CMOS*. The short course is being organized by Ken Rodbell, IBM. Topics and presenters for the Short Course include:

- » **Space Environments**
Paul O'Brien
Aerospace Corporation

- » **Device Scaling**
Dr. Jerome Mitard
IMEC R&D Center
- » **Modeling Neutron and Heavy-Ion SER from Planar CMOS to FinFETs**
Dr. Klas Lilja
Robust Chip, Inc.
- » **Single-Event Modeling for Rad-Hard Design Flows**
Dr. Jeff Kauppila
Vanderbilt University Institute for Space and Defense Electronics.

The short course should be of interest to radiation effects specialists as well as newcomers to the field. Electronic copies of the short course notes will be distributed to short course attendees.

The most current information about the Nuclear and Space Radiation Effects Conference, including contact information and paper submission requirements can be obtained on www.nsrec.com.

Allan Johnston, Chair of the Radiation Effects Committee, can be reached by e-mail at JohnstonAH25@gmail.com.

Functional Committees



Craig Woody
NPSS Awards Chairman

AWARDS COMMITTEE

We are again soliciting nominations for our NPSS Awards for the coming year, 2016. NPSS offers a number of awards for exceptional contributions to our field or our Society. These range from the highest IEEE level awards, such as the IEEE Medal for Healthcare Innovations and Technology and the IEEE Marie Skłodowska-Curie Technical Field Award, to various Technical Committee and Conference awards. Information about all of these awards can be found on the NPSS website <http://iee-npsc.org/awards/>. The due dates for nominations vary according to the award, but the NPSS Society-level awards are generally all due at the end of January 2016. However, it takes time to put together an effective nomination, so it's time to start thinking about possible candidates and working on those nominations packages before the end of this year. There are also tips on our website on how to write a successful nomination.

There are also a number of grants sponsored by NPSS that are designed to help students and young researchers attend various NPSS conferences and Short Courses. The Paul Phelps Continuing Education Grants provide funds for students, postdocs and unemployed NPSS members to cover the cost of tuition and other expenses for Short Courses offered at NPSS conferences. Many of our conferences also offer NPSS Student Paper Awards for outstanding student contributions at our conferences. Details on how to apply for these awards and the Phelps Grants are given on the NPSS website. There are also numerous Technical Committee awards, as well as conference awards and travel grants, that are related to specific Technical Committees and conferences. Details for these awards are given on the individual conference or Technical Committee websites.

Please nominate one of your colleagues, or yourself, for one of the many NPSS awards or grants (self nominations are allowed for some of the awards... just check the details to be sure). The deadlines approach rapidly as the year ends, and it takes time to put together a good nomination package. It's a great opportunity to recognize some of the many outstanding colleagues in our field and to raise the level of prestige of our Society.

Craig Woody, Chair of the IEEE NPSS Awards Committee, can be reached by E-mail at woody@bnl.gov.

PULSED POWER SCIENCE AND TECHNOLOGY STUDENT AWARD

CALL FOR NOMINATIONS

Arthur H. Gunther Pulsed Power Student Award

Dear Colleague,

One of the greatest honors you can bestow on the distinguished up and coming members of our community is to nominate them for an award. The Pulsed Power Science and Technology Technical Committee (PPS&T/TC) honors graduate student contributions and achievements in the field of Pulsed Power with the annual Arthur H. Guenther award.

The 2016 Arthur H. Guenther award recognizes outstanding students in the field of pulsed power by identifying their unique achievements in the field of pulsed power science, engineering and technology development. The recipients of the 2016 award will receive their honor at the 2017 Pulsed Power Conference.

The deadline for nomination is January 31st, 2016. Information about the award is found at the website <http://iee-npsc.org/awards/technical-committee-awards/>. Click the link to the "Arthur H. Guenther Pulsed Power Student Award" to view instructions for submission. All nomination materials must be sent as PDF files to the attention of the Awards Committee Chair, Dr. Bryan V. Oliver, at the email address b.v.oliver@iee.org. Note: Eligibility for the student award requires that the nominee document school enrollment (one long semester minimum) in the calendar year for which the nomination is made.

I strongly encourage you to please look at the website for nomination information and take the time to identify one of the future leaders in pulsed power science and technology.

Sincerely,
Bryan Oliver
PPS&T Award Subcommittee Chair
b.v.oliver@iee.org
505.284.7868

2015 IEEE/NPSS Radiation Effects Award

Cheryl J. Marshall received a B.S. in Chemistry and Physics from Georgetown University in 1979 and a Ph.D. in Physics from the University of North Carolina in 1986. She has been primarily interested in displacement damage and single-event effects resulting from the natural space radiation environment in photonic devices and subsystems, first at the Naval Research Laboratory (1986-1998), and since then at the NASA Goddard Space Flight Center. Dr. Marshall retired from NASA in September 2013, and is currently volunteering as a NASA Scientist Emeritus mentoring other scientists in radiation effects in scientific sensors for satellites

Throughout her career, Cheryl has worked with colleagues at government, industry and university laboratories to develop an understanding of the effects of space radiation on advanced scientific focal plane assemblies and fiber optic data buss applications. The resulting knowledge combined with experimental and analytical techniques enables the on-orbit prediction of the performance of these technologies so that deployed subsystems can be designed to be robust during their mission lifetimes



Cheryl Marshall, NASA GSFC (ret.)
2015 Recipient of the Radiation Effects Award

Cheryl led advanced sensor efforts for the NASA Electronics Parts and Packaging (NEPP). She also supported the evaluation and qualification of scientific detector focal planes for numerous flight projects including the Solar and Heliospheric Observatory (while at NRL), a series of Hubble Space Telescope detectors, the James Webb Space Telescope, the GOES mission, the Landsat Data Continuity Mission instruments, and Solar Orbiter. Professional recognition includes a Robert H. Goddard Honor Award and three NSREC Outstanding paper awards. Cheryl has served the NSREC community as a reviewer, session chair, poster chair, short course presenter and technical program chair. Cheryl's efforts have contributed to over 100 peer-reviewed publications.

The Radiation Effects Award was established by the Radiation Effects Committee in 1988 to recognize individuals with a sustained history of outstanding and innovative technical and/or leadership contributions to the radiation effects community. The award was presented on July 14th at the 2015 Nuclear and Space Radiation Effects Conference.

Citation: *For contributions to the understanding of the basic mechanisms of displacement damage and single event effects in microelectronic and photonic devices.*

COMMUNICATIONS COMMITTEE

Eliminating Paper from NPSS Promotion and Recruitment

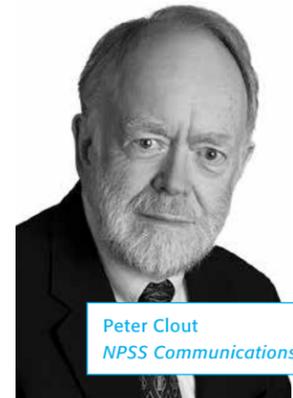
For many years we have been printing brochures and leaflets promoting our NPSS and IEEE activities. This has been done with the motive not only of recruiting members but also to promote our activities so that members of our communities are aware of all the advantages of being associated with IEEE, not only as a member. Over this time and through the economic ups and downs, the membership of NPSS has been essentially constant and certainly dead flat when compared to the performance of the financial markets of the world.

Almost one ton of paper a year was sent to members at renewal time and provided to conferences to stuff into the registration packets. In addition, a supply was provided to the membership table that we have at each of our conferences.

From personal experience, there are three outcomes for any document that is in the registration packet or shows up in the mail:

1. Clearly no interest, discard without reading.
2. Interested, read and discard.
3. Very interested, read and save to consult later.

Realizing that much is discarded, we are in the process of converting to paperless promotion and recruitment. As a result, more emphasis has been placed on our web site with the recent redesign and review of the content. In addition, we are developing an on-line membership form that incorporates the promotions that we and IEEE have for first-time new members joining at conferences as well as new items for the membership table.



Peter Clout
NPSS Communications Committee

Apart from the advantages of not preparing and printing so much literature, keeping the on-line information up to date is instantaneous and much easier to edit. Of course, we welcome any comments on the new approach - I am sure that we have not yet taken full advantage of the new paradigm.

A special thanks to Albe Larsen, Sal Portillo and Dick Kouzes for their involvement with these changes.

Peter Clout, Chair of the IEEE NPSS Communications Committee, can be reached by E-mail at clout@visita-control.com.

PUBLICATIONS COMMITTEE

Transactions on Plasma Science Upcoming Special Issues

- » December 2015 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 passed.
- » 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.

» 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.

» 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, Chinese Academy of Sciences)—Status: Submission deadline passed.

» June 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 (XL Scientific, Albuquerque NM USA), and Theodore Grabowski (Air Force Research Laboratory, Directed Energy Directorate, Kirtland AFB, NM, USA)—Status: Submission deadline passed.

» 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 30 November 2015.

» 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 2015 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)—Status: Submission deadline 31 March 2016.



Steve Gitomer
TPS Editor-in-Chief
IEEE Transactions on Plasma Sciences

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I HEAR YOU

It is the province of knowledge to speak out and it is the privilege of wisdom to listen.

Oliver Wendell Holmes

Liaison Reports

EAB Education Liaison Report



Edl Schamiloglu
IEEE NPSS Educational Activities Board

education, university education, professional education, education about standards, and support for women in engineering. The year begins with the first formal meeting of the Board in February during the IEEE Board Series meetings, where policies are agreed and programs established for the constituent activities of EAB. [For some insider information I recommend reading: T.S. Durrani, “A Year in the Life of the IEEE Educational Activities Board,” *IEEE Signal Processing Magazine*, vol. 29, pp. 88-89 (2012).]

IEEE EAB

The IEEE Educational Activities Board (EAB) is one of four major Boards of the IEEE; the others are the Technical Activities Board, the Publication Services and Products Board, and the Member and Geographical Activities Board. The EAB is concerned with the complete spectrum of educational activities, ranging from support for precollege/university

IEEE POSITION PAPERS ON EDUCATION

The EAB recommends policies on educational matters and implements programs specifically intended to serve the educational pursuits of IEEE members, the engineering and scientific communities, and the general public.

The following position papers were approved by the IEEE Board of Directors and endorsed by IEEE Educational Activities:

- » IEEE Position Paper on Accreditation of Academic Programs in ECT:
- » Describes views of IEEE on accreditation of educational programs in engineering, computing and technology.
- » IEEE Position Paper on the First Professional Degree in Engineering:
- » Describes the practice of obtaining the first professional degree in engineering.
- » IEEE Position Paper on the Roll of Technical Standards in Education:
- » Defines the desired role of technical standards in engineering, technology, and computing within engineering, technology, and computing academic curricula in the technical areas of interest of IEEE.

They can be accessed at:

https://www.ieee.org/education_careers/education/eab/position_statements.html

ACCREDITATION

The EAB also serves as the IEEE interface in education-related matters with external bodies and is responsible for administration of the annual assessment paid to ABET, Inc., (formerly Accreditation Board for Engineering Technology, Inc.).

EA INSIGHT

The EAB publishes a newsletter three times a year entitled EA Insight and these can be downloaded at: http://www.ieee.org/education_careers/education/eab/42177099.

Edl Schamiloglu, NPSS’s liaison to the EAB, can be reached by E-mail at edls@unm.edu.

Articles

Why Change IEEE Simply for the Sake of Change?

IEEE was created in 1963 by the merger of the IRE (Institute of Radio Engineers) and the AIEE (American Institute of Electrical Engineers).



Peter Clout
NPSS Communications Committee

Peter Clout and Harold Flescher

IEEE BACKGROUND

In creating the merger, equal weight was given to technical activities (conferences and journals) and geographic activities (local meetings and lectures,

local conferences). At the merger, of the 150,000 members, 140,000 members resided in the United States. Basically the structure we manage IEEE with today is a creation of the merger.

IEEE STRUCTURE

IEEE has what some of us call four major membership Boards;

Technical Activities Board (paid members of all of the technical societies including NPSS automatically belong)

Membership and Geographic Activities Board (all IEEE members automatically belong).

IEEE-USA - United States IEEE members belong to IEEE-USA, which serves these members by being a resource for achieving lifelong career vitality and by

providing an effective voice on policies that promote U.S. prosperity.

Standards Association We also have many members involved in developing and publishing standards.

There are small numbers of members involved in:

PSPB (Publications Services and Products Board) oversees IEEE’s publications and publication products.

EAB (Educational Activities Board) recommends policies on educational matters, implements specific programs and manages our ABET involvement.

The **IEEE Board of Directors** is made up of the Vice Presidents of these Boards (6), Regional and Divisional Directors elected by the members from TA and MGA (20), the past/present/next President of IEEE (3), a Secretary and Treasurer (2). There is no staff on the IEEE BoD. So the BoD is 31 people in total, 11 of whom are specifically Directors and VPs from TA and MGA. Thus the majority of the IEEE BoD today specifically represents the membership of the societies and the membership of geographic activities. We are the members for whom we believe IEEE exists, and through our members we serve



Harold Flescher
NPSS Communications Committee

the ultimate purpose of IEEE which is to benefit humanity.

It is important to note that all of the activities of these six Boards are overseen by volunteer IEEE members who set policies and approve all major decisions. The staff of these Boards are today responsible for implementing the policies set by the volunteers

This structure has allowed IEEE to grow from the original 150,000 members to over 400,000 members today, with fewer than half of our members coming from the United States. Because of our conferences and publications IEEE is a \$400 million dollar not-for-profit corporation. Obviously our structure and our members have created a very successful organization that publishes 33% of all of

IEEE Change Continued from PAGE 5

the technical literature in the fields of interest IEEE supports, financially sponsors over 600 conferences a year and co-sponsors an additional 800 conferences each year. That growth has required hiring staff that are more capable of managing companies of this size, but we must be very careful to protect the way we operate so we don't become just another company, run by staff!

We are very successful in part because of how we are organized and because of the hard work of our volunteers, and because the volunteers are responsible for the policy and direction of IEEE.

Several times in the past the IEEE BoD has looked at reorganizing the Board of Directors and/or its structure, but all have failed because no one could answer the most basic two questions:

» *What are the problems we are trying to solve with reorganization?*

» *How will the reorganization model selected solve these problems?*

There have been at least three movements for structural change in the last six years, some IEEE leaders dream of a significant reorganization of the governance of the IEEE. We are going round the loop again with a committee of the Board, chaired by Barry Shoop, President-elect, working on creating significant change. After the Board meeting in early October the current proposal is available as a set of slides at <http://taops.ieee.org/operations/ieee-in-2030.html> (but one does have to sign into your IEEE account first.) What follows is a response to the set of slides and we suggest that you review these first before reading on.

Why is this important? Do these proposed changes answer the two most critical changes mentioned above? What are the problems we are trying to solve and how does this reorganization solve these problems? Changes in governance inevitably lead to changes in the balance of power and while this is not necessarily bad, it does have to be understood and the consequences thought through.

We obviously haven't seen anything that tells the members how the balance of power will change. Most important to us is whether the societies will still have the ability to control our revenue stream and to plan our annual activities ourselves.

A number of senior members of the volunteer leadership have been discussing this on a Yahoo group (IEEE2020) and what follows is our input colored by others' comments.

1. The case for change—The only case made is that the Board needs to be more nimble to face the uncertain and increasingly complex future. Peter Drucker liked the measure of management effectiveness and from our vantage point nimble is only one component of effective. Another dimension not mentioned is quality. The group has interpreted information from The Board Source to achieve their ends of change, while many of us have looked at the data that we believe shows that both big and small Boards are equally effective. Still, there are no data to support the need for change and no discussion of the nonexistent data and where it might lead. The case for the very significant change being proposed is simply missing. Each of us knows of small problems that could be fixed, but this reorganization may or may not fix these.

So, where has the Board royally screwed up in the recent past? Where has it missed the boat? How could the Board being proposed have assured that these bad things would not have happened?

2. Covering up poor leadership—The Board is run by the President, and if there have been any lapses in the past one should first look at the leadership and show that the leadership tried but was defeated by the Board. The only instances we am aware of where the Board overturned the initiative of the leadership was when the Board proposed very significant changes to the Board structure in 2010 and 2014. It is said that those who ignore history are destined to repeat it.

3. Board size—When comparing with other organizations, one has to be careful to ensure that one chooses organizations that are at least as

effective and successful as IEEE and are comparable. As we said before, IEEE Board has 31 voting members, 20 of whom come from the 10 regions of MGA and the 44 societies and councils of TA. We think that it is who is on the Board and what they bring to the Board that is important, and from the many corners of IEEE it is impossible to cover all with a much reduced size. The arguments on Board size are inappropriate and irrelevant. The Board should be the size IEEE needs not the average from a consultant's table (where the range in sizes was a factor of more than 4)

4. Board function—One has to remember that IEEE is a volunteer-run professional organization. No volunteer is depending on the salary from IEEE (\$0) to pay the mortgage or put their children through college. Volunteers can, if disgruntled, just walk—and this has happened, even with a whole community. The function of the Board is to manage the support of these volunteers and provide the ecosystem so that their professional contributions can flourish. The Board should also stimulate involvement in new areas that the volunteers miss. The Board (or any sub-Board) is not a command and control body. There is no absolute chain of command.

5. Member representation—We believe that this is greatly reduced with the proposal, which is the exact opposite of what the proponents say. The slate comes from the Nominations & Appointments Committee, the makeup of which is in part controlled by the IEEE Past President, and the nominations are reviewed by the Assembly (the Directors elected by the membership). Currently TAB and the Divisions choose the TAB-VP and Division Director slates and now this would be out of their control. This process of nomination is similar for the Regional Directors where the Regions select their slate for the election. Each of the OUs, like TAB, MGA, Standards, etc select their own leadership, so what is the problem being solved by massive change?

6. Long presentation errors—We found the use of mumbo-jumbo in the early slides—the use of trademarked words that hide a lack of understanding or attempt a snow-job. Words should communicate and these do not. We found factual errors and at least 16 slides that are totally irrelevant to the issue.

The elimination of the election period was introduced with no discussion while many have found this to be a most useful period and would strongly challenge this change.

7. Adding Complexity—The Enterprise Board adds complexity to the current three-board management (Board, Assembly and the Management Council)

SUMMARY:

This proposal needs much more consideration by a wider group than the few on the committee. The absence of the proposed changes to the Constitution and Bylaws is a problem for that is where the changes take root. The last set of changes from 2014 was judged by many to be a disaster. Worse yet was the secrecy in which the change process was done, hiding from most of us that there was to be a vote as part of the annual election to massively change the Constitution from November 2014 until spring 2015. A successful effort was made by many to get the IEEE Board of Directors to rescind having the Constitutional change from this year's election ballot. We didn't even find out that there was a ballot issue until this spring, so these days we are living in an IEEE world of great distrust between the high level leadership and the OUs (operating units like Technical Activities). Technical Activities (TA) is responsible for between 70% and 85% of total IEEE revenues, so one would think that TA should have a big stake in any major organizational change decision. The silence since June and the minimal and flawed information now available just weeks before the Board Series in New Brunswick make this still a work in progress, leaves one with the distaste previously created by the insane secrecy of any change issue these days, and one that should either be continued next year with a view to a member vote in 2017 or it should be scrapped. Too many fears are raised by the recent history and this slide deck. It will take time to address these issues. Now this leaves one with the distaste previously created by the insane secrecy of any change issue these days.

The world is complex and so is the IEEE!

Peter Clout can be reached by E-mail at clout@vista-control.com and Harold Flescher can be reached by E-mail at halflescher@icloud.com

Richard Kouzes and Jinyuan Wu Present IEEE Distinguished Lectures at Technical University of Panama



Richard Kouzes
IEEE NPSS Webmaster

Dr. Richard Kouzes and Dr. Jinyuan Wu travelled to Panama to present two lectures each, supported by the Institute of Electrical and Electronics Engineers (IEEE) Nuclear and Plasma Sciences Society (NPSS). Drs. Kouzes and Wu are Distinguished Lecturers (DL) for the NPSS and, as such, present lectures to IEEE member Sections and Chapters with financial support of the IEEE NPSS. Descriptions of the DL program can be found on the IEEE NPSS web site at <http://ieee-npss.org/distinguished-lecturers/>.

The Technical University of Panama (UTP) Student Branch of the IEEE invited Drs. Kouzes and Wu to provide Distinguished Lectures on their campus as part of Electrical Engineering Week at UTP. UTP is the engineering university for the country of Panama. In addition, the IEEE Engineering in Medicine and Biology Society (EMBS) Branch in Panama took advantage of the UTP invitation to invite Dr. Kouzes to provide a second talk to an EMBS Branch meeting. The Branch members are

professional engineers working in various companies and organizations in Panama. Dr. Wu provided a second talk to UTP faculties and a SENACYT official at SENACYT.

Dr. Kouzes presented two talks. The first, "Neutron and Gamma Ray Detection," was presented to the EMBS Branch meeting. The second, "Radiation Detection and Its Application," was presented to the UTP students.

Dr. Wu presented two talks. The first talk, "Conventional and Unconventional Applications of FPGA," was presented to the students at UTP. The second talk, "Conventional and Unconventional Applications of FPGA—Advanced Topics," was presented at SENACYT the Panamanian National Secretariat for Science, Technology and Innovation.

The first day in Panama, Tuesday September 1st, 2015, included the talk by Dr. Wu to the UTP students and a visit to Dr. Carlos Aguirre Bastos at SENACYT, the Panamanian equivalent of the National Science Foundation, which provides research funding to academic institutions in Panama. We discussed the research efforts supported by that organization. This was followed by the talk by Dr. Kouzes to the EMBS Branch.

LECTURES Continued on PAGE 7



Students at UTP preparing to hear Dr. Wu's talk

Lectures Continued from PAGE 6

The second day, Wednesday September 2nd, 2015, included the talk by Dr. Kouzes to the UTP engineering students and discussions with the students and faculty. This was followed by a tour at

the Panama Canal hosted by Enrique Tejera, one of the founders of the IEEE Section.

The third day, Thursday September 3rd, 2015, included the presentation by Dr. Wu at SENACYT.

Through discussions with the UTP faculty and funding agency, we learned that most young faculty at UTP received their training in the U.S. funded by

government grants. On returning to Panama, these faculty members have an obligation to work for an equivalent amount of time as their educational support that was provided. These faculty members are expected to obtain research grants, which is a difficult process, and research facilities are limited. There would be mutual benefit if cooperative research opportunities existed for graduate students and postdocs at U.S. national laboratories.

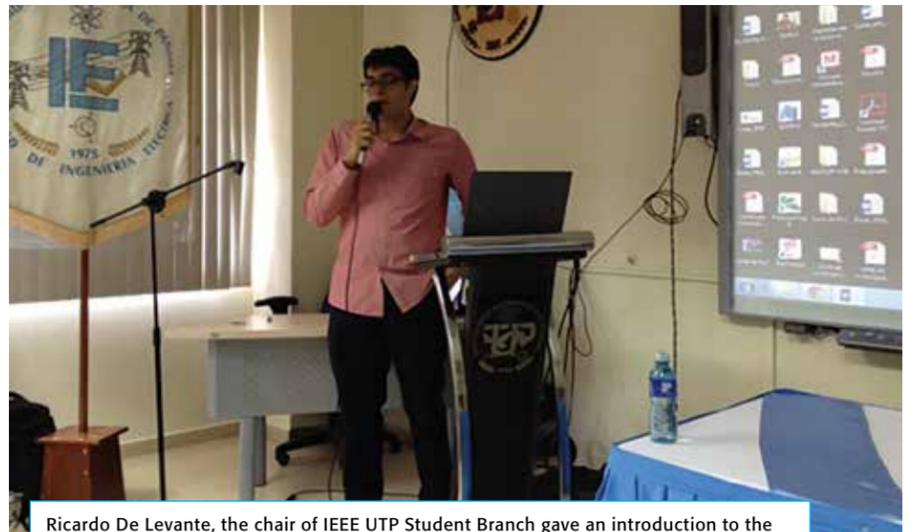
Richard Kouzes, IEEE NPSS Distinguished Lecturer and Web Master, prepared this report and can be reached by E-mail at rkouzes@pnnl.gov.



After the talk by Dr. Wu at SENACYT



Dr. Wu and Dr. Kouzes with UTP hosts.



Ricardo De Levante, the chair of IEEE UTP Student Branch gave an introduction to the presentation of Dr. Kouzes

The Data Acquisition System for the KOTO Experiment



Yasuyuki Sugiyama
Real-Time Conference Student
Paper Award Recipient

When matter and antimatter got created in the early universe, the naive expectation from the symmetries of physics would be that both should have been generated in equal amounts. However, we see the universe around us made of matter. There must be some mechanisms that create a small surplus of matter over antimatter. The vast majority of physics processes, such as the creation of an electron-positron pair from a photon, make the same amount of particles and anti-particles. What it takes are physics processes that do not obey that rule, which are said to violate (or "break") the "CP symmetry."

In the Standard Model of particle physics, the broken symmetry is explained by the Cabibbo-Kobayashi-Maskawa (CKM) model. The magnitude of this CP asymmetry predicted by the model, however, is not large enough to explain the abundance between particles and anti-particles that we observe. This is why we are looking for other CP-violating processes that could account for the amount of matter left in the universe

The KOTO experiment is a new kaon decay experiment at J-PARC in Ibaraki, Japan. Its goal is to find a particular decay mode of K-Long mesons ($K_L \rightarrow \pi^0 \nu \bar{\nu}$) and measure its branching ratio. The $K_L \rightarrow \pi^0 \nu \bar{\nu}$ decay mode is predicted by the Standard Model but is so rare that it has not been observed yet. The Standard Model predicts the branching ratio to be $(2.43 \pm 0.39) \times 10^{-11}$

To detect this rare decay, we use the high-intensity proton beam delivered from J-PARC to produce KLs. The requirement for the Data Acquisition system is to record the information of events with low noise and pile-ups under high counting rate conditions. Misidentified decays generate background events, which have to be taken into account and corrected for. A data acquisition with low dead time is required to cope with the high counting rates expected for the detector in the high-intensity beam from J-PARC Main Ring

To satisfy these requirements, we designed new readout and trigger electronics systems based on a waveform digitization and a pipelined readout.

The hardware modules of the data acquisition system are fully pipelined and process the data with FPGAs to reduce the deadtime.

Figure 1 shows a schematic view of the KOTO data acquisition system. A total of 4000 channels of output signals from the detector subsystems are digitized with 14 bit 125 MHz Flash ADC modules. The trigger system has three levels that use the waveform information to make a trigger decision of increasing sophistication at each level.

Figure 2 shows the layout of the KOTO data acquisition system at the Hadron Experimental Facility (Hadron Hall), where the KOTO detector is located. In the Hadron Hall, the ADC system is placed near the detector, and the Level 1/Level 2 trigger systems are placed outside of the concrete shield. A PC farm for the Level-3 Trigger is placed at the KOTO counting room located outside of the Hadron Hall

In order to reduce the effect from noise and widening of pulses during the transmission through cables, the analog output signals of detectors are converted from single-ended signals to differential ones by converter modules placed near the vacuum

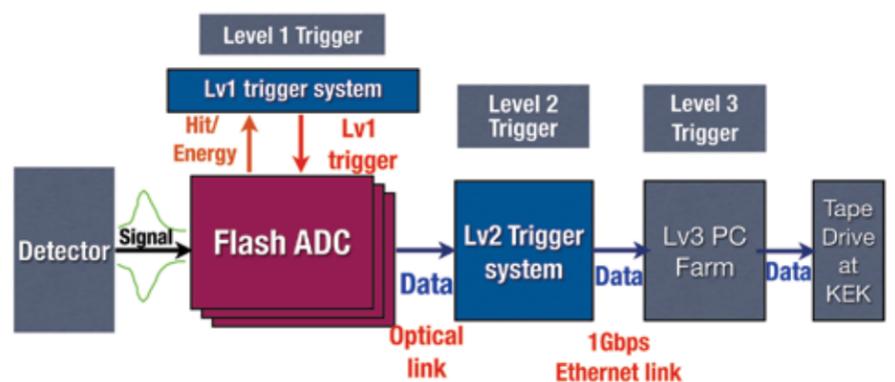


Figure 1

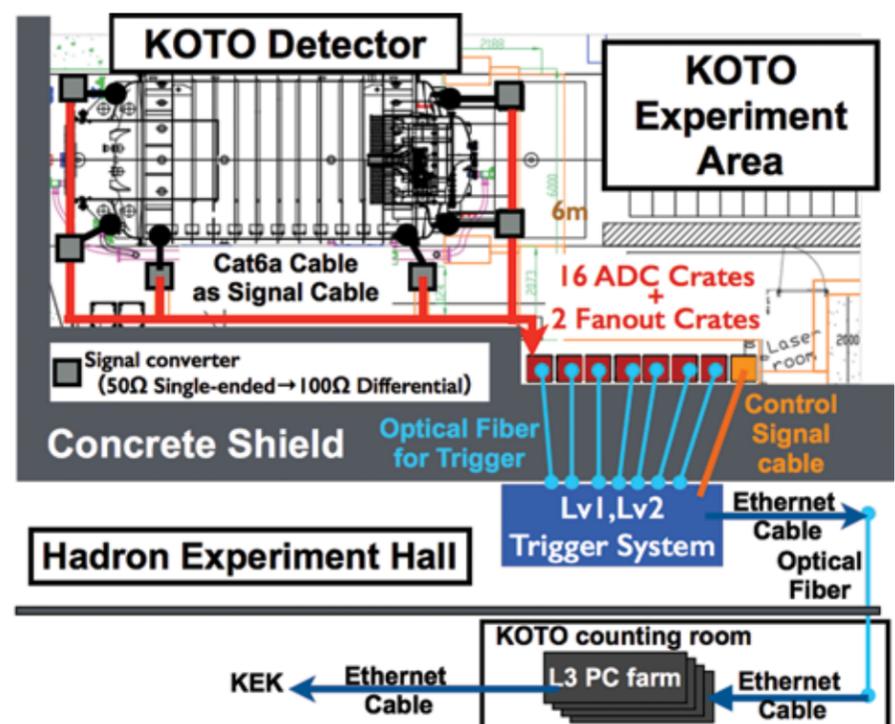


Figure 2

KOTO Continued from PAGE 7

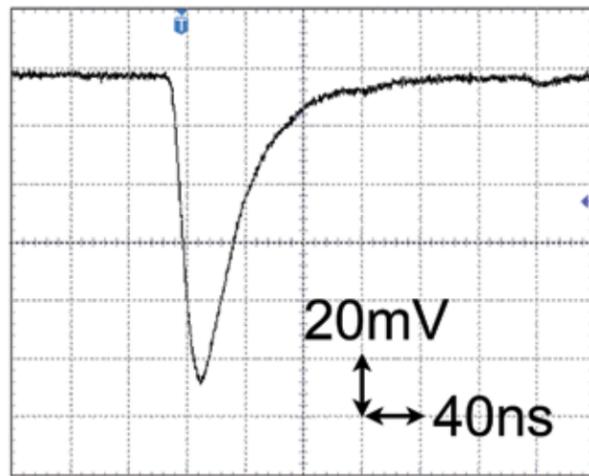
feed-through for the detector. For the analog signal we use commercial Category-6a Ethernet

cables, which are designed for high-speed digital transmission and have very stringent requirements on the signal transmission quality. In each Ethernet cable, two shielded twisted pairs are used to transfer the analog signals from two detector channels. The differential analog signals from detectors are digitized by 125 MHz 14 bit ADC modules[6]

Without pulse shaping, the 125MHz digitization is not fast enough to get a good enough timing resolution from the short pulses generated by the CsI crystals used in the detector. In order to increase the number of sampling points in the leading edge of the signal, we introduced a ten-pole Bessel filter before the ADC chip. The filter widens the input signals to a Gaussian-shape with a FWHM of about 64 ns (Fig. 3). With this technique, a timing resolution around 1 ns can be achieved with the 125 MHz sampling rate.

The digitized waveforms of detectors are used not only to obtain the energy and timing information, but also used by the trigger system to generate a trigger decision. The waveform data are stored in pipelines in the ADC module while waiting the trigger decisions.

The KOTO trigger system consists of three levels. The first two levels are implemented as special trigger hardware modules. The systems use a high-speed readout with an optical-fiber link and one Gbit Ethernet to transfer the data between the hardware modules. The first-level trigger decisions are made every 8 ns, by comparing the energy and hit information of the detectors collected from all the ADC modules.



The second-level trigger decisions are made based on the recorded waveform information of the event collected from the ADC modules by optical fibers. The third-level trigger decision is generated by the PC farm, where the full information of events from all the second-level trigger modules is available. The data of events that pass all trigger decisions are transferred to tape storage at the KEK Computer Research Center.

The KOTO experiment performed the first physics run in May 2013. The data acquisition system worked stably during the run with a deadtime of 17%. In order to increase the data recording rate and to further reduce the deadtime, we are planning an upgrade of the data acquisition system. We are looking into the possibility of data compression in the ADC modules, and upgrade the front-end networks to Infiniband. The development for these upgrades is under way.

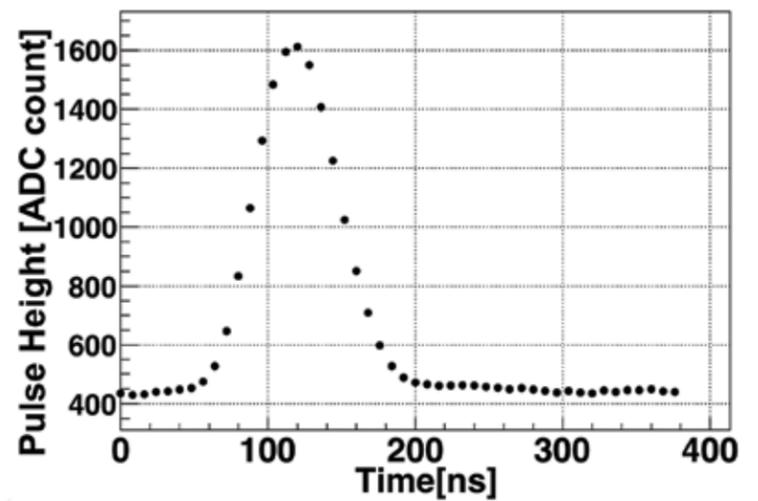


Figure 3

FOR FURTHER READING:

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BUT THEY DON'T LISTEN

The priest persuades humble people to endure their hard lot; the politician urges them to rebel against it; and the scientist thinks of a method that does away with the hard lot altogether.

Max Perutz

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Publicity releases for forthcoming meetings, items of interest from local chapters, committee reports, announcements, awards, or other materials requiring society publicity or relevant to NPSS should be submitted to the Newsletter Editor by January 5th, 2016 for publication in the March 2016 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.