NPSS NEWS

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International Conference on Plasma Science, to be held in Atlantic City, New Jersey, USA

The 44th annual IEEE International Conference on Plasma Science (ICOPS 2017) will be held from May 21st to May 25th , 2017 at the world-famous resort city of Atlantic City in the State of New Jersey on the east coast of the United States of America.

The General Chair of ICOPS 2017 is Dr. Jose L. Lopez of Seton Hall University, USA. Dr. Kurt H. Becker of New York University, USA serves as the Technical Program Chair. An electrifying scientific program is planned for the 2017 meeting covering seven technical areas:

1 *Basic Processes in Fully and Partially Ionized Plasmas* chaired by Dr. Wei Dong Zhu of Saint Peter's University, USA.

2 *Microwave Generation and Plasma Interactions* chaired by Dr. Sarita Devi Prasad of the University of New Mexico, USA.

3 *Charged Particle Beams and Sources* chaired by Dr. Evgeniya Lock of the U.S. Naval Research Laboratory, USA.

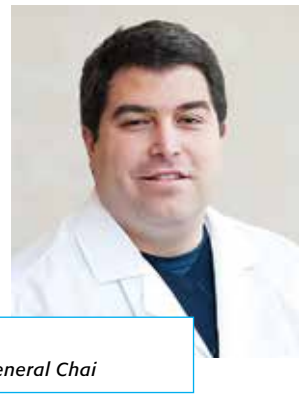
4 *High Energy Density Plasmas and Applications* chaired by Dr. Christine Coverdale of Sandia National Laboratories, USA.

5 *Industrial, Commercial, and Medical Plasma Applications* chaired by Dr. Gregory Fridman of Drexel University, USA.

6 *Plasma Diagnostics* chaired by Dr. Achim von Keudell of Ruhr University, Bochum, Germany.

7 *Pulsed Power and Other Plasma Applications* chaired by Dr. Tao Shao of the Chinese Academy of Sciences, China.

The selection of the State of New Jersey for ICOPS 2017 is very special in many ways, particularly because several important discoveries in the early historical development of plasma science and technology occurred in New Jersey. Such early plasma science pioneers as Irving Langmuir and in later years Lyman Spitzer worked in New Jersey. Further, there is a large concentration of plasma researchers throughout New Jersey particularly connected with the U.S. Department of Energy's Princeton Plasma Physics Laboratory. The location of Atlantic City with its close proximity to the New York, Philadelphia, and Washington D.C. metropolitan areas will allow for a greater participation than usual due to the large concentration of plasma science researchers in this region of the United States. Further, the comprehensive transportation hubs in the region will allow for easy access of many international plasma researchers from all over the globe.



Jose L. Lopez
Conference General Chai

ICOPS 2017 is therefore a singular forum to experience and showcase the most important and exciting discoveries in contemporary plasma science, to engage with the world's leading experts, and to update one's own understanding of how today's plasma science impacts science policy, industry, and society at large. The technical program of ICOPS 2017 will be anchored by seven notable plenary sessions and a program of invited talks (to be selected from abstracts submitted), many given by prominent scholars, international award winners, and Fellows of IEEE. The confirmed plenary sessions for ICOPS 2017 will be given by international, award-winning leaders in plasma science:

CONFERENCES Continued on **PAGE 2**

Conferences Continued from **PAGE 1**

Meyya Meyyappan
2016 IEEE NPSS Merit Award

Chandrashekhar Joshi
2017 IEEE Marie Sklodowska-Curie Award recipient

Alan Phelps
2017 Plasma Science and Applications Committee (PSAC) Award recipient

Kurt H. Becker
Technical Program Chair

» Dr. Meyya Meyyappan of NASA Ames Research Center, USA, recipient of the 2016 IEEE Nuclear and Plasma Sciences Society (NPSS) Merit Award

» Prof. Chandrashekhar Joshi of the University of California - Los Angeles, USA, recipient of the 2017 IEEE Marie Sklodowska-Curie Award

» Prof. Alan Phelps of University of Strathclyde, UK, recipient of the 2017 Plasma Science and Applications Committee (PSAC) Award

» Prof. Alexander Fridman of Drexel University, USA is a plenary speaker who will focus on work in plasma chemistry.

» Prof. Filippo Capolino of the University of California–Irvine, USA, will discuss research in plasmonics and in metamaterials.

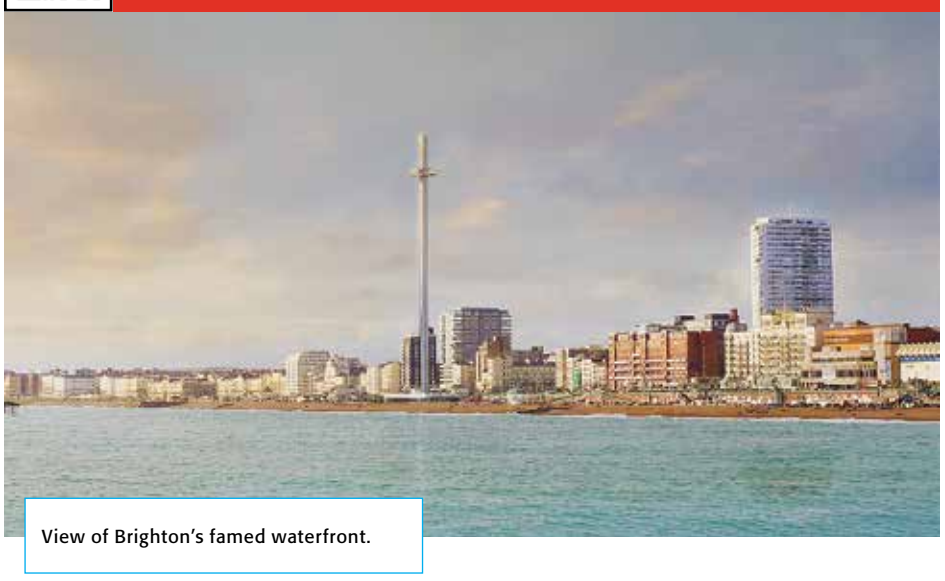
The authors of plenary and invited papers presented at ICOPS 2017 will be invited to publish, subject to the usual peer-review process, in a future issue of the IEEE Nuclear and Plasma Science Society (NPSS) journal IEEE *Transactions on Plasma Science*. Aside from the technical program, this year's conference will host two professional networking and social events: on the evenings of Monday, May 22nd, 2017 there will be an IEEE Women in Engineering (WIE) Event and on Tuesday, May 23rd, 2017 the IEEE Young Professionals Symposium. In addition to the conference, a one-and-half day minicourse on charged-particle beams and high-powered pulsed sources will be offered by world-renowned experts. The very high level of interdisciplinary expertise shown both in the background of the minicourse instructors and the topics of the minicourse makes it an exceptionally rare opportunity for participants to gain an in-depth understanding of the scientific phenomena, the opportunities, the applications, and the challenges in this scientific field of charged-particle beams and high-powered pulsed sources.

Atlantic City, a major resort destination, needs no introduction. Its Boardwalk is famous worldwide and and the City's colorful history inspired the famous Monopoly board game. Atlantic City offers a unique opportunity to enjoy classic Americana and modern life in the United States. It is also an excellent location to explore many areas of historic significance with the State of New Jersey being one of the original founding thirteen colonies of the United States of America. The uniqueness of Atlantic City as an American cultural center rivals the quality of the scientific and technical program of ICOPS 2017, making ICOPS 2017 the plasma conference of choice in 2017. The conference venue will be the newly built Waterfront Conference Center at the Harrah's Resort in Atlantic City, New Jersey, USA. Additional details regarding the conference including the technical and social programs in this historic resort and meeting venue to best organize your trip to participate may be found at: http://www.shu.edu/icops2017

Jose Lopez, Conference General Chair, can be reached by E-mail at jose.lopez1@shu.edu

PPC2017, 21st International Pulsed Power Conference Brighton, United Kingdom, 18th to 22nd June, 2017

www.ppc2017.org



View of Brighton's famed waterfront.

Bucur Novac
Technical Program Chair

PPC 2017 will host an active social program throughout the conference, from the welcome reception on Sunday, June 18th, through to the Awards Banquet on Wednesday, June 22nd. All attendees are encouraged to take part as these events can be excellent networking opportunities.

PPC 2017 is sponsored by NPSS through the Pulsed Power Science and Technology Committee.

For the first time since its inception in 1976, the bienniel Pulsed Power Conference will be held outside of the USA at the seaside town of Brighton in the United Kingdom. The Pulsed Power Conference traditionally attracts papers from countries spanning the globe and this year will be no exception. The Hilton Metropole Hotel, located on the seafront will serve as our conference hotel. It is of ample size to provide both attendees' accommodations as well as presentation/poster space. Situated on the seafront within a short walking distance of the historic centre of the town, it also provides easy access to shops and entertainment.

Brighton is located on the southern coast of England and has good connections to the London airports, especially Gatwick. This historic town can trace its history back to the Bronze Age but its main growth dates to the nineteenth century with the patronage of King George IV who built the famous Royal Pavilion. Modern day Brighton has a wide range of public houses, bars and restaurants to suit all tastes and is a popular holiday location for British and international visitors.

The international technical committee, led by Professor Bucur Novac has been working hard to bring together an excellent technical program encompassing the full technical and geographical breadth of the Pulsed Power community, covering the areas:

» Pulsed-Power Physics and Technology, Components and HV Insulation

» Pulsed-Power Industrial and Biomedical Applications

» High-Power Microwaves, RF Sources and Antennas

» High-Energy-Density Physics and Technology

» Particle-Beam and Accelerator Technologies

» High-Power Electronics

Abstract submission is now closed. Authors of accepted abstracts should receive notice by early April to allow time to prepare for the conference and to write manuscripts for the conference proceedings. In addition to the conference proceedings, there is a special issue in the IEEE *Transactions on Plasma Science* for each conference. Submissions to the journal are expected to be expanded versions of the conference submissions and will be subject to the full peer-review process. Deadlines for the journal submissions will be announced at the conference.

In addition to the oral and poster presentations, the conference will have four plenary speakers, one of whose talks will open the conference each day. Please check the conference website www.ppc2017.org for details on our plenary speakers.

In addition to the technical program, PPC 2017 will have one of the largest exhibition spaces of recent Pulsed Power conferences. This will enable a broad range of exhibitors to attend the conference to discuss the latest technologies and products of interest to the Pulsed Power community.

Mark Sinclair
Conference General Chair

KEY DATES

Early registration deadline—May 5th 2017

Hotel booking deadline—May 15th 2017

General Chair, Mark Sinclair, ppc2017@ieee.org; Technical Program Chair, Professor Bucur Novac, B.M.Novac@lboro.ac.uk; Exhibition Chair, Phil Surman, phil.surman@ppm.co.uk.

EXTRACURRICULAR ACTIVITIES

I have never let my schooling interfere with my education.

Mark Twain

NUCLEAR & PLASMA SCIENCES SOCIETY NEWS

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2017 IEEE Nuclear and Space Radiation Effects Conference is Finalizing Plans for New Orleans, Louisianna, USA

The 54th IEEE Nuclear and Space Radiation Effects Conference will be held July 17th–21st, 2017, at the New Orleans Marriott. The General Chair is Véronique Ferlet-Cavrois, European Space Agency. The conference will feature a Technical Program consisting of ten 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 17th, a Radiation Effects Data Workshop, and an Industrial Exhibit.

SHORT COURSE

The Short Course Chair is Jonathan Pellish, NASA Goddard Space Flight Center. The theme of the 2017 course is "Hardness Assurance for Satellite Systems—from Macro to Nano."

Sessions and speakers for the four sessions are:

- *Total Nonionizing Dose and Displacement Damage Hardness Assurance for Satellite Systems*, Dr. Christian Poivey, European Space Agency ESA/ESTEC
- *Single-Event Effects Radiation Hardness Assurance for Satellite Systems*, Dr. Ray Ladbury, NASA/GSFC
- *Introduction to SmallSats and Correlating Factors for Mission Success*, Prof. Michael Swarthout, Saint Louis University
- *Design Principles for Mission Success in Spacecraft Programs*, Dr. Dave Roth, John Hopkins Applied Physics Lab

TECHNICAL PROGRAM

The Technical Program Chair is Heather Quinn, Los Alamos National Laboratory. She and her technical committee will select contributed papers that describe the effects of 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 Marta Bagatin, University of Padova. The Data Workshop Chair is Jeff George, Aerospace Corporation.

The Technical Session Chairs are:

- Basic Mechanisms of Radiation Effects—Elizabeth Auden, Sandia National Labs
- Dosimetry—Ewart Blackmore, TRIUMF
- Hardness Assurance—Jerome Boch, University of Montpellier
- Hardening by Design—Mike Wirthlin, BYU
- Photonics Devices and ICs—Joe Srour, The Aerospace Corporation
- Radiation Effects in Devices and ICs—Tim Oldham, Ball Aerospace
- Single-Event Effects: Mechanisms and Modeling—Laurent Artola, ONERA
- Single-Event Effects: Transient Characterization—Shi-Jie Wen, Cisco
- Single-Event Effects: Devices and ICs—Paolo Rech, UFRGS
- Space and Terrestrial Environments—Pete Truscott, Kallisto

LOCAL ARRANGEMENTS

The Local Arrangements Chair is John Stone, Southwest Research. The conference social will be held on Wednesday, July 19th, at Mardi Gras World, an indoor venue with a "plantation" set. It will include several food stations with different cuisines, and entertainment by local musicians. Companion events include a city tour, cooking school, and the World War II museum.

Teresa Farris
RE Vice Chairperson for Publicity

Teresa Farris, Vice Chairperson for Publicity can be reached by E-mail at Teresa.farris@cobham.com

President's Report

Stefan Ritt
IEEE NPSS President

It is my distinct honor to write my first newsletter article as NPSS president for the two-year term 2017-2018. Let me start with a little personal story. Many years ago, I attended one of my first IEEE conferences. There was one presentation about a new way to send Ethernet UDP packets right out of a field-programmable gate array (FPGA) without any CPU. I was very excited about this and approached the author, who told me all the details. Back at my home lab, PSI in Switzerland, where I do basic research in particle physics, I spread the news to several electronics groups. Today, we use exactly this technique I learned at that IEEE conference in dozens of different experiments at various accelerators and synchrotron light sources. As I write these lines, I sit next to a brand new data acquisition crate we recently designed at our lab, which would not run without this technology. This is, in my opinion, the core of IEEE and NPSS. Read our journals, go to our conferences, to stay current with technology. If you get more experienced over time, spread your great ideas through publishing and presentations. You will not only build up a network of fantastic people, but learn great things which make your life as an engineer or researcher much easier. I take over the leadership of the Nuclear and Plasma Sciences society which runs extremely well thanks to the endless efforts by many volunteers. These are the members of the Administrative Committee (AdCom), our conference organizers, paper reviewers and many others. I would like to take the opportunity to express my deepest gratitude to those who left AdCom at the end of last year. These are in alphabetical order Gerry Cooperstein (Nominations), Patrick Le Dû (RITC), Ronald Jaszczak (NMISC), William Moses (Conferences), Don Shiffler (PSAC) and Mark Tillak (FTC). It was a great pleasure working with you and I hope to see you in one or another function in the future. On the other hand I would like to welcome our new AdCom members Cinzia Da Vie (WIE), Lorenzo Fabris (RITC), Martin Grossmann (CANPS), Michael Kong (PSAC), Susanne Kühn (Conferences), Fulvia Pilat (PAST), Vesna Sossi (NMISC), Dennis Youchison (FTC) and Heiko Körte, who will be the first incumbent of the newly created position of Industry Liaison. I am looking forward to working with you and to having many fruitful discussions. Having four out of seven new AdCom members coming from Region 7 (Canada) and 8 (Africa, Europe, Middle East) underlines the increasing internationality of our organization, the borderless spirit and the dissemination of knowledge worldwide. I am joined now by our new Vice-President/President-Elect, Ron Schrimpf from Vanderbilt University, who serves on AdCom as Elected Member for Radiation Effects (REC). Our past Presidents follow the traditional progression, so John Verboncoeur is now Chair of our Nominations Committee and Janet Barth is Chair of our Awards Committee. I would like to thank all our Committee members for their devoted efforts in making NPSS a successful society, and I wish our new members all the best in their new positions.

It is hard to improve a society that already runs well, but I see some opportunities I would like to concentrate on during my term. Coming from a computing community, these are naturally in the area of social media and software packages. Since March 2014 we have, in addition to our NPSS website http://ieee-npss.org, an NPSS Facebook page https://www.facebook.com/ieeenpss which I would like to strengthen with more contributions. Having more than four-thousand followers gives us a huge potential for possible outreach. If you want to advertise a conference, have some nice pictures from an NPSS event, see a good review article in one of our journals, or have anything else which could be interesting to our community, please post it on that page or send it to me and I will post it on behalf of our society.

Another topic is the use of conference software across our portfolio of conferences. This covers the conference registration, paper submission and review, conference agenda, up/downloading of presentation slides, proceedings submission, user feedback and evaluation, and finally some mobile app use. Many conferences use some proprietary solutions for these tasks. Offering some NPSS-wide solutions might not only improve the user experience for people attending more than one of our conferences, but might also ease the job of our conference organizers and save money and thus reduce registration fees for our attendees. My goal is to make several software packages available from which each conference can choose, all of them well maintained and documented. A conference organizer's forum in form of a web site or blog should ensure that information flows between different conferences, even coming from different technical communities within our society. This gives people the chance to exchange experiences not only about conference software but also about other topics such as best practices for improving the user experience and special conference events such as Women in Engineering (WIE) and Young Professional (YP) events. We have great people on every conference organizing committee, and it is important that we learn as much as possible from each other.

I'm very proud to be part of NPSS and serve as President for the next two years. First of all, I would like to thank our former President John Verboncoeur for mentoring me during the past two years and for his outstanding leadership during this time. John worked diligently to serve our society and demonstrated an unfailing sense of fairness. He never hesitated to stand up and articulate his opinion if something was not right, to the great benefit of the whole society. I thank our past two Presidents Craig Woody and Janet Barth, our secretary Albe Larsen, our treasurer Ron Keyser, our committee chairs Hal Flescher, Bill Moses, Patrick Le Dû, Peter Clout, Jane Lehr and Paul Dressendorfer, for their guidance and advice during my time as Vice-President. They generously provided me with invaluable insight into the workings of the IEEE, and I hope I can count on them during my presidential term.

Thanks to all NPSS volunteers and the whole membership for keeping our Society healthy, active and involved with our community. Please contact me if you see any opportunity for even further improvement, or if you are interested to become active as a volunteer. I am looking forward to meeting many of you during my term and finding ways to make our Society serve you even better. I wish everybody a magic moment like the one I had years ago with the Ethernet UDP packets, which was a key experience and had a significant impact on my career, and which I would have missed without IEEE and NPSS.

Stefan Ritt, IEEE NPSS President, can be reached at the Paul Scherrer Institute CH-5232 Villigen PSI, WBWA/140, Switzerland; Phone: +41 56 310 3728; Fax: +41 56 310 2199; E-mail: stefan.ritt@psi.ch.

GENERAL BUSINESS Continued on **PAGE 4**

BUSH-WACKED

Distrust everyone in whom the impulse to punish is powerful.

Friedrich Nietzsche

BUT IT IS SO SATISFYING

Punishment is the last and least effective instrument in the hands of the legislature for the prevention of crime.

John Ruskin

LOVE IS BLIND

In a country where values are collapsing, patriotism becomes the handmaiden to totalitarianism. The country becomes the religion. We are asked to live in a state of religious fervor: Love America! Love it because America has become a substitute for religion. But to love your country indiscriminately means that critical distinctions begin to go. And democracy depends upon these distinctions.

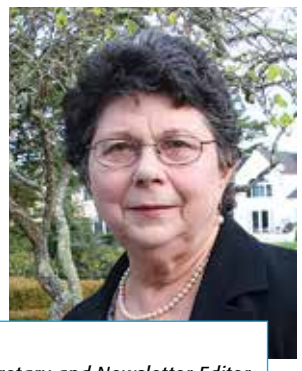
Norman Mailer

PUBLIC ACCOUNTING

My problem lies in reconciling my gross habits with my net income.

Errol Flynn

Secretary's Report



Albe Larsen
IEEE NPSS Secretary and Newsletter Editor

The Administrative Committee of the Nuclear and Plasma Sciences Society held its annual meeting on Saturday, November 5th, 2016 at the Strasbourg Hilton Hotel, Strasbourg, France, following the 2016 NSS/MIC Conference and RTSD Workshop.

Our treasurer reported that many conferences are still not closed. This gains attention of the IEEE auditors and puts IEEE at risk of losing its not-for-profit status, so it is important to close conference books in a timely way. Having the auditors qualify the accounts which makes financial operation costs higher as additional risk is percieved. Our treasurer and assistant treasurer are there to help. Draft conference budgets need to be submitted at least three months prior to needing a conference advance. The budget tool is 'a work in progress' and improvements to facilitate use are incorporated regularly.

Although NPSS is financially healthy, meeting revenue has dropped significantly. Our *Transactions on Nuclear Science* met its page count so will receive a bonus at the end of the year. *Transactions on Plasma Science* did not. Income from *Transactions on Medical Imaging* is not reflected in our budget. Our new journal, launching in January 2017 is not expected to see income for the next year or two.

John Verboncoeur, our President for 2015 and 2016, reported that he had attended many meetings including TAB, the ExComs of PAST and PSAC and other committee meetings related to TAB in 2030. The IEEE vote to amend the Constitution failed so the IEEE in 2030 activity will not go forward, but the TAB in 2030 committee will work toward improving TAB operations. John will be a member of the IEEE New Initiatives Committee, and of the TAB Management and Strategic Planning Committees.

The new Division IV director is Jennifer Barnhard from the Antennas and Propagation Society.

Bill Moses, the Division IV incumbent at the time of our AdCom meeting, noted that since 2011 IEEE is spending more than it earns, which is not a healthy policy. This has been due to several large initiatives including Collabratec, and ICP and IBP development. With no new major development projects, IEEE should be running in the black and not borrowing to fund operations or new projects. Money has been borrowed from reserves. The current CFO believes that reserves should be used for risk protection and to fund strategic initiatives of IEEE. The use by OUs such as societies to use reserves to fund their own strategic initiatives would be curtailed, although most of the money in reserves has come from OUs, and especially from society conferences and journals. However, with interest, dividends and market gains, IEEE has been in the black and so not all of these items have been used. The result is that reserves have increased.

TECHNICAL COMMITTEES

Our technical committees are doing well. The Real-Time conference organized by the Computer Applications in Nuclear and Plasma Sciences technical committee was held in Padua (Padova) and was a great success by every metric. The Fusion community is busily planning for its first off-shore conference in Shanghai in June 2017 and the Pulsed Power Conference will also go off-shore for the first time, to Brighton, UK. The NSS/MIC conference held in Strasbourg was also very successful with good attendance and a fine technical program as well as an excellent venue. Both the Nuclear Medical and Imaging Sciences and Radiation Instrumentation steering groups have elected new committee members. A joint NMISC/RI committee will look at conference software. The Particle Accelerator Science and Technology committee, jointly with APS-DPB held a North American PAC in Chicago in October with modest attendance but very successful student, Women in Science and Engineering and Teachers' Day events. In 2017 there will be an International PAC to be held in Copenhagen, and in 2018 an IPAC in Vancouver with TRIUMF as host and with NPSS cosponsorship. The ICOPS Conference organized by the Plasma Sciences committee was held in Banff, Alberta, Canada with attendance of just over 500 and plenary talks including those of Birdsall Award recipient Mark Kushner and PSAC Award recipient Christine Coverdale. An innovative Young Professionals poster session brought young professionals and prospective employers together in a social atmosphere conducive to conversation. Radiation Effects' 2016 conference, held in Portland, OR, was on a par with 2015. Conference attendance has been less predictable for many reasons.

A number of TCs will have new AdCom representatives in 2017, so we thank Ron Jaszczak and Mark Tillack for their service to their communities, NMISC and Fusion, respectively, and welcome Vesna Sossi and Dennis Youchison who will now represent these communities. Brendan Godfrey and Christian Bohm have each been awarded a full term representing Plasma Science and the Transnational community respectively. New Technical Committee chairs include Fulvia Pilat replacing Steve Gourlay (PAST), Michael Kong replacing Don Shiffler (PSAC) and Lorenzo Fabris replacing Patrick Le Dû (RITC). See below for the brief biographies of our new officers and members.

AdCom Functional Committees and Liaisons were also busy. Please see individual reports for updates.

Of particular note was the successful Instrumentation School held in Ho Chi Minh City, Vietnam and hosted by the Nuclear Technique Laboratory, University of Science, Vietnam National University, Ho Chi Minh City. Instructors are senior NPSS members including Christian Bohm, Patrick Le Dû, Zhen-An Liu, Masaharu Nomachi, Martin Purschke and Stefan Ritt, as well as faculty from VNU-HCM. The school, the second sponsored by NPSS, is organized by members of the CANPS and Transnational communities and provides both lectures and hands-on experience for students in the field of radiation detectors and their application. The students are selected by personal interviews using face-to-face and/or Skype interviews to assess the students' knowledge level and to get a sense of competency. Students were from several countries in Asia including Vietnam, Japan, Malaysia, Indonesia and China. Future schools are in the planning stages.

ADCOM ACTIONS

» It was moved by FinCom and passed that NPSS donate excess new initiatives 2016 funds of $100,000 to the Education and supporting Internet-Intranet Electricity Program of IEEE Smart Village.

» It was moved by FinCom and passed that an NPSS e-membership be created with dues 50% of regular NPSS dues, as with IEEE e-membership. NPSS will also offer free first-year NPSS and IEEE membership for students at our schools and workshops.

» It was moved by FinCom and passed that every NPSS conference, financially sponsored and technically cosponsored, shall provide free conference registrations for two people who are there to work at the membership desk, and are not there to attend the conference. The conference shall provide a membership desk in a highly trafficked area. This shall be part of every TCS MOU approved by NPSS, and the TC chairs will ensure that this is part of their conferences and so inform the conference chair and committee.

» It was moved by FinCom, and passed, that for budgeting purposes 2018 dues shall remain at the current level.

» The NPSS AdCom approves support for a 3.5-day international workshop on requirements development for standard space radiation environment models. Support includes $12K to partially cover the cost of the workshop and up to $20K to provide travel support for up to 10 members of the radiation effects community to participate in the workshop. The motion, submitted by the Radiation Effects Committee and supported by FinCom, passed

» AdCom approves the IEEE Technical cosponsorship of the 2017 6th Conference on PET-MRI and SPECT-MRI. The motion was submitted by NMISC.

» AdCom approves the new MOU for the APS-DPB, IEEE-NPSS and PAC OC for the IPAC and NA-PAC conferences held in the Americas.

» AdCom approves the Technical Cosponsorship of the 2017 International Workshop on Plasma for Cancer Treatment (IWPCT), which will be held in Paris, France on March 27-28, 2017.

AdCom will hold its first meeting of 2017 on March 4 at the DoubleTree by Hilton in St. Augustine, FL. The meeting will be preceded by a retreat.

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

New AdCom Officers & Members

Stefan Ritt
AdCom President

Stefan RITT (M'07, SM'11, F'16) received his Ph.D. in physics from the University of Karlsruhe, Germany, in 1993. He was then employed by the University of Virginia in Charlottesville from 1993 to 2000 where he was responsible for the design, assembly and operation of the PIBETA experiment. In 2000 he returned to Europe to the Paul Scherrer Institute in Switzerland, where he is now the head of the muon physics group working in the lab's particle physics program. He is currently responsible for five different user groups doing experiments with muons and pions at his lab, each of them with ten to fifty guest scientists and technicians from different regions including Asia and South America. As science coordinator he is responsible for the beam-time distribution to the different user groups. In addition he is technical coordinator of the MEG experiment, where he is responsible for the readout electronics, the DAQ hardware and software and the slow control system. In 2013 he became co-spokesperson of the new Mu3e experiment. He is primary author of the MIDAS DAQ system and the ELOG electronic logbook software, which are now used in many experiments worldwide. He designed and co-owns two patents for the DRS series of chips, which allow ultra-fast waveform digitizing in the GHz range. These chips and associated electronics boards are now used in more than 50 locations worldwide and are having a major impact in the community, enabling many groups to perform better experiments compared with traditional electronics, since the chips have a much higher sampling speed and currently hold the world record in time resolution. As a physicist he works in both the physics community organising, for example, workshops in fundamental particle physics, as well as in the engineering community, which develops the tools and detectors to make experimental particle physics happen. He has been involved in the organisation of the IEEE NPSS Real-Time conference since 2003. He served as short course instructor, program co-chair and chair of the CANPS technical committee (2010-2014). He served as Associate Editor of the *Transactions on Nuclear Science* (2005-2009) and is a member of several NPSS award committees including the Curie Award. At the NPSS Nuclear Science Symposium he was involved as topic convener and refresher course lecturer. He has been an NPSS Distinguished Lecturer since 2013. He was co-organizer of the first NPSS real-time schools, held in Japan in 2014 and in Vietnam in 2016. He was chosen twice as the elected member of AdCom from the CANPS community and served as NPSS Vice-President/President-elect 2015-2016.

Stefan Ritt can be reached by E-mail at stefan.ritt@psi.ch.

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 and he 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. ISDE translates the basic research conducted as part of Vanderbilt's Radiation Effects and Reliability Group to meet the needs of

Ronald D. Schrimpf
AdCom Vice President/President-elect

government and industry. Ron has been involved with IEEE NPSS, particularly through the Nuclear and Space Radiation Effects Conference, since 1987. For NSREC, he served as General Chair, Technical Chair, Awards Chair, Short Course Chair, Short Course Speaker, Session Chair, and Guest Editor of the IEEE *Transactions on Nuclear Science*. He also served as Chairman of the Radiation Effects Steering Group and IEEE Liaison with RADECS, the European radiation effects conference. 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. 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*.

Ron Schrimpf can be reached by E-mail at ron.schrimpf@vanderbilt.edu

Ralf Engels
AdCom Treasurer

Ralf Engels is a research scientist working on detector systems at the Forschungszentrum- Juelich in Germany. Ralf has served for the past year as NPSS Assistant Treasurer and now takes over as society treasurer. He has served as conference treasurer, local arrangements chair and in a number of other capacities within NPSS.

Ralf Engels, NPSS Treasurer, can be reached by E-mail at r.engels@fz-juelich.de.

NEW ADCOM MEMBERS

Martin Grossmann
CANPS representative to AdCom

Martin Grossmann works as a physicist in the Center for Proton Therapy (CPT) at the Paul Scherrer Institute (PSI), Switzerland. He studied in Münster (Germany), Lausanne (Switzerland) and at CERN and obtained a Ph.D. from Zürich University for experimental work on rare muon decays. In 1996 he joined the PSI proton therapy team and developed the control system for the world's first treatment facility using a magnetic scanning proton beam. Since then he has been responsible for the control and safety systems of the proton therapy installations which include three treatment rooms built by PSI. Currently a fourth room, with an industry-built gantry, is being installed. The integration of this new machine into the existing controls concept is an interesting and challenging task. Martin has been leading the IT & Electronics group of CPT for more than 10 years.

Martin Grossman can be reached by E-mail at martin.grossmann@psi.ch.

Vesna Sossi
NPSS AdCom NMISC representative

Vesna Sossi received the Laurea degree from the University of Trieste, Italy, in High Energy Physics in 1986 and the Ph.D. degree from the University of British Columbia (UBC), Vancouver, B.C., Canada in Nuclear Physics in 1991. Since 2001 she has been a Faculty member in the UBC Physics and Astronomy Department. She first worked on detectors and data analysis as applied to measurements of nuclear reaction cross sections at the Canadian Nuclear Physics Laboratory TRIUMF and then transitioned to nuclear-medicine-based imaging. Since then she has worked in many areas ranging from instrumentation-related topics such as development of data reconstruction and quantification algorithms, motion correction for high-resolution PET data, design and development of a preclinical MR-compatible PET insert, to more applied areas such as development of novel kinetic modeling approaches for PET tracers and performance and interpretation of preclinical and clinical studies. Her publication list includes more than 150 papers and 200 abstracts; she sits on several national and international review committees and is a reviewer for many journals and conferences. She has been attending the IEEE MIC meetings since 1993 and has served on Nuclear Medical and imaging Sciences Council (NMISC), the Marie-Sklodowska-Curie Award Committee, was MIC Program chair in 2012 and NSS/MIC General Chair in 2015.

Vesna Sossi can be reached by E-mail at vesna@phas.ubc.ca.

Dennis Youchison
NPSS AdCom Fusion representative

Dennis L. Youchison (M'07-SM'09) received the B.S., M.S., and Ph.D. degrees in nuclear engineering from the Pennsylvania State University, University Park, PA in 1982, 1984 and 1989, respectively. His dissertation at the Westinghouse R&D Center involved measurements of sputtering yields for redeposited graphite and beryllium plasma-facing surfaces. From 1990 to 1993, he was an Office of Naval Technology Postdoctoral Fellow at the Naval Research Laboratory (NRL), Washington D.C. At NRL, he developed plasma diagnostics for electron cyclotron resonance plasma-assisted chemical vapor deposition. During 1993 to 2015, he was a staff member at the Sandia National Laboratories, and appointed a Distinguished Member of the Technical Staff in 2003. He was responsible for high-heat-flux testing and electron-beam thermal processing of materials. Currently, he is a Distinguished Scientist at Oak Ridge National Laboratory in the Fusion and Materials for Nuclear Systems Division. He is the author of over 70 journal papers. He currently holds five U.S. patents and is a licensed professional engineer. His research has focused on the development of materials for extreme environments and the design of plasma-facing components. Dennis served as the general chair for the 22nd Symposium on Fusion Technology (SOFE, 2007) and served three years as the chair of the Fusion Technology Committee (FTC) on the NPSS AdCom (2010-2012). He also served on the NPSS awards committee and contributed as a Guest Editor to two SOFE Special Issues in *Transactions on Plasma Science* (2011 and 2013). In addition to being a senior member in IEEE, he is also a member of ASME and ANS.

Dennis Youchison can be reached by E-mail at dennis.youchison@ornl.gov.

Lorenzo Fabris is Senior R&D Engineer in the Nuclear Security and Isotope Technology Division at Oak Ridge National Laboratory. He received his Master's degree in microelectronics and electronic instrumentation from the University of Pavia, Italy in 1993 and his Ph.D. from the University of Bergamo, Italy, in 2016. After working as research associate at the University of Pavia in 1992 and 1993, he joined Lawrence Berkeley National Laboratory as an engineer, focusing on the development of low-noise

Lorenzo Fabris
Chair, RITC

readout electronics for X- and gamma-ray detector systems used in beamline experiments at particle accelerators and light sources, for astrophysics missions, and environmental and nonproliferation applications. In 2002, he joined Lawrence Livermore National Laboratory as senior engineer expanding his interests to detector systems design and new detector materials and taking the technical lead of radiation detection projects for the Department of Homeland Security. In 2007 Lorenzo joined Oak Ridge National Laboratory, working on nonproliferation and homeland security programs as well as nuclear physics and astrophysics collaborations. His recent work includes instrumentation for different types of gamma-ray imaging detectors, neutron detectors and advanced fast and slow neutron imaging systems, and the development of instrumentation techniques for silicon photomultipliers in liquefied noble gases. Lorenzo has always been involved in several roles with the IEEE Nuclear Plasma and Science Society. For several years, he has been a reviewer, associate editor and senior editor for the *Transactions on Nuclear Science*; he co-chaired and chaired the Nuclear Science Symposium in 2005, 2009 and will chair NSS in 2017. Lorenzo has been a RISC member since 2012, deputy RISC chair since 2014 and will assume the role of chair for the period 2017-2019.

Lorenzo Fabris can be reached by E-mail at fabrisl@ornl.gov

Michael Kong
Chair, PSAC

Michael Kong is Batten Endowed Chair in Bioelectrics and Professor of Electrical Engineering at Old Dominion University. His current interests include low-temperature gas plasmas and their utility in biology and medicine (e.g., disinfection, cancer therapy, and regenerative medicine). He has published over 180 journal papers with some 6.000 citations, and has given over 70 plenary and invited talks at international conferences. Before moving to Old Dominion in 2012, he had been in the UK for 24 years, initially as a Ph.D. student in electrical engineering at the University of Liverpool (1988 – 1992) and then rising through the ranks to become, in 2004, Chair and professor in Bioelectrical Engineering at Loughborough University. At Loughborough University, he held leadership positions including Associate Dean and Co-director of a campus-wide Center for Biological Engineering. He has been active with the Institute for Electrical and Electronic Engineers (IEEE), having chaired the 2012 IEEE International Conference on Plasma Science (ICOPS) in Edinburgh, UK, and served as a Senior Editor of IEEE *Transactions on Plasma Science*. At present, he is Chair of the Plasma Science and Applications Committee, IEEE Nuclear and Plasma Science Society.

Dr Kong has been a member of the editorial board for several other scientific journals in the field of gas plasmas, including *Plasma Sources Science and Technology, Plasma Chemistry and Plasma Processing*, and *Plasma Medicine Journal*. He won the inaugural International Society for Plasma Medicine Prize (2010) and the IEEE Nuclear and Plasma Science Society Merit Award (2015) for his contributions to biomedical applications of ionized gases and to non-equilibrium gas plasmas, respectively. He is an IEEE Fellow.

Michael Kong, PSAC chair, can be reached by E-mail at mkong@odu.edu.

Fulvia Pilat
Chair, PAST

Fulvia Pilat is the Deputy Associate Director for Accelerators at Jefferson Lab (JLAB) and the Program Lead for JLEIC, the Jefferson Lab Electron Ion Collider, the JLab proposal for the next-generation facility for Nuclear Physics. Fulvia is an accelerator physicist, graduated in physics from the University of Trieste in Italy in 1986 with a thesis on accelerator nonlinear dynamics sponsored by the European Organization for Nuclear Research (CERN). After a fellowship at CERN, she worked at the Superconducting Super Collider project in Texas before joining Brookhaven National Laboratory in 1994. Fulvia led commissioning activities and the program for beam experiments at RHIC, the Relativistic Heavy Ion Collider. In 2005 she became the Head of Operations for RHIC and its injectors and eventually joined JLAB in 2010 in her current role. Fulvia has served as the Chair of the APS Division of Particles and Beams, the main organization promoting the interest of accelerator physics in the physics community, and is presently Chair of the IEEE PAST Committee, which promotes accelerators in the engineering community, and is a member of HEPAP. She has served as a Chair and reviewer for many Department of Energy (DOE), National Science Foundation (NSF), and Laboratory Management Review Committees.

Fulvia Pilat, PAST chair, can be reached by E-mail at pilat@jlab.org.

NEW LIAISONS

Cinzia Da Vià
IEEE Women in Engineering Liaison

Cinzia Da Vià is a Professor of Physics at the University of Manchester UK. She received her Ph.D. at Glasgow University in 1998 and is an expert in radiation detectors for High-Energy Physics and Medical Applications. She has been working on radiation-hard silicon detector development for the Large Hadron Collider (LHC) since 1998 and in 1995 she participated in the discussions which led to the design of 3D silicon sensors and has been working on the development of this technology ever since. She formed and led the 3D ATLAS pixel R&D Collaboration (2007-2014), which successfully designed and industrialized the first 3D sensors to be installed in an experiment. 3D sensors have been operating in the ATLAS experiment since 2015. In 2010, she proposed the use of Micro-Electro-Mechanical Systems (MEMS) technology to fabricate sensors for microdosimetry in hadron therapy and is currently involved in 3D printed dosimetry and

GENERAL BUSINESS Continued on **PAGE 6**

Technical Committees

COMPUTER APPLICATIONS IN NUCLEAR AND PLASMA SCIENCES

Martin Purschke
Chair, CANPS Technical Committee

For the Computer Applications in Nuclear and Plasma Sciences committee, this is the quiet year in between two conferences. The preparations for next year's Real-Time conference are underway behind the scenes. When I visited Jefferson Lab on unrelated business recently, we organized a site visit to Colonial Williamsburg where the Real-Time Conference will take place next year. We toured the site together with David Abott, chair of the RT2017, and members of the Lab's conference organizing staff. We saw the conference rooms and future poster areas, the cafeteria, and the surroundings, and met with some of the staff of the conference site. We can look forward to a very nice conference venue.

In this issue you will find a report from the 2016 International School in Real-Time Systems that was held in Ho Chi Minh City, Vietnam, in July. The school was organized and run almost exclusively by members from this committee. It was a very interesting school where both students and lecturers learned many new things.

Last but not least we have the second installment of the articles by the student award winners from the Padova Real-Time Conference. Today you can read about the award-winning work of Stephanie Su from the University of Michigan. She is a graduate student who has been working on the KOTO experiment since 2013. The KOTO experiment aims to observe the rare kaon decay that can possibly discover new physics and explain why there is a surplus of matter over antimatter in our surrounding universe. Her major effort on the experiment has been in developing the data acquisition system, which is the essential part of the experimental data readout chain. She built the online computer clusters and the algorithm for parallel data processing, which have been running efficiently since 2015. Stephanie is currently devoting her time to upgrade the hardware trigger in order to prepare for future increasing beam intensities. This improvement will allow the experiment to collect more data to study even better the kaon decays.

Martin Purschke, Chair of the CANPS technical Committee, can be reached by E-mail at Purschke@bnl.gov.

FUSION TECHNOLOGY

Charles Neumeyer
FTSC Chair

The Fusion Technology Standing Committee (FTC) welcomes Dennis L. Youchison (M'07-SM'09) as its newly elected representative member to the AdCom, effective January 1st. See Society General Business, New AdCom Members for Dennis's biography, page 5.

Registration is open for the 2017 Symposium on Fusion Engineering (SOFE). The Symposium will move outside the United States for the first time in its 52-year history. The 27th SOFE will be held in Shanghai, one of China's most vibrant and cosmopolitan cities, 4th – 8th June 2017 at the Marriott Shanghai City Centre Hotel. The conference will offer five mini-courses on topics of timely importance in the field: Plasma-Material Interactions, Stellarators, Plasma Diagnostics, Fusion Radiation Effects on Electronics, and Inertial Fusion Energy. To encourage students to attend and present their work at SOFE, the conference has established a fund to help with their travel and registration expenses. And a concerted effort is under way to raise awareness of the Best Student Paper Award and its ultra-simple application procedure, namely checking a box on the abstract submission form! Applicants for the participation grants or student paper award must be IEEE student members to be eligible. Along with support for students, we will also recognize our experienced researchers and leaders by announcing the recipients of Fusion Technology Awards for both 2016 and 2017.

The 2017 SOFE is sponsored by NPSS, with the IEEE Shanghai Section and the Institute of Plasma Physics of the Chinese Academy of Sciences (ASIPP) as technical co-sponsors. Conference planning is well under way, led by Hutch Neilson and Jiangang Li as General Chair and Co-Chair, respectively, and guided at every step by FTSC Chair Charles Neumeyer. The technical program is being planned by an international committee led by Paul Humrickhouse and Yuntao Song as Program Chair and Co-Chair, respectively, and ASIPP Director Baonian Wan chairs the local organizing committee. Further details about the Symposium are available at https://sofe2017.princeton.edu/.

Charles Neumeter, chair of the Fusion Technology Committee, can be reached by E-mail at Neumeyer@pppl.gov.

NUCLEAR MEDICAL AND IMAGING SCIENCES

Paul Marsden
NMISC Chair

The 2016 IEEE NPSS Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) was held in the newly completed Conference Centre in Strasbourg, France at the end of October. The meeting was a great success—if you weren't there you can get a flavor of it from this short movie http://2016.nss-mic.org/images/Nssmic.mp4. 2078 people registered for the meeting overall. For the MIC 564 abstracts were submitted of which 122 and 376 were accepted for oral and poster presentations respectively representing a rejection rate around 11%. A very well-received innovation was the introduction of Scientific Summary Sessions comprising very rapid reviews of all the significant presentations in the main MIC topic areas. Congratulations to Dimitris Visvikis (MIC Program Chair), Suleman Surti (MIC Program Deputy Chair) and everyone else involved for making such an excellent job of the program and putting on such an enjoyable meeting.

At the meeting presentations were made to Joyita Dutta who received the 2016 Bruce Hasegawa Medical Imaging Conference Young Investigator award, David Townsend who received the 2016 Edward J. Hoffman Medical Imaging Scientist Award, and Simon Cherry who received the 2016 IEEE Marie Sklodowska-Curie Award. Also at the meeting, the student awards were decided and these went to:

- Chen-Ming Chang, Stanford University. First award (oral) for *Time-over-Threshold for Pulse Shape Discrimination in a Time-of-flight/Depth-of-Interaction Phoswich PET Detector*.
- Audrey Corbeil Therrien, Université de Sherbrooke. Second award (poster) for *Energy Discrimination Using First Emitted Photon Timestamps: an Exploratory Study*.
- Anna Turco, KU Leuven. Third award (oral) for *Ex Vivo and in Vivo Study Evaluating Edge-Preserving and Anatomical Priors for Partial Volume Correction in Cardiac PET*
- Cameron Miller, University of Michigan and Loma Linda University. Fourth award (poster) for *Scintillator-Based Measurement of off-Axis Neutron and Photon Dose Rates During Proton Therapy*.

Congratulations to all our award winners! Please consider nominating worthy colleagues for this year's Bruce Hasagawa and Ed Hoffman awards. The deadline is 15th of July (see NMISC website for details)

This year's NSS-MIC meeting will be held in Atlanta, USA, with John Aarsvold General Chair and Lars Furenlid and Matthew Kupinski MIC Chair and Deputy Chair. For details see the conference website at http://www.nss-mic.org/2017/. Note that this year's meeting is from 21-28 October and so slightly earlier than in recent years. The 2017 Conference on PET-MRI and SPECT-MRI ('PSMR') will take place between the 29th and 31st of May in Lisbon http://www.psmr2017.pt/. In 2018 the NSS-MIC will be in Sydney, Australia (General Chair Anatoly Rozenfeld, MIC Chair and Deputy Chair Steve Meikle and Taiga Yamaya), and in 2019 it will be held in Manchester, UK (General Chair Paul Marsden, MIC Chair and Deputy Chair Dimitra Darambara and Suleman Surti).

From the beginning of 2017 Emilie Roncali from UC Davis has taken over the role NMISC secretary from Andrew Goertzen, and Vesna Sossi, from UBC, has taken over from Ron Jaszczak as one of our two NMISC AdCom representatives. I look forward to working with Emilie and Vesna, and thanks to Andrew and Ron for all your hard work.

I encourage all of you to volunteer as candidates for being Council members and help in serving the NMISC 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—if you are interested more detailed information can be found on the NMISC website http://ieee-npss.org/technical-committees/nuclear-medical-and-imaging-sciences/.

The new NPSS journal *Transactions on Radiation and Plasma Medical Science* (TRPMS) is now up and running - please consider submitting your latest work at https://mc.manuscriptcentral.com/trpms

Paul Marsden, NMISC Chair, ccan 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; Email: paul.marsden@kcl.ac.uk

New AdCom Officers & Members

Continued from **PAGE 5**

vertical integration of smart-systems. She is on the scientific committee of several international conferences on Radiation Detectors and Instrumentation and is the co-founder of the ERDIT (European Radiation Detector and Imaging Technology) Network to promote Radiation Imaging Technology research across different fields of application in Europe.

As a member of the NPSS Transnational Committee representing the United Kingdom, she will be the NSS Chair at the NSS-MIC Conference in 2019 and since 2015 she has been an elected member of the NPSS RISC Committee.

Cinzia Da Vià can be reached by E-mail at Cinzia.DaVia@manchester.ac.uk.

Heiko Koerte
Industry Liaison

Heiko Koerte has been with Gesellschaft für Netzwerk- und Automatisierungstechnologie mbH (N.A.T.) for more than 23 years and is responsible for the world-wide sales and marketing activities of N.A.T.. Before having been appointed VP and Director Sales & Marketing back in 2000 he led Software Development at N.A.T. for more than seven years. Due to his strong background in engineering he still is personally involved in the definition of all strategic hardware and software products at N.A.T.. He holds a diploma degree in Physics from Bonn University in Germany.

N.A.T. was founded in 1990 with the aim of developing high-performance network interfaces for industrial computers. From the beginning the goal has been to provide turn-key solutions each based on an individual combination of hardware and software. Constant growth during the last 26 years and substantial knowledge in networking technologies has brought N.A.T. to the forefront of the embedded communication market. N.A.T is privately owned and located in Bonn, Germany.

This combination of engineering and business experience makes Heiko the ideal person to fill the new AdCom position of Industry liaison, with the goal of increasing NPSS involvement with and membership from the industries that support our research needs,

Heiko Koerte, Industry Liaison, can be reached by E-mail at heikort@nateurope.com.

DOWN TO EARTH

Be not too hasty to trust or to admire the teachers of morality: They discourse like angels but they live like man.
Samuel Johnson

PULSED POWER SCIENCE AND TECHNOLOGY

Andreas Neuber
PPS&T Committee

The year 2017 marks the beginning of a new era for the Pulsed Power Science and Technology (PPST) technical committee as the transition to a fully elected committee is now in full swing. We wish to thank all election candidates who were willing to spend their time to grow our technical area. The following received the highest number of votes: Dr. Kenneth W. Struve, Dr. Frank Hegeler, Dr. William M. White, and Dr. Randy Curry. Congratulations to all four, they have officially started their four-year term on the PPS&T committee beginning January 1st, 2017. We would also thank the outgoing committee members for their tremendous service over the years: Dr. Susan Heidger, Dr. Weihua Jiang, Dr. Ravi Joshi, and Dr. Luis Redondo.

In this year's election cycle, an additional four members will be elected for a four-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.

Nominations shall be submitted to the PPST Chair or the Secretary in writing by June 1st, 2017. 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

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) explaining 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.

Of course, 2017 is also a pulsed power conference year. For the first time since its inception in 1976, the Pulsed Power Conference will be hosted in Europe. Abstract submission closed in February. Early registration for the conference, at a reduced rate, will close on May 5th, 2017. The conference will open on the 18th of June with a buffet reception.

At the conference we will be presenting the Pulsed Power Science and Technology Committee Awards: the Marx Award for outstanding technical contributions to the field of Pulsed Power, the Haas Award for sustained management and influence of programs to support Pulsed Power, and the Arthur H. Guenther Pulsed Power Student Award for the outstanding students of 2016 and 2017. The nomination deadline for the awards was December 1st, 2016.

We are looking forward to seeing you in Brighton, UK—www.ppc2017.org.

See the NPSS website for further information.

Andreas Neuber, Chairman of the Pulsed Power Technical Committee, may be reached by E-mail andreas.neuber@ttu.edu.

MUTUAL UNDERSTANDING

We were in agreement that the danger of nuclear war was great, but Teller meant that the danger was great if the U.S. government should listen to me, and I meant the danger was great if the U.S. government should listen to him.

Leo Szilard

AND POLLUTION TOO

We have an economy of planned waste—and war is the most efficient means of waste there is.

Ralph Rabb

Functional Committees

AWARDS

Class of 2017 IEEE 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 2017 Fellows, and wish them each our heartfelt congratulations. [Editor's note]

Hugh Barnaby

Hugh Barnaby
Class of 2017 IEEE Fellow

Dr. Hugh Barnaby, Associate Professor of Electrical Engineering at Arizona State University, was elected to IEEE Fellow for his significant contributions to understanding how ionizing radiation and nonionizing radiation affect the performance of bipolar junction transistors (BJTs) and linear bipolar analog circuits. BJTs have two unique radiation response characteristics when compared to other technologies. The first is that bipolar devices show greater degradation in performance when the rate of ionizing radiation dose is low. This effect is known as enhanced low-dose-rate sensitivity (ELDRS). The second is a significant susceptibility to protons. In radiation environments such as space, characterized by an abundance of protons and low-dose-rate exposures, this combination of BJT vulnerabilities presents significant challenges. Hugh is a leading expert on ELDRS and proton effects in BJTs. He was first to successfully model ELDRS in integrated circuits and is an authority on the effects of interface traps on BJTs. He was among the first to quantify and model how trap buildup in base oxides is impacted by radiation dose-rate and the presence of hydrogen.

Hugh has also been a major contributor to the study of the combined effects of ionization and displacement damage on BJTs caused by long term exposure to protons. This work led to his development of an analytical model which facilitates circuit level simulations of proton radiation effects in bipolar circuits. In 2004, based on his expertise in the field of radiation effects in bipolar technologies, Hugh was selected by NASA to design and build the first space instrument for proton/ELDRS characterization. His techniques have been adopted by NASA designers to select candidate parts for proton-abundant space missions.

Citation: *For research of radiation effects in bipolar junction transistors*

Janet Barth

Janet Barth
Class of 2017 IEEE Fellow

Janet Barth is an Emeritus Scientist at NASA's Goddard Space Flight Center (GSFC). She joined NASA in 1992 after working several years on NASA engineering support contracts. Her leadership and technical contributions in the space science and engineering communities have been instrumental in the advancement of the capability to design, build, and operate capable, robust space systems. She was a lead radiation hardness assurance engineer for multiple NASA missions including Hubble Space Telescope instruments, the Microwave Anisotrophy Probe, and the Geostationary Operational Environmental Satellites. As a member of NASA's Living With a Star science architecture team, she led collaborations in the space science and engineering communities resulting in high fidelity space radiation climate models and improved space weather forecasting capabilities. In 2010, she was appointed to NASA's Senior Executive Service and was selected as the Chief of GSFC's Electrical Engineering Division where she was responsible for the design and delivery of spacecraft electronic systems and integration and testing for NASA observatories. Her leadership included the successful launch and performance of the Lunar Reconnaissance Orbiter, the Magnetospheric MultiScale Mission spacecraft constellation, the Global Precipitation Monitor observatory, and the Thermal Infrared Sensor instrument on LANDSAT-8. In 2014 she was the recipient of GSFC's Robert H. Goddard Award of Merit, the highest individual honor that can be bestowed to a Goddard Space Flight Center employee. She served as the NPS Society's President in 2013 and 2014 and is currently the Executive Vice-chair of the Radiation Effects technical committee. She has held several positions on conference committees for Radiation Effectsincluding general conference chair, technical program chair, guest editor, and short course presenter.

Citation: *For leadership in spacecraft reliability and electronic systems.*

Stephen Milton

Stephen Milton
Class of 2017 IEEE Fellow

Stephen Milton is a Professor in the Electrical and Computer Engineering Department at Colorado State University (CSU) and holds a joint appointment in the Department of Environmental and Radiological Health Sciences.

Since the early days of his career, Milton has been on a quest to push the frontiers of free-electron lasers (FELs)—a powerful type of light source in which a laser beam is generated from clusters of oscillating relativistic electrons that emit coherently. From understanding the mechanism of why we age, to bolstering missile defense, FELs are revolutionizing science. His work has laid the groundwork for bringing high-quality light to a broad user community.

Among his many firsts, Milton demonstrated the first FEL operating from a self-amplified seed of light that grows to extreme intensities. He next led the design, engineering, and construction of the $55 million undulator magnet system for the Linac Coherent Light Source (LCLS), the world's first X-ray FEL. Milton then led the final design, construction, and initial commissioning of the world's first high-gain, harmonic-generation FEL user facility, FERMI@elettra.

In addition to using particle accelerators for light sources, Milton is engaged in multidisciplinary collaborations that leverage other machine genres to advance medical applications and enable big science endeavors in high-energy physics. Using particle accelerators as a key tool, Milton is working in partnership with a team of researchers in CSU's College of Veterinary Medicine and Biological Sciences to launch a cancer therapy and research institute aimed at providing free-of-charge radiation therapy for humans and companion animals.

Milton, who received a bachelor's degree in physics from the University of California-Davis and a Ph.D. in physics from Cornell University, is the recipient of the IEEE Particle Accelerator Science and Technology Award, is an elected member of the IEEE/NPSS Administrative Committee, and is a Fellow of the American Physical Society.

Citation: *For contributions to free-electron lasers.*

Bryan V. Oliver

Bryan V. Oliver
Class of 2017 IEEE Fellow

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 in 1991 and 1994, respectively.

Over the course of his career he has worked at the Institute for Non-Linear Science at the University of California, San Diego; the Plasma Physics Division at the Naval Research Laboratory, Washington D.C.; Mission Research Corporation, Albuquerque, New Mexico and Sandia National Laboratories, Albuquerque, New Mexico. Presently, 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 has authored or

FUNCTIONAL COMMITTEES
Continued on **PAGE 8**

Functional Committees Continued from **PAGE 7**

coauthored over 100 publications, received eight NNSA Defense Programs Awards of Excellence, and is a recipient of the Department of Energy Secretary's Achievement Award.

Dr. Oliver is a member of the Institute of Electrical and Electronic Engineers and serves on the IEEE NPSS Pulsed-Power Sciences and Technology Committee, the Plasma Science and Applications committee and the International High Power Particle Beams committee. He has served as a Guest editor for the *Transactions on Plasma Science* and as an IEEE Distinguished Lecturer. In 2013, he was Chair of the Pulsed Power Plasma Science (PPPS 2013) conference.

Citation: *For contributions to the theory and simulation of intense particle beams and plasmas.*

We also congratulate other NPSS members elevated to Fellow in the Class of 2017, Hulya Kirkici for contributions to high frequency, high field dielectric breakdown and electrical insulation for space and aerospace power systems, nominated by Dielectrics and Electrical Insulation Society, and Jin Jiang for contributions to methodology, design, and evaluation of engineering systems safety, nominated by Product Safety Engineering Society.

PLASMA SCIENCE AND APPLICATIONS COMMITTEE 2017AWARD

Alan Phelps
2017 Plasma Science and Applications Committee Award recipient

The 2017 Plasma Science and Applications Committee (PSAC) Award for outstanding contributions to the field of Plasma Science has been awarded to Professor Alan Phelps of the University of Strathclyde in the United Kingdom. The PSAC Award recognizes those who have made outstanding contributions to plasma science. As part of the award, Alan Phelps will present a Plenary Lecture at the 44th International Conference on Plasma Science (ICOPS 2017) to be held in Atlantic City, New Jersey, USA from May 21st to May 25th, 2017.

Alan Phelps graduated in physics from Cambridge University in 1966 and received his doctorate for plasma research from Oxford University in 1970. After postdoctoral fellowships at Oxford University, Imperial College, London University and a year in the USA, followed by a research appointment at Oxford University, he moved to a permanent academic position at the University of Strathclyde in 1978. At Strathclyde he formed a new research group working on intense electron beams, plasmas, and microwave sources. In 1993 he was appointed to a personal chair in plasma physics and became deputy head of department and later head of department. He has published several hundred research papers and served on many national and international committees. Alan is a member of the IEEE and a Fellow of several scientific organizations, including the UK Institute of Physics, the American Physical Society, and the Royal Society of Edinburgh. Professor Phelps' research interests include plasma waves and instabilities in laboratory, ionospheric and magnetospheric plasmas, intense relativistic electron beams and novel high-power microwave and millimeter-wave sources.

Citation: *For groundbreaking and influential contributions to the field of plasma science, including: diagnostics, waves, plasma-surface interactions, beam instabilities, ionospheric plasmas, magnetospheric science and novel microwave radiation sources.*

AMANDA M. LOVELESS WINS OUTSTANDING STUDENT PAPER AWARD AT ICOPS 2016

Amanda Loveless
Outstanding Student Paper Award

Amanda Loveless, Ph.D. student at Purdue University in the Department of Nuclear Engineering under the tutelage of Prof. Allen Garner, received first place for the NPSS Outstanding Student Paper for her presentation entitled *Generalization of Scaling Laws for Gas Breakdown to Account for Pressure* at the 2016 ICOPS Awards in Banff.

The first Runner-Up for the NPSS Outstanding Student Paper was Xi Tang for his work on *Recent Advances in Theory and Experiment of Metamaterial-based High Power Radiation Devices*, while the final three of the top five in the Student Paper Award competition, the CRC Book Prize winners, were: Vighneswara Siva Santosh K Kondeti, David Yager-Elorriaga, and Brett Scheiner.

A summary of Loveless's work, to be published in IEEE *Transactions on Plasma Science* follows:

Breakdown laws fail to predict accurately the breakdown voltage, V_b, for microscale gaps. Loveless and Garner take laws previously used to model atmospheric argon discharges and extend them to 100 nm to 30 μm gaps. Paschen's Law predicts the breakdown voltage between two electrodes via Townsend discharge. Where the Paschen Law is written as:

$$V_b = \frac{Bpd}{\left[ln(Apd) - ln\left[ln\left(1 + {}^{1}/_{\gamma_{SE}}\right)\right]\right]}$$

where p is gap pressure, d is electrode gap distance, A and B are material constants, and γ_{SE} is the secondary electron emission coefficient. This equation highlights the dependence of the breakdown voltage, V_b, on pd [1]. Boyle and Kisliuk have shown that, while accurate in macroscale systems, Paschen's Law fails to accurately describe the breakdown behavior of the scales applicable to micromechanical, and other such microscale, systems [4].

When looking at these microscale systems, the field emission effects, predicted by Fowler and Nordheim [18], but neglected in the Paschen Law, must be considered [19]. In the traditional PL model, decreased gap length is equated to fewer opportunities for ionizing collisions, with the extreme being that electrons can transit the gap without ever having ionized gas molecules. Thus, PL would predict that smaller *pd* lead to larger V_b. This falls apart when considering large enough electric fields in which field emission, or electrons tunneling from the cathode, occurs. The smaller the gap, the larger the electric field is for a given gap voltage. Similarly, the smaller the gap length, the more likely it is for positive ions to collide with the cathode prior to recombination, thus freeing more electrons. It is the combination of the excess electrons from field emission and the excess of electrons from the positive ions colliding with the cathode that cause a decrease in breakdown voltage at small distances [20], contrary to PL predictions.

"Modified Paschen curves" have been created which include both the Townsend effects and field emission effects [19, 20, 27-33]. Loveless and Allen improve upon these data, avoiding the dependence on experimentally determined fitting parameters and the need for numerical solutions through "an asymptotic analysis these modified Paschen's models.' From this, they derive the analytic expressions for atmospheric breakdown voltages as a function of gap distance in argon [34].

The Loveless model has been demonstrated to accurately predict breakdown voltages in nitrogen, argon, helium, and oxygen through the use of a fitting parameter, β. These models are substantiated through comparison with numerical solutions, analytic equations, PIC simulations, and experimental data.

See IEEE Xplore for a partial list of references and the full paper, yet to be published, for the full list.

To enter the Student Paper Award competition, candidates should check the box for the Best Student Paper Award during abstract submission and advisors should promptly submit a letter of support indicating that the work is primarily that of the student.

RADIATION INSTRUMENTATION AWARDS SUBCOMMITTEE REPORT

Cinzia Da Via
Chair, RI Awards Subcommittee

I had the honor to be appointed for 2016 as RISC Honors and Awards Subcommittee Chairperson and I would like to give you a brief report of this year's activities.

The RISC had to assign two prestigious awards in 2016: the Radiation Instrumentation Early Career Award (RIECA) and the Glenn F. Knoll Radiation Instrumentation Outstanding Achievement Award (RIOAA).

First of all we decided to publish on the RITC web-page the Committee members' names and the ways to manage and solve Conflict-of Interest that might arise in order to increase the perception on transparency and conflict-of-interest management. Committee Members cannot nominate anybody for RI awards. If a committee member is asked to write a reference for a candidate, that member will then recuse him/her self from participating in candidate evaluation.

The Radiation Instrumentation Early Career Award is given to a young investigator in recognition of significant and innovative technical contributions to the fields of radiation instrumentation and measurement techniques for ionizing radiation. The prize consists of $1,500 and an engraved plaque. For 2016 the RIECA Committee Members were Zane Bell (Oak Ridge National Laboratory, USA), Gianluigi De Geronimo (at that time at Brookhaven National Laboratory, USA), Grzegorz Deptuch (Fermi National Accelerator Laboratory, USA), Lorenzo Fabris (Oak Ridge National Laboratory, USA), Stuart Kleinfelder (University of California, Irvine, USA), Chiara Guazzoni (Politecnico di Milano & INFN, Italy) and Richard Lanza (Massachusetts Institute of Technology, USA).

The Committee received seven new nominations for 2016 for the RIECA as well as the two top candidates (runner-ups) from the 2015 selection process for reconsideration. Applications were carefully evaluated by the Committee. Unfortunately not all nominations were of adequate profile for this award, probably because some of the nominators may have overlooked the difference between a grant (financial support in view of something) and an award (prize in recognition of something that has been achieved). The Committee decided to keep the two runners-up of this year (applications of extremely high profile) for the 2017 edition of the award and the nominators will be asked to update their nomination well in advance of the 2017 deadline.

The 2016 Radiation Instrumentation Early Career Award was presented on October 31st during the opening ceremony of the 2016 Nuclear Science Symposium to Marc-André Tétrault, nominated by Réjean Fontaine (professor at the Université de Sherbrooke, Canada) *for contributions to the field of real time radiation instrumentation data acquisition systems applied to Positron Emission Tomography*. In addition to the certificate and the plaque, the awardee received a copy of Glenn Knoll's textbook donated by Bill Moses and dedicated to him by Glenn Knoll. Marc-André, who received his Ph.D. in 2016 from the Université de Sherbrooke, is author of 24 peer-reviewed publications and 27 conference proceedings. His Ph.D. research focuses on a 3D stacked heterogeneous digital SiPM module for time of flight PET. He was responsible for coordinating the 3D integration between the three tiers and designing

Photo by Ralf Engels

Marc-André Tétrault receives the 2016 Radiation Instrumentation Early Career Award "for contributions to the field of real-time radiation instrumentation data acquisition systems applied to Positron Emission Tomography" during the opening session of the 2016 IEEE Nuclear Science Symposium in Strasbourg on October 31st, 2016. From left to right: Chiara Guazzoni, Marc-André Tétrault, Susanne Kuehn, Eckhard Elsen.

the real-time digital data acquisition system (DAQ). The chip design took advantage of the 3D vertical hierarchy to reduce the timing jitter caused by the layout of the trigger tree, and included a full-fledged DAQ system directly under the detector. The DAQ also included a novel dark count discrimination circuit. To Marc-André all our congratulations and good luck for the new post-doc position at Harvard University.

The prestigious Glenn F. Knoll Radiation Instrumentation Outstanding Achievement Award is given to an individual in recognition of outstanding and enduring contributions to the field of radiation instrumentation. The prize consists of $3,000 and an engraved plaque. For 2016 the RIOAA Committee Members were Zane Bell (Oak Ridge National Laboratory, USA), Chiara Guazzoni (Politecnico di Milano & INFN, Italy), Richard Lanza (Massachusetts Institute of Technology, USA), Paul Lecoq (CERN, Switzerland) and Veljko Radeka (Brookhaven National Laboratory, USA).

The Committee received three new nominations for 2016 and included the two top runner-ups from 2015 for reconsideration. Applications were carefully evaluated by the Committee.

The 2016 RIOAA was presented on October 31st during the opening ceremony of the 2016 Nuclear Science Symposium to Christopher (Chris) Damerell, physicist at Rutherford Appleton Laboratory, UK for outstanding contributions to the development of silicon pixel vertex detectors, in particular Charge Coupled Devices for high energy physics experiments and other fields" Chris was nominated by Patrick Le Dû, senior physicist at the IPN Lyon, France.

He summarizes his career path as follows:

"Damerell's group, working in the ACCMOR Collaboration (Amsterdam, CERN, Cracow, Munich, Oxford, Rutherford) studied the possibility of silicon pixel detectors to be used as vertex detectors for charm production experiments, starting in 1978, as part of the follow-up to the 'November Revolution', the discovery of the J/psi in 1974. Simulations clearly demonstrated that two layers of pixel detectors, close to the interaction point, could provide excellent topological reconstruction, i.e. clean association of the tracks to the primary and secondary vertices in charm production. When later extended to B physics, the separation between primary, secondary and tertiary vertices was even cleaner, due to the longer lifetimes of B hadrons. However, in the late 1980s, such ideas were widely viewed with skepticism by the particle physics community. The UK funding panel regarded them as 'too speculative' to be given any financial support at all. Fortunately, Erwin Gabathuler, then director of EP Division at CERN, was able to provide some initial support, as a result of which a telescope of 4 CCDs was installed in the t6 beam in the East Hall of the P.S. Quite quickly, it was possible to demonstrate nearly 100% efficiency for detecting beam tracks in each layer, with about 3.5 micron spatial resolution. These results were obtained with an average density of about 20 beam particles per mm^2. Such results were entirely unprecedented (except in nuclear emulsions, which could not be used in any high rate conditions), and generated excitement in the community, and the necessary financial support to try these detectors in real experiments.

The first such experiment used the ACCMOR spectrometer already running in the North Hall of the SPS, where a 200 GeV pion beam was incident on a thin copper target. Adding just two CCDs at 1 and 2 cm beyond this target, enabled charm decays to be seen even in the real-time event displays before offline reconstruction. The off-line reconstruction was then followed for some thousands of topologically reconstructed charm decays, allowing identification and lifetime measurements to be made for many species of charmed hadrons, some of which even today remain the best lifetime measurements (for the shortest-lived charmed particles).

The next step involved a daring decision on the part of Marty Breidenbach and the SLD collaboration leadership, to build a CCD-based vertex detector for that facility. This was done in two stages, with the full detector, which did most of the physics, being a 307 Mpixel, 3-layer assembly of barrels surrounding the SLD interaction region. Due to the small beampipe (25 mm radius) and the availability of longitudinally polarised electrons, the SLD detector was able to cover a large range of heavy-flavour physics that was inaccessible at LEP, despite their much higher luminosity.

Since those early days, vertex detectors based on silicon pixels have become more and more powerful and widely used, in a whole range of experiments, including ATLAS, CMS, KEK-B, the STAR detector at RHIC and (coming soon) LHCb. Many young physicists today regard silicon pixels as the 'obvious choice' for vertex detectors, possibly not realising that 35 years ago they were considered 'too speculative', and certainly less promising than holographic bubble chambers, streamer chambers, high pressure drift chambers, silicon microstrips, etc, all of which were receiving generous R&D funding at that time. As has been mentioned, it was by good fortune that modest startup funds were provided by a back-door route, which enabled the enthusiasts for this idea to prove that it could be made to work. This is one of many examples of an ancient Chinese saying, that 'the person who believes something to be impossible, should not hinder the one who is trying to do it'. All members of the ACCMOR/SLD vertex detector group are very grateful to the IEEE RISC Honors and Awards Sub-committee, which has acknowledged the importance of this contribution to the historical development of a new class of detectors.

In summary, the capability of silicon pixel vertex detectors has grown remarkably over the years, and is able to meet the challenges associated with reconstructing short-lived particles containing heavy quarks, even in the 'inferno' of the ATLAS and CMS interaction regions. Meanwhile, silicon pixel devices have revolutionised imaging in many fields of science, as well as the mass-market cameras that are used by everybody today."

2016 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 recognizes 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.

It is our pleasure to announce the following 2016 NSREC Award winners. Their awards will be presented at the 2017 Conference.

OUTSTANDING CONFERENCE PAPER

Inclusion of Radiation Environment Variability in Total Dose Hardness Assurance Methodology, by *M.A. Xapsos, C. Stauffer, A. Phan, S.S. McClure, R.L. Ladbury, J.A. Pellish, M.J. Campola, and K.A. LaBel.*

OUTSTANDING STUDENT PAPER

Dark Current Spectroscopy in neutron, proton and ion irradiated CMOS Image Sensors: from Point Defects to Clusters, *by J.-M. Belloir, V. Goiffon, C. Virmontois, P. Paillet, M. Raine, R. Molina, O. Gilard, P. Magnan.*

OUTSTANDING DATA WORKSHOP PRESENTATION

Compendium of Single Event Effects Results from NASA Goddard Space Flight Center, *by M. V. O'Bryan, K. A. LaBel, C. M. Szabo, D. Chen, M. J. Campola, M. C. Casey, J.-M. Lauenstein, J. A. Pellish, M. D. Berg.*

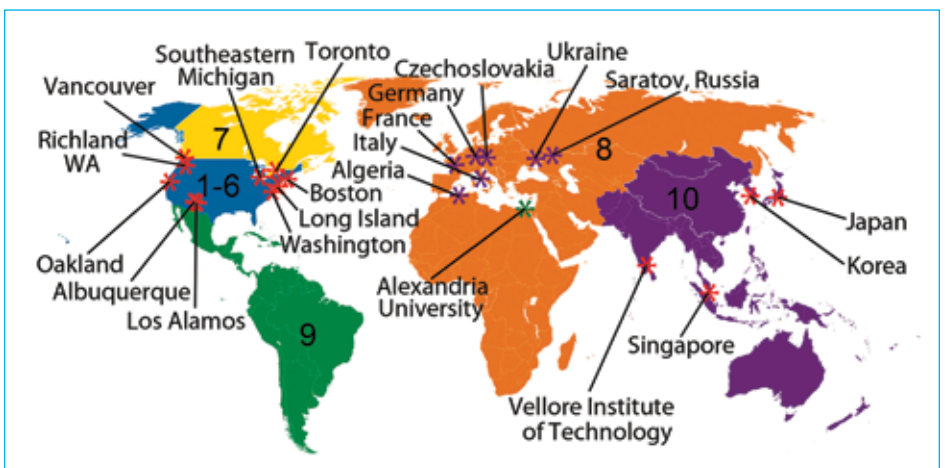
For information on Radiation Effects awards please contact Allan Johnston, Chair, Radiation Effects Technical Committee at johnstonah25@gmail.com.

CHAPTERS

Steve Gold
Chapters Chair

The IEEE is organized around regional activities (Sections) as well as technical activities (Societies and Councils). At the intersection of these two are Chapters and Student Chapters. Chapters are local units of the IEEE that are part of their Region and Section (or sometimes more than one Section), but are affiliated with one or more IEEE Societies, while Student Chapters are student-run organizations that are affiliated with one or more Societies but are formed within an IEEE university Student Branch. The purpose of both kinds of chapters is to serve their members by sponsoring local activities that are linked to the technical areas of interest of their members, such as lectures with guest speakers, workshops, and social activities such as dinner meetings that provide opportunities for networking. In addition, chapters provide opportunities for leadership training. The NPSS currently has 22 active chapters and joint chapters around the world, including two student branch chapter. Of these, 8 are in the United States (Regions 1–6), 2 in Canada (Region 7), 8 in Europe, including eastern Russia, Africa and the Middle East (Region 8), and 4 in Asia (Region 10). Their locations are shown on the accompanying map. The two newest are a chapter in Southeastern Michigan and a student branch chapter at the Vellore Institute of Technology, in Tamil Nadu, India, both of which were established in 2015. As a matter of policy, the NPSS provides both technical support to its chapters, via our active Distinguished Lecturers program, as well as annual financial support, and will provide active assistance in the formation of new chapters, wherever there is interest and enough NPSS members to support a local chapter. There are currently efforts under way to form new chapters in China and the United Kingdom, and new student chapters in France and Costa Rica. Information on our chapters program can be found at http://ieee-npss.org/chapters/.

For additional information, or if you are interested in establishing a new NPSS chapter, please contact Steven Gold, the NPSS Chapter Coordinator, at steeve@ieee.org



Map showing current locations of NPSS chapters.

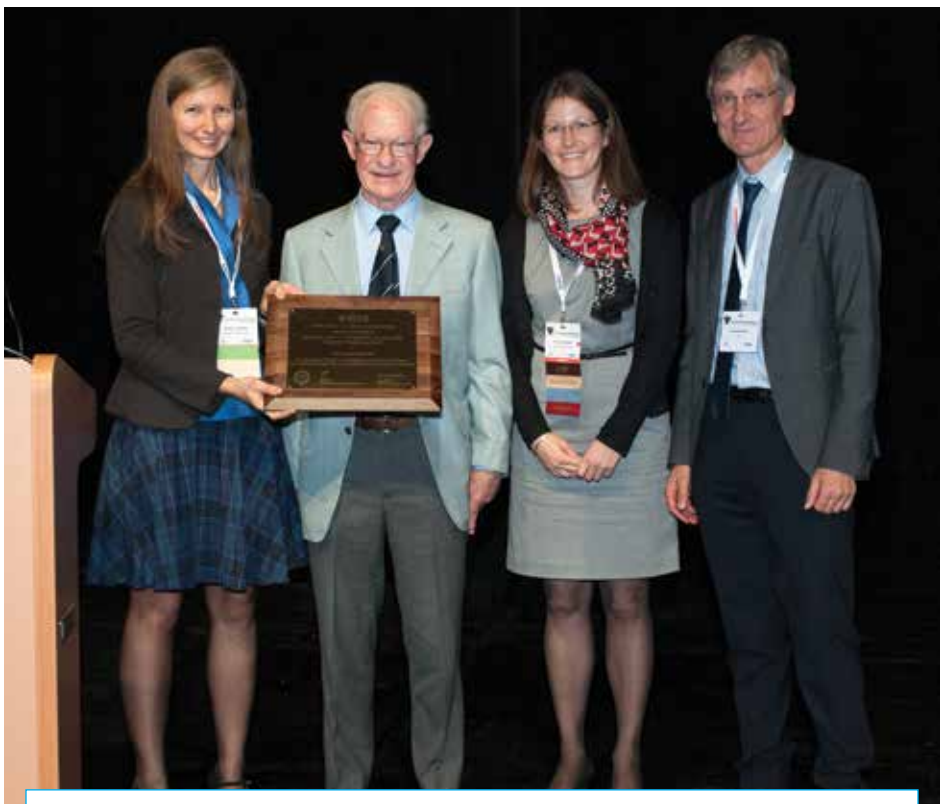


Photo by Ralf Engels

Chris Damerell receives the 2016 Glenn F. Knoll Radiation Instrumentation Outstanding Achievement Award "for outstanding contributions to the development of silicon pixel vertex detectors, in particular Charge Coupled Devices for high energy physics experiments and other fields." From left to right: Chiara Guazzoni, Chris Damerell, Susanne Kuehn, Eckhard Elsen.

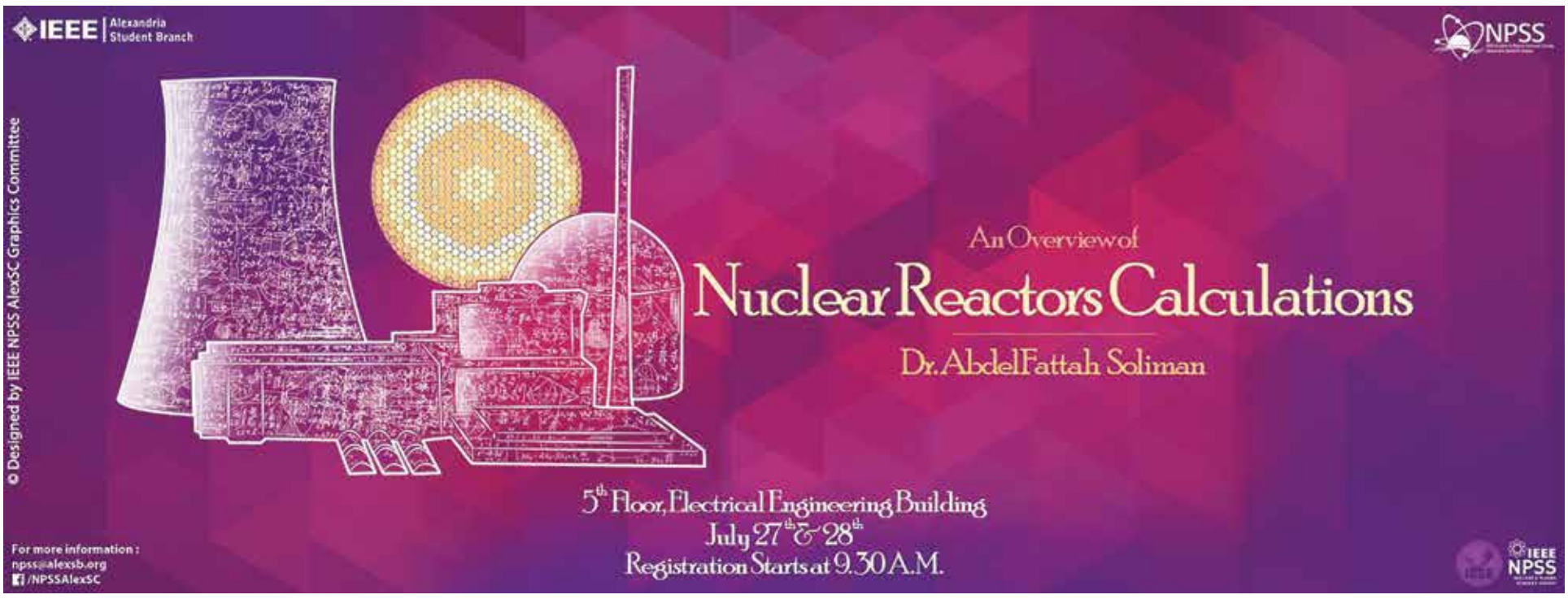
ONLY IF YOU PAY ATTENTION

Thucydides says history is philosophy learned from examples.

Dionysius of Halicarnassus

FUNCTIONAL COMMITTEES Continued on **PAGE 10**

Functional Committees Continued from **PAGE 9**



Poster for Alexandria Student Branch Chapter Workshop.

ALEXANDRIA STUDENT BRANCH CHAPTER

Mahmoud El-Tawila
NPSS Alexandria SC Vice chair and author

Haidy Mohamed
Secretary Alex SC

The Alexandria Student Branch Chapter has recently organized two events that targeted the students of the Nuclear & Radiation engineering department in Alexandria University; the first one is a short course named An Overview of Nuclear Reactor Calculations and the second one is a session entitled Understand the Roadmaps. Dr. Abdelfattah Soliman, an assistant professor of Nuclear Engineering, King Abdulaziz University, was our guest presenter for the two events.

The main focus of the short course was to present some parts of the framework of nuclear reactor design. It was oriented towards the technical and professional work that is being done in industry and research institutes. Knowing that our target audience was freshmen students who had only taken a basic "Introduction to Nuclear Engineering" course and that the topic was somewhat advanced it was necessary to introduce some concepts and basics to the audience to help them understand the engineering problems faced during the work.

The short course covered topics such as: Reactor Criticality, Nuclear Data, Benchmarking, Fuel Management, Reactor Thermal Hydraulics and Reactor Design. It was a very beneficial course that we in NPSS Alex SC were very glad to organize.

Our second event "Understand the Roadmaps" was previously organized in 2013 and we were more than happy to present it again to a new audience. The roadmap's purpose is to connect all the 56 courses in the curriculum of the Nuclear & Radiation Engineering Department, Alexandria University.

Alexandria Student Branch Workshop Underway.

The nuclear engineering major includes courses from diverse disciplines such as Electrical, Mechanical and Thermal engineering. All these courses with their diversities form a road map towards the many applications and technologies in the nuclear field. This seminar helps the students to link these courses together and understand the object of each course.

In 2015 we started the NPSS open courseware project believing in the idea of free and open educational sharing. The graphics committee of NPSS Alex SC is doing a great job to videotape and edit the lectures to make them available for everyone. We've already published three courses under this project on YouTube. The "Understand the Roadmaps" seminar was also published recently. And soon our recent short course An Overview of Nuclear Reactors Calculation will be available.

Haidy Mohamed, the secretary of the Alexandria Student Brach Chapter can be reached by E-mail at haidymohammed94@gmail.com

Liaison Reports

EDUCATIONAL ACTIVITIES BOARD

Edl Schamiloglu
NPSS Liaison to EAB

LIMA ACCORD SIGNED BY SEVEN LATIN AMERICAN AND CARIBBEAN ACCREDITING BODIES

Two years of work culminated in the signing of the "Lima Accord" on 6th September 2016. Representatives of the accrediting agencies and IEEE gathered in Lima to officially launch this international accreditation agreement between the bodies responsible for accreditation in Latin America and the Caribbean (IEEE Region 9).

Accords are mutual recognition agreements in which two or more accrediting agencies agree to provide equal recognition to all programs accredited separately by each one of the entities who are parties to the accord. The objective of these accords is to ensure that degrees of graduates from programs of one county or region are fully recognized in another.

The signatories of the Lima Accord included the following accreditation agencies:

- Agencia Acreditadora Colegio de Ingenieros de Chile (Chile)
- Agencia de Acreditación de Programas de Ingeniería y de Arquitectura (Costa Rica)
- Caribbean Accreditation Council of Engineering and Technology (CACET)

» Consejo de Acreditación de la Enseñanza de la Ingeniería Superior, A.C. (Mexico)

» Instituto de Calidad y Acreditación de Programas de Computación, Ingeniería y Tecnología (ICACIT - Peru)

» Sistema Nacional de Evaluación, Acreditación y Certificación de la Calidad Educativa (SINEACE - Peru)

An additional agency, the Agencia Centroamericana de Acreditación de Programas de Arquitectura y de Ingeniería (ACAAI - Central America) was not able to attend, but signed the accord at the end of September in a separate ceremony.

NEW #IEEELESSONSINACTION CAMPAIGN HIGHLIGHTS PRE-UNIVERSITY STEM EDUCATION

IEEE Educational Activities recently launched a new social media campaign to excite and inspire pre-university STEM educators about their implementation of the free lesson plans that are available at TryEngineering.org, TryComputing.org, and TryNano.org. The goal of the new #IEEELessonsInAction (go to TryEngineering.org to view this) campaign is to encourage educators to share photos from their classrooms when creatively implementing any of IEEE's 130+ engineering, computing, and technology lesson plans.

Additional information about the #IEEELessonsInAction campaign and promotional materials can be found at http://bit.ly/IEEELessonsInAction.

CONTINUING EDUCATION

More than 120,000 learners have registered for IEEE's Massive, Open, Online Courses (MOOC) since the partnership with learning provider edX was established in 2014. Recent courses on smart grid and smart cities have attracted learners of all ages from all around the world. Look for content on the National Electrical Safety Code® (NESC®), cybersecurity and more in later 2016 and early 2017.

Meanwhile, the eLearning Library—the online learning resource that delivers more than 400 courses in core and emerging technologies—released over a dozen new courses on hot topics in cybersecurity, the Internet of Things, ethical hacking and more. Through the IEEE Certificates Program, Educational Activities works with Societies, Sections, Chapters, and other IEEE units to deliver certificates awarding Continuing Education Units (CEUs) and Professional Development Hours (PDHs), as well as certificates of participation, directly to attendees of their educational events via email.

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

THE CAREER GAME CHEAT CODE: IEEE YOUNG PROFESSIONALS

Mario Milecivic
Past IEEE YP Chair

Why do young people come to the IEEE? For those in academia, the answer is simple: "I need to publish papers in order to graduate." But for those working as engineers or scientists in industry, the decision to join is typically much more personal and focused on long-term career development.

As a member of the IEEE, you are part of a global network of over 400,000 highly skilled and technically qualified individuals that can help influence and shape your development as a young engineer, scientist, or associate in a related field. So regardless of whether you wish to pursue academia or dive into industry, the IEEE is here to serve as your career backbone.

But how? There's so much going on in the IEEE. For newcomers, the learning curve can be overwhelming. The IEEE runs over 1,500 technical conferences annually, the IEEE Xplore Digital Library has over 4 Million indexed technical publications, there are over 1,400 active working groups developing IEEE Standards, and over 25 meetings are held each day in local chapters, branches, and sections. The good news is that there's no shortage of activity, but the question many young members ask is: how exactly does the IEEE advance my career? This is where the IEEE Young Professionals program comes in.

The newly rebranded IEEE Young Professionals program now focuses primarily on providing young members with meaningful professional networking and mentorship opportunities, as well as opportunities to stay technically relevant and develop new skills.

PROFESSIONAL NETWORKING AND MENTORSHIP

Heading to an IEEE conference soon? Be sure to check out the IEEE Young Professionals program part of the conference agenda. Many flagship IEEE conferences now feature a special on-site event for IEEE Young Professional members such as a career panel, hackathon, or "breakfast with mentors," as well as an off-site meetup at a nearby pub or restaurant where you can mix and mingle with local IEEE members. What better way to expand your professional network than to meet new IEEE members in a new city and in a relaxed environment?

Earlier this year, the IEEE Young Professionals team from the IEEE Circuits and Systems Society hosted a 2-hour tech entrepreneurship panel for students and young professionals during their flagship 2016 IEEE International Symposium on Circuits and Systems in Montreal, Canada. Immediately following the on-site event, participants were invited to an informal evening reception at a beer hall across the street where they had the opportunity to network among each other, as well as with IEEE members from the local IEEE Montreal Section, thanks to the coordinated efforts of the IEEE Montreal Young Professionals Affinity Group.

On the other side of the continent, the IEEE Young Professionals team from the IEEE Microwave Theory and Techniques Society organized a career panel with experts from academia and industry during the 2016 IEEE International Microwave Symposium in San Francisco, California. Naturally, the event was followed by an evening reception in a nearby billiard hall with local IEEE members from the IEEE San Francisco Section.

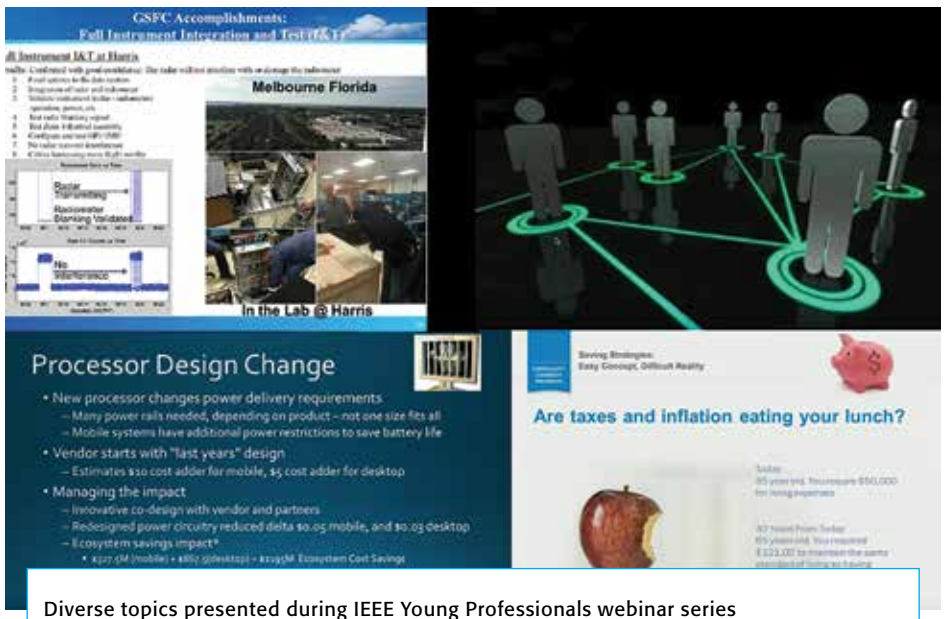
These are two of the most recent meetups held at Society conferences in 2016, however, there's action to be found in almost all of the IEEE Technical Societies, including Photonics, ComSoc, EDS, DEIS, NPSS, SSCS, and EMC. The IEEE Consumer Electronics Society will be hosting a special IEEE Young Professionals program during the annual IEEE International Conference on Consumer Electronics, which coincides with the world-famous Consumer Electronics Show in Las Vegas, Nevada.

While these large-scale events typically draw over 200 participants, there are other ways to connect with IEEE members and explore professional networking and mentorship opportunities. Get in touch with the local IEEE Young Professionals Affinity Group in your IEEE Section to learn more about

LIAISON REPORTS Continued on **PAGE 12**

IEEE Young Professional meetups bring together IEEE members from around the world

IEEE N3XT global entrepreneurship summit



Diverse topics presented during IEEE Young Professionals webinar series

IEEE congresses provide career and leadership training to IEEE volunteers

NO JOKER

There is no objection to his [Gladstone's] always having the ace of trumps up his sleeve, but only to his pretence that God had put it there.

Henry Labouchere (paraphrase)

Liaison Reports Continued from **PAGE 11**

upcoming events and ways to connect with your local community.

ADVANCING AND DEVELOPING TECHNICAL SKILLS

While many employers invest in career development and training for their employees, there are two things that your employer will never teach you: (1) how to be an entrepreneur, and (2) technical skills in a different technical field, focus area, or discipline. But for many young people, the job market is very different than what their parents lived through. We now stay at a job for 1 or 2 years, and then hop over to a better position, and on again in another few years. Geographic boundaries are more flexible, and we no longer feel the need to remain in a specific technical field. The IEEE can serve as a tremendous resource during these times of transition.

Has the idea of launching your own company ever crossed your mind? Overwhelmed by all the risks and unknowns? The global IEEE Young Professionals team has been working closely with the new IEEE Entrepreneurship initiative http://entrepreneurship.ieee.org to help create and curate online content relevant to tech entrepreneurs, as well as in the development and execution of IEEE N3XT entrepreneurship summits, which convene the global tech entrepreneur community, including founders, venture capitalists, and aspiring innovators. The IEEE can help serve as your support network as you incubate and launch your technology to the world.

Not ready to take the plunge? That's perfectly fine. Many young members are simply looking to stay relevant in their field or gain some new skills in a hot new area. The IEEE Young Professionals program launched two technology bootcamps this year with the aim of providing hands-on training in the development and deployment of modern core technologies, at zero cost to IEEE Young Professional members. The Mobile App Development bootcamp in Bangalore, India and the IoT Technology bootcamp in Medellin, Colombia were two pilot events with over 50 participants each that demonstrated the need for such training workshops. Stay tuned to IEEE Young Professionals social media and newsletters for 2017 bootcamp dates and locations.

For the busy young professional, monthly webinars hosted by IEEE Young Professionals provide a quick way to learn more about special topics such as personal finance, career leadership, and select technical topics with a very low time commitment. Our webinar program has featured technical experts from multiple Technical Societies such as Consumer Electronics, Electromagnetic Compatibility, Microwave Theory and Techniques, Robotics and Automation, and Technology Engineering Management. Several Societies such as Electron Devices and Power and Energy feature their own discipline-specific webinars with more depth. Again, check out the IEEE Young Professionals social media and monthly newsletter for upcoming virtual events.

YOUR MOVE

The IEEE Young Professionals IMPACT Blog http://yp.ieee.org/impact features all of the latest developments in the global IEEE Young Professionals community, from interviews with prominent IEEE volunteers to highlights on past events and upcoming initiatives. If you see something you like, reach out to the editor to see how you can get involved. There's no shortage of volunteer opportunities in the IEEE, and we are always looking for young people to share their thoughts, experiences, and energy with this thriving organization.

The IEEE Young Professionals community is a very tightly knit group that meets frequently all around the world. Just in the past few months, we hosted the first-ever IEEE-USA Future

Leaders Forum in New Orleans, as well as biennial congress events in Toronto, Canada (Region 7), Regensburg, Germany (Region 8), Guayaquil, Ecuador (Region 9), and Bangalore, India (Region 10). Young professionals—you are the future of the IEEE. Take advantage of what it has to offer, get involved, and help shape the future of technology.

Mario Milicevic was the 2015-2016 Chair of the IEEE Young Professionals Committee, and is a Ph.D. Candidate at the University of Toronto where his research focuses on the integrated circuit design of error correction decoders for wireless, optical, and quantum security systems. He can be reached by E-mail at mario.milicevic@ieee.org.

Articles

The Data Acquisition System of the KOTO Experiment

Stephanie Su
Author

At the beginning of the universe, equal amounts of matter and antimatter were created. When matter and antimatter come in contact, they annihilate into energy. However, as far as we know, our universe is mainly composed of matter. Where did all the antimatter go and why there is more matter than antimatter? This is the driving motivation for the KOTO experiment.

Charge-Parity (CP) symmetry, part of the well-established Standard Model in particle physics, describes the behavior of equal generation of matter and antimatter particles. This symmetry is violated when the imbalance of asymmetry of matter and antimatter occurs. In the Standard Model, the strength of the CP violation is related to the Cabibbo-Kobayashi-Maskawa (CKM) matrix [1], which is used to numerically determine the branching ratio - the probability of a particle decaying into a specific decay mode. We can, therefore, experimentally determine the strength of CP violation by measuring the branching ratio of the corresponding particle decay in the CKM matrix.

The KOTO experiment is located at J-PARC, Ibaraki, Japan. The goal of the KOTO experiment is to search for a particular decay of the long-lived neutral kaon meson, $K_L \to \pi^0 \nu\bar{\nu}$, and measure its branching ratio. This particular process is a direct CP violating decay. The theoretical prediction from the Standard Model of the branching ratio of this decay is 3x10-11 [2]. Presently, this rare decay mode has yet to be observed.

We use high-intensity proton beams provided by the J-PARC accelerator to create Kaons. In future steps of the experiment, we plan to increase the beam intensity to achieve the event sensitivity at the Standard Model level. The first KOTO experiment run was conducted in May 2013, using 24 kW beam power. The beam intensity increased to 41 kW for the 2015 and 2016 experiment runs. To observe this one out of 30 billion rare decays, the balance between the amount of data collection and the event selections is critical. A data acquisition system capable of handling high trigger rates and performing complex event selections was implemented. A schematic of the data acquisition chain is shown in Figure 1. The KOTO data acquisition system uses 125 MHz and 500 MHz ADCs to digitize detector waveform signals, followed by two levels of hardware triggers and one level of software trigger for online event selections and event building. Several upgrades to the data acquisition system have been made since the first KOTO experiment run in May 2013. These upgrades include the usage of lossless data compression inside the ADC and the development of a complete new computer cluster trigger in order to create a high livetime (low deadtime) data acquisition system.

Detector waveform signals from 4000 channels are digitized by the ADCs into 14 bits and 12 bits, using two different frequencies of 125 MHz and 500 MHz respectively based on different detector sampling requirements. These digitized waveform signals are compressed under a lossless data compression algorithm inside each ADC to allow more triggers to be analyzed in the downstream data acquisition chain. Energy values from the triggers are sent to the Level 1 hardware trigger (L1) for trigger decisions. Each L1 trigger board sends the sums of energy via the daisy-chain VME P3 backplane to the master L1 trigger board. The master L1 trigger board uses the energy sum information to make the trigger decision every 8 ns. The ADC pipeline readout allows trigger decisions in the L1 to be made before sending data to the Level 2 hardware trigger (L2) via optical fibers. The L2 trigger hardware setup is identical to the L1 trigger system and the trigger decision is the made based on a unique physics characteristic of the rare decay.

To assemble the event fragments scattered among all the trigger modules, Level 3 (L3) software trigger receives the data from each L2 board using 1 Gbps Ethernet connections and builds complete events using an Infiniband switch. The L3 trigger system is a computer cluster made of a computer head node and 47 computer worker nodes. Each has a 10 Gbps Infiniband connection to the switch. The worker nodes are divided into two groups (Type 1 and Type 2) for different job tasks. Type 1 nodes receive event fragments from the L2 trigger and send them to the corresponding Type 2 nodes via the Infiniband for event building. Type 2 nodes collect all the event fragments from the Type 1 nodes and construct complete events. At this point, Type 2 nodes can uncompress the data for online data analysis, and then re-compress the data for storage.

The current data acquisition successfully ran with up to 80% livetime without the ADC lossless compression and up to 95% with the ADC lossless compression during the experiment runs from 2015 to 2016, as shown in Fig. 2. To achieve the goal of the KOTO experiment, we plan to increase the beam intensity beyond 50 kW. To maintain high data acquisition livetime and efficient event selection, we are developing the new L2 hardware trigger with the RCE Platform Technology (RPT) [4]. This will allow us to move the event building process upstream, enhance the flexibility of the event selection, and allocate more online data analysis resources in the L3 trigger. We will continue making improvements to the system to gather more data and hope to measure the decay soon.

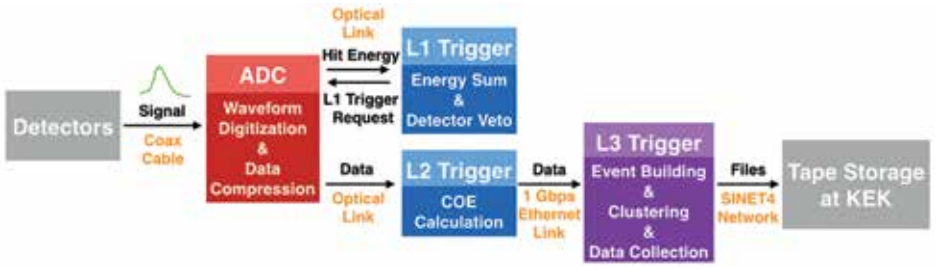


Figure 1: This data acquisition chain shows the propagation of the data from the detectors to the permanent storage. Data passes through three levels of trigger before reaching the storage.

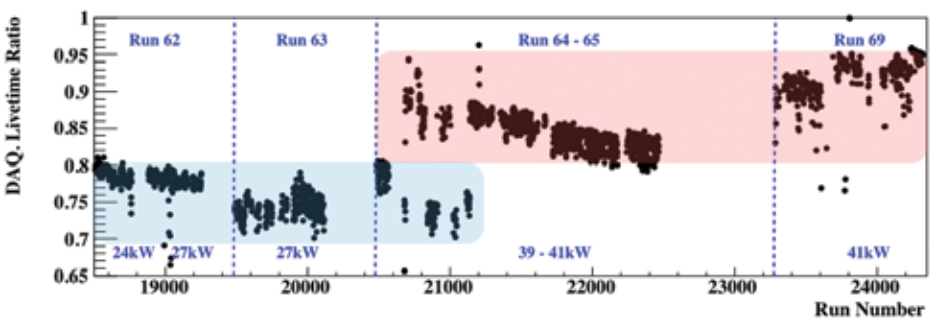


Figure 2: The data acquisition livetime for all KOTO experiment runs from 2015 to 2016. The DAQ livetime increased as the ADC lossless data compression is implemented [3].

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FOOD FOR THOUGHT

Earth provides enough to satisfy every man's need, but not every man's greed.

Mahatma Gandhi

The 2016 International School in Real-Time Systems Ho Chi Minh City, Vietnam

Martin Purschke
Author

The students and lecturers at the 2016 International School in Real-Time Systems in Ho Chi Minh City, Vietnam

At the very successful Real-Time School held in Osaka in 2014, the idea was born to bring a similar school to Vietnam in 2016. This is part of a larger campaign to increase the interest in Nuclear and Plasma Sciences (and the IEEE in general) in Asia. This gives young students a chance to participate in relatively advanced lab exercises and exposure to international lecturers in an informal setting.

Masaharu Nomachi, the chair of both the Nara Real-Time Conference and the Osaka school, and Võ Hồng Hải from the Ho Chi Minh City University of Science took the lead in organizing and setting up the 2016 school, which took place July 18th-26th. The school was hosted by the University's Vice President Chau Van Tao, with the Head of the Nuclear Technique Lab, Truong Thi Hong Loan, as chair, and Hải, Lê Công Hảo and Tuyết Trần Kim as local organizers.

Twenty students from Vietnam, Malaysia, China, Japan, and other Asian countries were selected by their applications and through online interviews. The school began at the University campus, where the Lab courses were held, and moved to the City close to the Nuclear Physics Lab for the last three days. All students and lecturers/instructors stayed at the same place - in the student dorms on campus (and at the same hotel later). Good food and a nice community area created a very informal atmosphere. Discussions and questions would often continue until late at night. The days were divided between lectures and lab exercises led by Christian Bohm, Stefan Ritt, Patrick Le Dû, Masahru Nomachi, Igarashi Youichi, Zhen-An Liu, and article author Martin Purschke. The school presented a diverse set of practical exercises, such as time-of-flight measurements, High Voltage slow controls, FPGA programming, and a light sensor readout. The lectures covered data acquisition technologies and various readout techniques, the LHC and other physics programs, interactions with computers, networking, and many other topics from the real-time arena.

Stefan Ritt opening a durian, (stinky fruit). It has a very strong odor but tastes very sweet.

Masaharu Nomachi giving a lecture in the auditorium

While the students learned about real-time technologies, we were exposed to the wonderful Vietnamese culture and also the local cuisine (and some exotic fruits). The local Vietnamese students also taught us how to properly cross a busy street swarming with motor scooters without accident, and many other aspects of Vietnamese daily life. The school excursion went to the Mekong River, where we made several stops, taking boats of various sizes, with good food, performances, and a glimpse of life in Vietnam.

The school enjoyed considerable support from the NPSS Distinguished Lecturers program, and in part from the lecturers' institutes funding the trips and also supplying some material. The best reward for us was the overwhelmingly positive feedback from the students, many of whom were exposed to reading out and analyzing data for the first time.

For additional information contact Martin Purschke, chair of the CANPS TC by E-mail at Purschke@bnl.gov.

Lab exercises where the students measure the time-of-flight

The International Workshop on Plasma for Cancer Treatment

The International Workshop on Plasma for Cancer Treatment, IWPCT, is an international workshop that focuses on basic and clinical research into the interaction of low temperature plasmas (LTP) with cancer cells and tumors. It was founded in 2014 by this author (ML) and Prof. Michael Keidar (see Figure 1) as a venue for researchers to present their cutting edge research on the application LTP for cancer treatment, or "plasma oncology". The first IWPCT was held in March 2014 in Washington DC, under the co-chairmanship M. Laroussi (Old Dominion University) and M. Keidar (George Washington University). The second workshop, IWPCT-2, was held in March 2015 in Nagoya, Japan under the chairmanship of Prof. Masaru Hori (Nagoya University). IWPCT-3 was held again in Washington DC in April 2016 under the co-chairmanship of Dr. Jerome Canady (Jerome Canady Research Institute) and Dr. Jonathan Sherman (George Washington University). The upcoming fourth workshop, IWPCT-4, will be held March 27th–28th, 2017 at the Institut Curie in Paris, France, under the co-chairmanship of Dr. Joao Santos-Sousa (Universite Paris- Sud) and Dr. Pierre-Marie Girard (Institut Curie). IWPCT-4 is technically co-sponsored by the IEEE-NPSS and papers based on the oral talks given at the workshop will appear in a special issue of the newly established NPSS medical journal, the IEEE *Transactions on Radiation and Plasma Medical Sciences* (TRPMS). The guest editors of this special issue are Mounir Laroussi, Michael Keidar, and David Graves.

Fig. 1 Founders of IWPCT: Dr. M. Keidar (left) and Dr. M. Laroussi

The application of LTP in the field of oncology is a topic of growing importance within the discipline of Plasma Medicine. Plasma Medicine is an interdisciplinary field of research that emerged in the mid-1990s when seminal investigations showed that LTP can effectively inactivate various bacteria genera [1]-[4]. This biological application attracted the attention of the Physics and Electronics Directorate of the US Air Force Office of Scientific Research (AFOSR) which saw the potential of using such plasmas to decontaminate/sterilize biotic and abiotic surfaces and to treat soldiers' wounds for disinfection and to accelerate the wound healing process. Subsequently the AFOSR funded proof of principle research work that lasted for more than a decade. Also, in the late 1990s, experiments conducted in Russia showed that plasma-generated nitric oxide (NO) plays a crucial role to enhance phygocytosis and accelerate the proliferation of fibroblasts, showing that plasma can indeed assist the wound-healing process [5]. Furthermore and in the early 2000s researchers from the Netherlands reported that low-temperature plasma can be used to detach mammalian cells without causing necrosis and under some conditions can lead to programmed cell death (apoptosis) [6]. These early efforts conducted in the USA, Russia, and the Netherlands led to the foundation of a novel multidisciplinary research field, the biomedical applications of low-temperature plasma, or plasma medicine as it is known today.

In the last decade several investigators reported in various published studies that low-temperature plasmas can destroy cancerous cells, first in vitro [7]-[12] and later in vivo. The in vivo work showed that plasma can reduce the size of cancer tumors in animal models [13]-[15]. The mechanisms of action of LTP on cancer cells include the induction of apoptosis via caspases activation, mitochondrial dysfunction, cell cycle arrest in the S-phase, and increase of the intracellular concentrations of reactive oxygen species, ROS. The plasma-produced ROS have been implicated in penetrating the cells and inducing secondary reactions within the cells and/or triggering cell signaling cascades involved in processes such as apoptosis, causing the death of cancer cells. LTP has been shown to preferentially kill cancerous cells while leaving healthy cells mostly undamaged. This selectivity could make LTP a viable technology for a new cancer therapy.

Figure 2 is a timeline graph showing some of the most important milestones in the development of the field of plasma medicine.

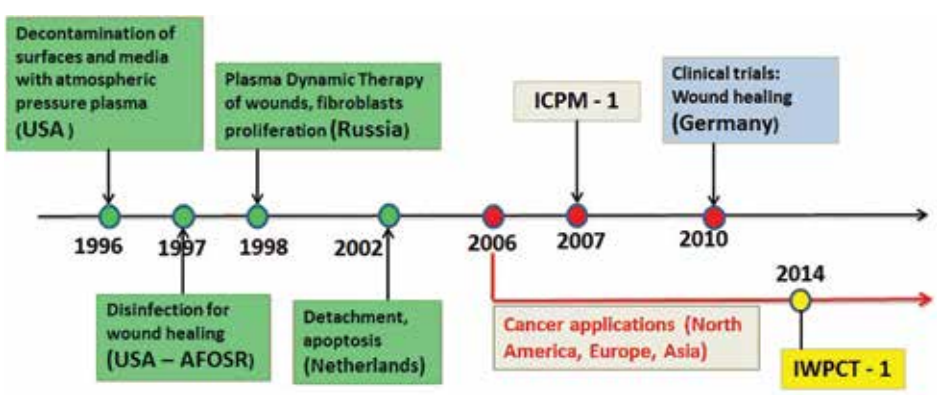

Fig. 2 Timeline of major milestones in the development of plasma medicine

Today the field of plasma medicine, including plasma oncology, is a thriving research discipline with numerous research groups and research centers in almost every continent. Hundreds of papers have been published in various prestigious peer-reviewed journals and in special issues [16] – [25]. IWPCT has become the main yearly meeting where leading researchers and their students present their latest work, exchange data and ideas, and establish fruitful collaborations. The international scientific committee (ISC) of IWPCT is pleased and honored that NPSS has become a technical cosponsor of the workshop.

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Obituaries

Emilio Gatti (1922–2016):

A Mentor, A Role Model, A Great Man

Emilio Gatti

On July 9th, 2016 Emilio Gatti passed away. He was born in Torino on March 18th, 1922.

Emilio graduated in Ingegneria Elettrotecnica (Electrical Engineering—no Electronic track was available in Italy at that time and later on Emilio contributed to its foundation) at the University of Padua in 1946—although he was eager to study physics, he enrolled in an engineering track in order to follow his father's advice about ease in securing a job—and he was able to focus on electronics the year after.

He began his scientific activity in Nuclear Electronics in 1948 at the Centre for Information Study CISE in Milano, Italy. He then became Adjunct Professor in 1951 at the Politecnico di Milano, Italy and obtained a lecturing post in 1953. In 1957 he became full professor at Politecnico di Milano where he taught up to his retirement in 1997, becoming Emeritus in 1998.

Every autumn for 30 years Emilio used to visit, since 1973, the Instrumentation Division of BNL, as Senior Visiting Scientist collaborating with Veljko Radeka and the late Pavel Rehak.

He had a lifelong association with INFN that he contributed to found in 1951.

He became an IEEE Fellow in1973, received the IEEE Centennial Medal in 1988 and the IEEE Radiation Instrumentation Outstanding Achievement Award in 2004. As a member of the Italian Accademia Nazionale delle Scienze since 1983, he received, in 1986, the Feltrinelli award and the Gold Medal of the President of the Italian Republic.

In 1995 he was able to make his dream a reality when he was awarded a Laurea Honoris Causa in Physics by the University of Milan, Italy.

It is impossible to do justice in a few words to all Gatti's achievements and inventions. Among his most brilliant achievements. one which played a revolutionary role, is the idea of a capacitive feedback to stabilize the input charge-to-output voltage transfer function to perform minimum noise measurements of the charge deposited in radiation detectors (at the time ionization chambers). This idea is the basis of the charge preamplifier that nowadays is the one and only solution to readout radiation detectors.

Emilio introduced and patented the sliding-scale technique to improve the differential nonlinearity in ADCs. ADCs based on this approach were recognized as a significant Italian contribution to the Mars 96 mission. An ADC based on his sliding-scale principle was employed in the APXS contained in the Pathfinder robot. The idea of the sliding scale was also applied in the instrumentation on board the Pathfinder unit.

Starting from his earliest experiences with the electronics for radiation detectors, Emilio was attracted by the investigation of the limitations to the accuracy of detector measurements set by the stochastic noise in electron devices and circuits. This interest continued throughout his entire professional life leading to relevant studies on optimum filtering that resulted in a lengthy monograph *(Processing the signal from solid-state detectors in elementary-particle physics)* written together with his late friend and colleague Franco Manfredi (see below), who unfortunately passed away on December 5th, 2015. The monograph was published in 1986 in "La Rivista del Nuovo Cimento."

Last but not least, in the field of semiconductor radiation detectors Emilio, together with his late friend and colleague Pavel Rehak (Brookhaven National Laboratory, USA) created a widely acknowledged revolution: the Semiconductor Drift Chamber, then called the Silicon Drift Detector. For a long time a semiconductor equivalent to a gas-drift chamber for particle tracking was envisioned. The base of the inception of the Silicon Drift Detector was the search for a way to fully deplete a semiconductor bulk through a small contact. Emilio was looking for a way to fully deplete a semiconductor bulk in order to be able to build a very high value resistor for applications in low-noise frontend electronics. In the autumn of 1982 at BNL he presented the concept for a fully depleted Charge Coupled Device. In the same period Pavel Rehak, at that time a physicist in BNL's Physics Department , was exploring the way to overcome the limitations of buried channel CCDs, which had, at that time, began to be used for position tracking in particle detectors. The basic idea of the sideward depletion—the revolutionary concept at the basis of the Silicon Drift Detector and of related devices—is to fully deplete the semiconductor substrate—in the most natural way—through a point-like "virtual contact," as it is called in the original paper. As a consequence of having a rectifying junction on both sides of the wafer, full depletion was achieved with only a quarter of the bias necessary for standard pin diodes. The more impressive consequence, however, was on the capacitance of the virtual contact. In order to provide experimental evidence of the sideward depletion mechanism they decided to build a test silicon structure. H. Kraner (BNL) provided the high-purity silicon crystal and R. H. Beuttenmuller, then an Instrumentation technical associate at BNL, fabricated the test device. The device was created in two days, and provided the desired experimental evidence. The problem to be solved was then to avoid the instability of the fully depleted wafer against the thermal generation of electron-hole pairs. In other words, the question still open was how to transport the signal electrons toward the collecting electrode. Emilio and Pavel collaborated energetically for four straight days and they originated three new detector configurations, described in their original paper. The idea of Pavel was then to superpose to the depletion field an external electrostatic field. In this way the potential "gutter" that is formed in the semiconductor volume is tilted so that the electrons generated by radiation interaction are transported from the position of the generation to the anode. "The time delay between the passage of the fast particle and the signal at the anode is due to the drift of electrons. The measure of this time delay gives the measure of the distance between the position of the fast particle and the position of the anode in a similar manner to a gas drift chamber." The Silicon Drift Detector was born.

Emilio was a great man, a gifted teacher and a passionate and brilliant scientist. With a multifaceted and original intelligence coupled with a deep and strong knowledge of mathematics he served as a mentor and role model for generations of students and colleagues. He was able to concentrate so much on his studies and notes that—I remember one day in his office in the late 1990s—even a bookcase occupying the entire wall of the office on the top floor falling down full of books—was not able to distract him from the paper he was writing. On the other side he was able to pay attention to every single person's comments. His legacy is the most precious gift for all of us: his simplicity, his kindness and his habit of sharing scientific ideas and results. We will miss him forever. As Veljko Radeka said, "Emilio's passing, preceded by Franco (Manfredi), marks the end of an era."

This Workshop summary was prepared by Chiara Guazzoni who can be reached by E-mail at Chiara.Guazzoni@mi.infn.it

Detecting Signals into the Noise:

Remembering the Life and Work of Franco Manfredi

Franco Manfredi during a popular lecture in Caspoggio, Italy.

Franco Manfredi passed away at the beginning of December 2015 in his home in Caspoggio, in the Italian Alps. On the 5th of December 2016 a workshop was held in Pavia, Italy, to remember his life and scientific work.

After graduating in physics from the First University of Rome, La Sapienza, Franco Manfredi moved to the Milan Polytechnic to work with Emilio Gatti. At the Polytechnic, in 1976, he became a full professor of Nuclear Electronics. He was also a full professor of Electronics at the University of Milan and at the University of Pavia. That was before joining, in 1997, the Lawrence Berkeley National Laboratory in Berkeley, California, as a senior staff scientist.

During his scientific career, Franco oriented his research interests to radiation detectors, detector signal processing, noise limits in electron devices and front-end electronics for different detector applications. He led international projects in the area of low-noise front-end systems for the acquisition and processing of signals from radiation detectors in nuclear and elementary particle physics. His work was strongly inspired by his belief that front-end electronics developments are among the main forces responsible for the progress in physics.

The tribute to Franco Manfredi took place in one of the historic halls of the University of Pavia, dedicated to Alessandro Volta, who held the chair of experimental physics in Pavia for nearly 40 years during the 18th century and is mostly known for his work on electricity. This was indeed an appropriate location to remember a gifted teacher and a passionate and brilliant researcher such as Franco Manfredi, who taught electronics to generations of students and mentored and inspired many young researchers.

The workshop was made possible through funding from the Department of the Electrical, Computer and Biomedical Engineering of the University of Pavia and from the NPS Italy Chapter. It was attended by about 40 people, including former students, collaborators and colleagues of Franco Manfredi's from Pavia and other universities and research institutes in Italy, Europe and the United States. The day was introduced by Franco's sons, who shared their memories with the audience and showed and commented on a few pictures and documents portraying their father's family life. The workshop scientific program (still available on the web, https://agenda.infn.it/event/fmanfredi) included eight presentations in some of the fields where Franco

The workshop participants under Alessandro Volta statue in one of the courtyards of the University of Pavia.

Manfredi's contributions were most significant: low-noise circuit design, radiation detectors, rad-hard electronics. The lectures were subdivided into one morning and two afternoon sessions. The spirit of the presentations was not only, or not mainly, that of recalling and going through Franco Manfredi's scientific activity. The invited speakers also outlined how his work and ideas are still stimulating and influencing current research projects and activities in the field of low noise front-end electronics for radiation detectors, and beyond. The workshop was also the occasion to announce two prizes to be awarded to M.Sc. and Ph.D. students in Electronic Engineering and in Physics. One, in honor of Emilio Gatti, also recently deceased, and Franco Manfredi, for the best Ph.D. thesis on radiation instrumentation, will be funded by the NPS Italy Chapter. The second one, in honor of Franco Manfredi, for the best M.Sc. thesis on experimental activities in fundamental physics with the use of low-noise electronics, will be funded by the Società Italiana di Fisica (SIF, Italian Physics Society) and by the Ricerca Fondamentale in Fisica (Fundamental Research in Physics) Association.

The day concluded with a social dinner in Santa Maria Gualtieri, a deconsecrated church in the heart of Pavia, where the participants had some more time to recollect the memory of their teacher, mentor, colleague and friend.

This article was prepared by Lodovico Ratti who can be reached by E-mail at lodovico.ratti@unipv.it

OBITUARIES Continued on **PAGE 16**

Obituaries

Continued from **PAGE 15**

Vernon Gabriel Price, 1924-2016

Vernon Gabriel Price

Our beloved father, Vernon Gabriel Price, passed away peacefully the morning of November 30, 2016 in Los Altos, California. He was 92 years young and a resident of Los Altos since 1960.

Vernon was born on October 15th, 1924 in Salt Lake City, Utah to Charles Eton and Renee Lola Felt Price. He was a lifelong learner, starting as a boy when he tinkered with radios and became fluent in German. He got his ham radio license (W6RRK) when he was fourteen and continued to be an active amateur ham radio operator until his death (AI6VP, after the Extra Class). He absolutely adored his family, which included his three brothers and two sisters.

During World War II, Vernon served in the U.S. Navy where he worked on airborne electronics and radar systems. Afterward he received his BS/MS degrees in Electrical Engineering at the University of Utah and continued his education at Stanford University. But he didn't stop there. He took classes on history, engineering, genealogy, and technology throughout his life.

He first noticed his sweetheart Patricia Forbush when she rode by his home on her horse. Vernon and Patty fell in love and married on September 1, 1948 in the LDS Salt Lake Temple. They spent several years in Salt Lake, Coeur d'Alene, San Diego, and Palo Alto before settling into their ranch home on Berkeley Court in Los Altos.

In 1962 he joined the Stanford Linear Accelerator Center (SLAC—now the SLAC National Accelerator Laboratory) as a microwave engineer, and then worked as manager of accelerator operations for many years. He started when they were still planning the beam and the offices were in trailers on Stanford's campus, and finally retired from the lab in 1992. Vernon was a Life Senior Member of IEEE and served as the membership chair for the Nuclear and Plasma Sciences Society, where he enthusiastically promoted and encouraged membership in NPSS and other societies in the IEEE organization. He was an active member of the Administrative Committee for many years and even after turning over the chairmanship of the Membership Committee continued to do all the back-room work in processing applications. He also trained the people you now meet at NPSS conference membership desks. He worked diligently for NPSS until only a few days before his death.

His hobbies were varied and as interesting as he was. He was a private pilot and loved to fly. He also enjoyed sailing, genealogy, astronomy, travel, music, politics, and of course his ham radio. In his final years, his home became a lab filled with his latest projects.

Vernon was a faithful member of The Church of Jesus Christ of Latter-day Saints (LDS) and truly enjoyed attending services every Sunday. He was loved by many and will be greatly missed by those who knew his warmth and kindness. His family never knew a day without his love, since he showed it with every word and action. Goodbyes could include a cheery "Thanks for calling!" or an "I love you" in Morse code while holding your hand.

He is survived by his children Gayle Price, Mary Price, Karen Zensius, Judy Miller, Paul Price, Martha Siegel, and Gwen McLean; their spouses; his nine grandchildren and eight great-grandchildren. He is predeceased by his beautiful wife, Patricia, and their eldest son, Steven.

Many thanks to his PAMF doctors, El Camino Hospital, The Terraces at Los Altos, Pathways Hospice, and Alta Mesa for their kindness and comfort; and the LDS Stevens Creek Ward, neighbors, and friends for decades of love and support. The Price family children will never forget you.

This obituary was written by the children of Vernon Price and appeared in a slightly modified form in the Mercury News.

For more information, contact Albe Larsen at a.m.larsen@ieee.org

Opportunity to Sign a Petition to Allow a Candidate to be Considered in the Next IEEE Election.

Dear NPSS members,

The IEEE Board of Directors has selected two president-elect candidates for the annual election to be held later this year. In the opinion of many members, a third outstanding person, José M. F. Moura, should have also been selected. If you would like to ensure the strongest slate of candidates, please consider "signing" José's petition at—http://www.ieee.org/petition, and following the link to "Annual Election Petition?" He needs 3720 signatures to get onto the ballot; not an easy task.

Signing the petition does not obligate you to vote for José. It is purely to allow him to be considered. If his petition is successful, members will be able to compare the qualifications of the three candidates and vote for the candidate of their choice.

José did an outstanding job last year as the IEEE Vice-President for Technical Activities. Further information about him is available at http://www.josemoura.com, and at http://www.ece.cmu.edu/~moura .

Sincerely,
The NPSS Executive Committee
Stefan Ritt, President

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Publicity releases for forthcoming meetings, items of interest from local chapters, committee reports, announcements, awards, or other materials requiring society publicity or relevant to NPSS should be submitted to the Newsletter Editor by April 5th, 2017 for publication in the June 2017 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.