2022 IEEE/APS NA-PAC
Albuquerque, New Mexico, August 7th–12th, 2022

CONFERENCES
IEEE/APS NA-PAC 1
ANIMMA 2

SOCIETY GENERAL BUSINESS
President’s Report 3
Secretary’s Report 3

TECHNICAL COMMITTEES
Nuclear Medical and Imaging Sciences Council 4
Pulsed Power Science and Technology 4
Radiation Effects 4
Radiation Instrumentation Steering Committee 5

FUNCTIONAL COMMITTEES
Awards 4
Publications 6

LIAISON REPORTS
Smart Village 5
Henrietta Hyde 9
Never Give Up on Your Ideas 9

IN MEMORIUM
Dr. Eiichi Tanaka 10

The 2022 North American Particle Accelerator Conference (NA-PAC22) will be held at the beautiful Hotel Albuquerque Old Town in the heart of New Mexico. Held every three years, NA-PAC is distinct from the larger International Particle Accelerator Conference. Whereas the latter might have more than 1,000 participants, the NA-PAC typically hosts 400 participants, thus offering a much more personal feel without sacrificing the world-class science, technology, and engineering. The format also lends itself well to minicourses in a wide range of topics, and its regional nature allows for broader participation from North American students and early career scientists and engineers. Short courses are planned to be offered in project management, systems engineering, cryocooling, machine learning and artificial intelligence. These details are being developed and will be communicated on the conference website.

As the largest domestic particle accelerator conference, NA-PAC brings together experts in all fields of accelerator science, technology, and engineering. Because it covers the entire spectrum of accelerator STBE topics, it is extremely useful for students, post-docs, technicians, and engineers. Attendees can be exposed to the entire field and interact with many of its best in one place.

New Mexico is a confluence of Indigenous, Spanish, and American influences as evidenced in the state’s unique cuisine, music, and architecture. Hotel Albuquerque sits in the city’s historic Old Town neighborhood and is surrounded by shops, restaurants, and other attractions many of which are within walking distance. If you want to explore further, one can consider the short, picturesque train ride to Santa Fe, the nation’s highest and oldest state capital. An easy walk from the train station brings you to the famous Santa Fe Plaza. Whatever your interests, we believe you will truly enjoy your stay in the Land of Enchantment—while discussing accelerators, of course.

The conference is cosponsored by the Institute of Electrical and Electronics Engineers (IEEE) Nuclear and Plasma Sciences Society and the American Physical Society (APS) Division of Particles and Beams.

Come and join us for NA-PAC22 and experience it for yourself. Please visit the NA-PAC22 website at https://attend.ieee.org/napac-2022/ for conference details and travel planning tips.

Cynnamon Spain, NA-PAC Vice Chair for Publicity, can be reached by e-mail at Cynnamon@ymcs.com.
The conference report of ANIMMA 2021, held in Prague, Czech Republic, from June 21st to 25th, highlights the significant efforts made to enhance the conference experience despite the challenges posed by the COVID-19 pandemic. The conference was a platform for discussing the latest advances in areas such as instrumentation and measurement methods, beam dynamics, EM fields, hadron accelerators, circular and linear colliders, machine learning, artificial intelligence, data analytics, and high-performance computing for particle accelerators. The event was technically co-sponsored by major institutions and featured contributions from experts and institutions around the world. The conference program included technical sessions, workshops, and a plenary session, aiming to facilitate discussions and exchanges among scientists, engineers, and industrialists. The conference was also open to remote attendance, allowing for interaction between students and professionals through Zoom meetings. The ANIMMA 2021 conference was locally organized by the Czech Technical University and represented by the Institute of Experimental and Applied Physics (IEAP) in a strong partnership with the Centre d’Études Spatiales de la Terre (ESTEC) and the University of the French-speaking Community of Belgium (ULB).
President’s Report

As I write this article, my hometown of Sydney has just emerged from 106 days of lockdown caused by the Delta outbreak that started in July. This is the same strain that caused major challenges in many countries, including those with high vaccination rates. However, the data show that vaccination is effective in reducing the incidence of severe COVID, hospitalizations and deaths. There are also hopeful signs of effective treatments for severe COVID. Approximately half the world’s population has received at least one dose of vaccine and several regions have reached over 90% including my own state of New South Wales. I sincerely hope that by the time this newsletter reaches you, lockdown will be a thing of the past and we can start to look forward to a much brighter future, including a return to face-to-face teaching, conferences and meetings in 2022.

My most recent newsletter article (September issue) was written soon after we held our mid-year AdCom virtual meeting. AdCom is the governing body of NPSS which sets the strategic direction for our Society, supports our conferences and publications, including this newsletter and four scientific peer-reviewed journals, gives and awards prizes and manages our Society’s finances. As I wrote this article, we are due to hold our next AdCom meeting in two weeks’ time. Therefore, I don’t have much new to report since the last article. However, between AdCom meetings there have been a couple of important developments.

First, a further update on EduCom. You may recall that we have an ad hoc working group, led by Past-President, Scott Ritt, which has been working on the terms of reference for this new standing functional committee. I can now report that the work of this ad hoc has concluded. The terms of reference will be presented at the upcoming AdCom for endorsement and EduCom will commence operations in January 2022. Keeping in mind that the terms of reference are still to be endorsed by AdCom, they are as follows.

“The purpose of the Educational Committee (EduCom) is to provide strategic advice to NPSS AdCom on new educational initiatives, to effectively manage the Schools as an ongoing sustainable educational activity, and to act as the main point of contact for all educational activities of NPSS. The Chair shall be appointed for a one-year term by the President as per the NPSS Bylaws. The other members of EduCom shall include the following functional committee chairs: Distinguished Lecturers, Chapters and Local Activities, Transnational, Young Professionals, and the liaisons to IEEE Women in Engineering and the Educational Activities Board. These members are all ex-officio. The EduCom shall be responsible to AdCom for the NPSS schools, identifying and helping to establish new educational initiatives in collaboration with technical committee chairs, identifying and soliciting and speakers for NPSS educational activities and reviewing and maintaining an EduCom page on the NPSS web site.”

I have invited Steve to be the inaugural chair of EduCom and he has graciously accepted the role. I am excited to see how this important new committee evolves under his strong leadership.

The second important development is the establishment of the IEEE NPSS Foundation Fund under the leadership of Finance Co-Chair Hal Steber who conceived the idea of the Fund and steered it through the approvals process on behalf of NPSS. The purpose of the Fund is to provide the Society with greater certainty and flexibility in the way we finance initiatives that have been successful during their three-year pilot phase and which we wish to continue without putting added pressure on our operating budget. The Instrumentation Schools are a recent example of such an initiative. The NPSS Fund will permit NPSS to fund successful initiatives, such as the Schools, when the operational budget cannot afford to do so. The establishment of the Fund was recently approved by the Vice President Technical Activities. It will accept donations from NPSS and other donors in support of NPSS mission-driven society, education, outreach, diversity and humanitarian efforts. I will have more to report about the NPSS Foundation Fund in future newsletters.

As usual, I encourage you to reach out to me or your elected representative(s) on AdCom and your Technical Committee Chairs with any ideas or issues you feel NPSS ought to address. We welcome your input.

Secretary’s Report

As noted by Steve Mokle, in his report above, our latest AdCom meeting falls well after the deadline for this newsletter. Hence, I am going to use this space to talk a little about the newsletter and then I have left space to include, before printing, the AdCom actions from our October meeting.

Our survey last year indicated that those who replied valued the newsletter and also were eager to see it convert to an electronic format. Only one respondent was unwilling to read the Newsletter as an electronic offering. We have been looking at software possibilities and have not yet settled on what seems just right, but we do realize that this conversion is important and will make it happen as soon as we can.

Much more important, however, is the recent lack of submitted content to the Newsletter. Not only are our Technical and Functional committees members of AdCom asked to contribute. So are chairs of upcoming conferences, people whose research may not yet be in journal/publishable state but may be of interest to the NPSS audience; graduate students who have won awards for meritorious papers – all are asked to consider contributions to this Newsletter. It is only sustainable if there is adequate content of interest to our members, so please do your part and contribute! Thanks.

AdCom Actions for the Meeting of the IEEE NPSS Administrative Committee, 23 October 2021

• MNRSC: move that AdCom approve the 2022 PSMR (PET/SPC/M) be an NPSS technically co-sponsored conference. Passed. 19Y, 0N, 1A.

• MNRSC: move that AdCom approve that the technical co-sponsored administrative fees for the 2022 PSMR/ conference. Passed. 17Y, 0N, 4A.

• AdCom approves that funding of the Bruce H. Hasegawa Young Investigator Medical Imaging Science Award be changed as follows:

Funding: Funded by the Nuclear and Plasma Sciences Society (EduCom) for continuing education courses. Actual award amounts for individual grants and use of funds for applicable travel expenses are determined by each NPSS conference.

The maximum amount for NPSS conferences is up to a maximum of $15,000 per year for all grants. Funds are to be used to cover tuition costs and/or travel costs to attend short courses/continuing education courses. Actual award amounts are determined by the Conference Chairs. Applicant/Grantees are responsible for all travel, lodging and other expenses associated with attendance.

Based on eligibility, the NPSS Fund will permit NPSS to fund successful initiatives, such as the Schools, when the operational budget cannot afford to do so.

Honest reason:

People who are brutally honest get more satisfaction out of the brutally than out of the honest.

Richard J. Neuhold

Plain geometry:

We live on an island surrounded by ignorance. As our island of knowledge grows, so does the size of our ignorance.

John Wheeler

To be continued:

Sometimes I lay awake at night and ask, “Where have I gone wrong?” Then a voice says to me, “This is going to take more than one night.”

Charles Schulz
NPSS News

Technical Committees

NUCLEAR MEDICAL AND IMAGING SCIENCES COUNCIL

Roger Fulton, NMISC Chair

At the time of writing, it is early October, and the 2021 NSS/MIC in Yokohama is rapidly approaching. Like the 2020 meeting in Boston, it will be a fully virtual conference. I would like to congratulate the entire organizing committee, and in particular our MCi-Co-Chairs Jiee Sung Lee and Taiga Yamaya, for putting together such a high-quality meeting under difficult circumstances. Hopefully we can return to face-to-face meetings again very soon. At present the organizing committee of the 2022 conference in Milan is planning a hybrid conference which is a promising sign.

This year the NMISC Annual General Meeting (AGM) will be held after the NSS/MIC on November 1st, rather than during the conference, due to the later than usual close of voting in the NPSS elections. This will enable the new NMISC members to attend the AGM. We will also elect a new NMISC Vice-Chair at the AGM to replace Andrew Coetzee, who moves into the chair at the end of 2021. Outcomes of the AGM will be announced in the next newsletter.

By the time you read this, the following 2021 recipients of three prestigious MIC awards will have been announced.

Prof. Paul F. Krchnak, University of Washington

The Edward J Hoffman Medical Imaging Scientist Award

"For contributions to PET imaging physics, especially novel PET detector, system geometries, and application-specific PET systems"

Dr. Kuong Gong, Massachusetts General Hospital and Howard Medical School

The Bruce Hasegawa Young Investigator Medical Imaging Science Award

"For contributions to machine learning-based PET image reconstruction, image denoising and attenuation correction as well as advanced PET point-spread function modeling and novel PET system design."

Congratulations to these deserving winners and thank you to all those who nominated and supported candidates for these awards. To those who were nominated for an award and were unsuccessful, please consider nominating again. Unfortunately, only one candidate can be selected each year.

Two new NMISC subcommittees have been formed this year. An Initiatives Subcommittee chaired by Robert Miyakawa that will endeavour to encourage and facilitate the high-impact NPSS initiative proposals, and a subcommittee on Future MIC Fields of Interest, chaired by Vania Sozzi, that will seek to ensure that topics at future MIC conferences continue to reflect current and future directions in medical imaging and to attract a wide audience.

As 2021 ends, we sadly say goodbye and thank you to the following elected members whose terms are coming to an end: Nicola Bellet, Taiga Yamaya, Georges El Fakhri, and Chuck McVicker. My term as chair also ends and I wish Andrew Coetzee every success as his incoming chair. My personal thanks to Andrew and Jiee Sung for their constant support as vice-chair and immediate past chair, and to our Secretary Nicole Kaczkowski without whose attention to detail nothing would happen. On behalf of NMISC I would like to extend our thanks to Jiee Sung for his years of service as vice-chair, and past chair, and for so expertly managing the awards process as Awards and Fellowship Chair during 2020/2021.

Finally, please keep the following nomination deadlines in mind and consider nominating a colleague for IEEE Fellow or an award.

IEEE Fellow—March 1, 2022
MCI Awards—July 15, 2022.

Roger Fulton, NMISC Chair, can be reached by E-mail at roger.fulton@sydney.edu.au.

PULSED POWER SCIENCE AND TECHNOLOGY

Teresa Ferris

Vice Chair, Publicity.

Annual report from the Radiation Effects Committee—December 2021

Robert Reed, Vanderbilt University, is the present Chair of the Radiation Effects Steering Group, which oversees NSREC Conferences.

We hope this newsletter finds everyone healthy and doing well. It is with some regret that we inform you that the colocated 2021 IEEE Pulsed Power Conference (PCC) and Symposium on Fusion Engineering (SFOE) was forced to go virtual. The conference was moved from its original dates of May 31st–June 4th, 2021 to December 12th–16th, 2021 to maintain an in-person format in Denver, Colorado. The Delta variant and travel restrictions, both domestically and internationally, forced us to turn into a virtual format in early September 2021. By the time this article comes out, we will be only a few days from hosting the event. Although we wish we could maintain an in-person format so that we can greet each other in person, we are very optimistic that we will have a great attendance and technical program for our attendees. We have learned so many lessons from all the virtual meetings we have already attended, and we are confident that we can put on a great show. Hopefully you are attending and you will find it to be a great experience.

The PCC is chaired by me, Dr. David Watz from the University of Texas at Austin (UTA), and SFOE is chaired by Dr. Kevin Feuerboux from Oak Ridge National Laboratory (ORNL). We have a superb organizing committee, led by Dr. John Merkle from Texas Tech University in Lubbock, Texas for PCC and Dr. Hutch Nelson from Princeton Plasma Physics Laboratory (PPPL) in Princeton, New Jersey for SFOE, working tirelessly to put together an outstanding program. The content will be available for some time after December 12th, 2021 so if you miss the conference and still want to view the technical content, it won’t be too late. Visit the conference website, https://jaing.org/pcc/pcc2021/, for more information.

My term as Chair of the PPS&T Committee comes to an end on December 31st, 2021. Between trying to put on an excellent 2021 PCC/SFOE meeting and helping to lead the PPST Committee, I have been a very exciting and rewarding two years as Chair. I am passing the Chair torch on to our current Vice-Chair, Heather O’Brien from the U.S. Army Research Laboratory (ARL) in Adelphi, Maryland. Our new Vice-Chair is Emily Schmidt from Sandia National Laboratories in Albuquerque, New Mexico. The committee is in amazing hands with these two special people, and we all are so grateful for their commitment and service to IEEE and to PPST. Thank you everyone to the NPSS community for your support of me the past two years. We hope everyone has a very safe and happy holiday season! Happy New Year and hopefully 2022 brings us all back together for in-person meetings and events.

David Watz, PPST Chair, can be reached by E-mail at david.watz@utexas.edu.

RADIATION EFFECTS

Robert Reed, REC Chair

The IEEE Radiation Effects Committee (REC) held its annual Open Meeting on July 25th, 2021 at the virtual 2021 Nuclear and Space Radiation Effects Conference (NSREC). Presentations were given by the general chairs of the 2020 through 2022 NSRECs and the chairs of the 2021 and 2022 European Conference on Radiation and its Effects on Components and Systems (RADI스크).

Janet Barff, NASA (ret), outgoing REC Chair, opened the meeting by recognizing elected and appointed members of the Radiation Effects Steering Group (RESG). The elected members of the 2021/2022 RESG are Robert Reed, Vanderbilt University, Vice-Chair; Allan Johnson, J4 Associates, Past Chair; Sarah Armstrong, Naval Surface Weapons Center (Canc), Secretary; Kyle Miller, Ball Aerospace, Senior Member-at-Large; Michael Campbell, NASA Goddard Space Flight Center, Member-at-Large; and Rubén García Arla, Consell Europeu per a la recerca nuclear (CERN), Junior Member-at-Large. Janet recognized outgoing members of the RESG, outgoing elected members are Allan Johnson, Sarah Armstrong, and Kyle Miller. Janet also recognized Conference Chairs Hugh Ramabally, Arizona State University, NSREC 2020, and Steve McClure, NASA Jet Propulsion Laboratory, NSREC 2021, as well as NSREC Meeting Planner Anne Meadows and the ETC team for their outstanding support in delivering two excellent virtual conferences.

Robert Reed, incoming REC Chair, continued the meeting by recognizing elected and appointed members of the 2022 RESG and the elected members of the NPSS Advisory Committee, which will take over the Chair role. The newly elected members of the RESG are Kay Chestnut, Raytheon Technologies, Vice-Chair; and Arto Jauwennä, Jyväskylä University, Secretary. He also recognized Michael Campbell and Rubén García Arla as the Senior Member-at-Large and Member-at-Large, respectively. The election of the new Junior Member-at-Large will take place during the conference. After the conference, Mike Tostanoski, Radiation Test Solutions, is the new Junior Member-at-Large.

Robert announced the general chairs for future NSREC Conferences: Tom Turlftting, Aerospace Corporation, 2022; Keith Avery, Air Force Research Laboratory, 2023; Heathen Quinn, Los Alamos National Laboratory, 2024, and Dolores Black, Sandia National Laboratories, 2025.

Hugh Ramabally, the General Chair of the 2020 Conference, summarized statistics of last year’s conference. A total of 484 people registered for the technical sessions and attended the short courses which was included in the technical program registration fee for NSREC 2020. There were 35 exhibits only registrants.

Steve McGall, the General Chair of the 2021 Conference, summarized statistics of this year’s conference. A total of 569 people registered for the technical sessions and attended the short courses which was included in the technical program registration fee for NSREC 2021. There were 137 student registrants.

The NSREC 2021 was held in a virtual format from July 16th–23rd. All presentations were available “on-demand” through Aug 15th, 2021. The technical sessions which were presented during the face-to-face day 31 oral presentations, 37 poster presentations, and 30 poster presentations in the Radiation Effects Data Workshop. For this tutorial presentations were given at the Short Course, held on demand on Sunday July 18th–19th. On 1st, the Short Course Chair, Marta Bagdon, University of Padova, hosted a QA session with the four Short Course presenters: Baljit Nairzahnham, Daniel Losowiec, Vincent Crofton, and Kay Chestnut. All short-course attendees received copies of this year’s course. The Industrial Exhibit, which had 13 exhibitors, was well attended, as were the 26 Industrial Webinars.

Thomas L. Turlftting, The Aerospace Corporation, General Chair of the 2022 Conference, discussed his plans for the 2022 Conference that will take place at the Utah Valley Convention Center in Provo, Utah, on July 18th–22nd, 2022. The conference will feature research results in radiation effects. The program will include oral and poster papers, with a separate...
NPSS News

IEEE NPSS Awards

NPSS News

IEEE NPSS Awards Chairman

The deadline for most of our NPSS Awards for 2022 is approaching quickly, on Jan 31st, 2022. Please consider nominating somebody for one of our prestigious awards or grants. Members of our community are eligible for a number of awards for exceptional contributions to our field or our Society. These include the highest IEEE level awards, such as the IEEE Medal for Healthcare Innovations and Technology and the IEEE Marie Skłodowska-Curie Technical Field Award, our Society awards, and numerous Technical Committees and Conference awards. Information about all of these awards as well as tips on how to write a successful nomination can be found on the NPSS website http://ieee-npss.org/awards/

Radiation Instrumentation Steering Committee

As I write this update, we are about to kick off our second consecutive virtual Nuclear Science Symposium and Medical Imaging Conference (NNS/MIC) with our sibling Nuclear Medical and Imaging Sciences Council (NMI). We all sincerely hope this will be the last virtual NNS/MIC and are planning accordingly for a hybrid in-person and virtual 2022 NNS/MIC in Milan, Italy. As we’ve indicated over the last year and a half, check the conference web sites early and often to get the latest updates.

The 2021 NNS/MIC Organizing Committee has gone to extraordinary lengths to ensure a productive virtual conference and its success was evident from the beginning. All of these efforts will hopefully translate in large part to hybrid conferences as we experiment with this format over the coming years as a means of bringing more inclusive through outreach to underrepresented communities of radiation instrumentation scientists and engineers. In addition, it is worth reminding everyone that 2021 NNS/MIC Organizing Committee has gladly agreed to reconvene for the 2021 NNS/MICRDSTD (Room-Temperature Semiconductor Detector conference) in Yokohama, Japan – the site where we planned to have the 2021 conference. We look forward to visiting Yokohama!

A mentioned in my previous update, to increase the likelihood of an in-person conference, SCNT 2021 has been postponed to 2022 and renamed SCNT 2022 https://web.eventbrite.com/e/scnt-2022-radiation-effects-conference-4689040-26144162726-tickets#.Yb072J_1dXm. The conference will be held September 19-23, 2022 in Santa Fe, NM, USA.

Beyond our Radiation Instrumentation conferences, the 2021 Radiation Instrumentation annual award winners were recently announced and honored in an NNS plenary session.

The Radiation Instrumentation Early Career Award (RIECA) is given to a young investigator in recognition of significant and innovative technical contributions to the field of radiation instrumentation and measurement techniques for ionizing radiation. The prize consists of US$1,500 and an engraved plaque. For 2021, the award goes to Dr. Yuhu He, Professor at Soochow University, China. Dr. He was nominated by Dr. Mercuri Kanadakis of Northwestern University, USA with a citation reading “For contribution to the significant and innovative work on the development of novel semiconductor detectors for next generation ionizing radiation detection at room temperature”.

The prestigious Glenn F. Knoll Radiation Instrumentation Outstanding Achievement Award (RIOAA) 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 2021, the award goes to Charles R. “Chuck” Hurlbut of Eljen Technology, USA. Chuck was nominated by Dr. Richard Sievers of Pacific Northwest Laboratory with a citation reading “For contributions to decades of development and enhancement of cosmic photon technology for applications to radiation detection in the nuclear and plasma sciences.”

For the second time we are accepting nominations for the Edward J. Hoffman Grant. Dr. Hoffman was a scientist whose research in medical imaging was instrumental to the development of the Position Emission Tomography (PET) scanner, which is today used to detect cancer and other diseases. After he passed away in 2004, his wife, Carolyn G. Hoffman, established the Edward J. Hoffman Grant to provide support to outstanding early-career researchers in the field of medical imaging. The grant may support a pilot project, purchase of laboratory equipment or visits to other labs or institutions and more.

The three recipients of the 2021 Paul Phelps Continuing Education Grant were Dr. Yuhu He, Professor at Soochow University, China; Dr. Matteo Poro, Project Leader, European XFEL GmbH, Germany; and Dr. Carlos Lin, Politecnico di Milano, Italy with a citation reading “For extraordinary contributions to the development of soft x-ray imaging detectors with megapixel rate and single photon detection capability for Photon Science experiments with X-ray Free Electron Lasers”.

The purpose of the Phelps Grant is to promote continuing education and encourage membership in the Nuclear and Plasma Sciences Society (NPSS). The criteria for judging are exceptional promise as a student, postdoc or research associate in any of the fields of NPS, or exceptional work in those fields by currently unemployed NPSS members with an expectation that attendance at the Short Course will improve the possibility of obtaining a job in an NPS field.

NPSS News

IEEE NPSS Awards

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The three recipients of the 2021 Paul Phelps Continuing Education Grant were Marine Aubry, Fernando Fernandez des Santos, and Maria Corchero.

Marine Aubry is a 2018 graduate of the PSA Paris (Polytechnic Institute of Advanced Sciences) engineering school. After doing her master internship at the CEMES (National Center for Space Studies), she joined the MOPERE (Materials for Optics and Photonics in Extreme Radiation Environment) group of Laboratory Hubert Curien in October 2018 to pursue a doctorate. She is now a PhD. student at
2021 IEEE/NPSS Radiation Effects Award

Lloyd Massengill, Vanderbilt University and Reliable Microsystems LLC

Lloyd W. Massengill is a Professor of Electrical and Computer Engineering at Vanderbilt University in Nashville, TN. He received the Ph.D. degree in Electrical and Computer Engineering from North Carolina State University in 1987 and joined Vanderbilt that same year. During his 30+ year academic career, Prof. Massengill has been involved in the development of fundamental analytical models suitable for the study of radiation-hardening by design of electronic systems and the establishment of design tools for radiation hardening used extensively by the U.S. Government and industry.

Mariia Gorchichko received the Specialist Degree in Computer Science from Universidade Federal do Rio Grande do Sul (UFRGS) in 2015. Currently, she is a Ph.D. student at UFRGS working on fault tolerance in HPC and safety-critical applications.

Photo: Mariia Gorchichko

Paul Phelps Continuing Education Grant Nominations

Nominations are currently being accepted for the 2022 Paul Phelps Continuing Education Grant. The purpose of the grant is to promote continuing education (attendance at the 2022 NSREC Short Course) and encourage membership in NPSS. Outstanding members of NPSS who are either Student Members, Post-Doctoral Fellows or Research Associates, or university faculty, and who have contributed to radiation effects in education or research in support of several major acquisition programs, this center has provided a radiation-vulnerability assessment for every major technology node to 7nm and the primary radiation response models to the DoD in support of several major acquisition programs, including the U.S. Navy and U.S. Air Force. In 2016, he founded Reliable Microsystems LLC, a design services company specializing in concept-to-creation of high-reliability electronics for fault-tolerant applications. He established Reliable Microsystems to meet customer-driven needs for high-reliability performance in fundamental research to applied high-reliability system design, both commercial and DoD.

Marina Ashley 2021 Phelps Grant Recipient

University of São Paulo and Politecnico di Bari under the supervision of Prof. Sylvain Grand, Prof. Emmanuel Marioli and Prof. Luciano Mesía. She is studying the combined radiation and temperature effects on optical fiber amplifiers for space applications. More specifically, she investigated how these coupled effects impact the amplifier performances and the properties of rare-earth doped fibers. Her Ph.D. thesis is co-funded by the CNES (under the responsibility of Dr. Julien Mélé) and CNRST (Dr. Thoine Robich). As a Ph.D. student, she created the IEEE student branch of the University of São Paulo and she is actually the founding chair of its NPSS student branch chapter.

Technical Committees

Continued from PAGE 5

Steven J. Gitomer Editor-in-Chief

Radiation Effects Call for 2022 Award Nominations

Nominations are due January 29, 2022, for awards that will be presented at the IEEE NSREC 2022 Conference, July 18-22, in Provo, Utah.

Nominations are currently being accepted for the 2022 IEEE Nuclear and Plasma Sciences Society (NPSS) Radiation Effects Award. The purpose of the award is to recognize individuals who have had a sustained history of outstanding and innovative technical and/or leadership contributions to the radiation effects community. The $5000 cash award and plaque will be presented at NSREC Provo, Utah. Forms are available electronically at http://www.ieee.org/technical-committees/radiation-effects/ and must be submitted by January 29, 2022. Additional information can be obtained from Michael Campola, Member-at-Large, NASA GSFC, for the Radiation Effects Steering Group.

Michael can be reached at michael.campola@nasa.gov.

Photography: Ruben Garcia Alia

Announcing the 2021 TPS Best Paper Award

The winner of the 2021 TPS Best Paper Award has been selected (please refer to our TPS home page for details about the award and http://ieeexplore.ieee.org/publications/transactions/plasma-science) this year. The award is the first year that the award is being given, and I am pleased to announce that the paper, “A Primer on Pulsed Power and Linear Transformer Devices for High Energy Density Physics Applications” Published in IEEE Transactions on Plasma Science, Volume: 46, Issue: 11, Nov. 2018, Page(s): 3928 – 3967. The lead author of this 40-author paper is Professor Ryan D. McBride, of the Department of Nuclear Engineering and Radiological Sciences, University of Michigan, Ann Arbor, MI, USA. See Professor McBride’s bio below for the full list of co-authors and abstract of this paper below. The award plaque, certificate and check will be presented to Professor McBride representing the team of co-authors at an upcoming virtual IEEE NPSS Pulsed Power Conference in December 2021. This is an open access paper and is freely available to our readers. Congratulations to Professor Ryan McBride and the team of co-authors on this accomplishment.

R. D. McBride (Member, IEEE) received the Ph.D. degree from Cornell University, Ithaca, NY, USA, in 2009, where he conducted experimental research on pulsed-power technologies using the 1-MA CDRRA pulsed-power facility. From 2008 to 2010, he was with Sandia National Laboratories, Albuquerque, NM, USA, where he held appointments as a Staff Physicist and a Department Manager. At Sandia, he conducted research in nuclear fusion, radiation generation, and high-pressure material properties using the 2.5-MA pulsed-power facility. Since August 2010, he has been an Associate Professor with the Department of Nuclear Engineering and Radiological Sciences, University of Michigan, Ann Arbor, MI, USA. In May 2021, he became the Director of the University’s Plasma, Pulsed Power, and Microwave Laboratory, which includes two linear transformer driver (LTD) facilities, MAIZE C (~1MA, ~100 ns) and BLUE (~150 kA – ~100 ns). His research interests include plasma physics, nuclear fusion, high-power radiation generation, pulsed-power technology, plasma diagnostics, and the dynamics of magnetically-driven, cylindrically imploding systems. Most recently, his research has been focused on both experimental and theoretical studies of magnetized inertial fusion (MIF) and the energy output of one of the United States’ three marine approaches to studying controlled inertial confinement fusion in the laboratory.


1) To help students and researchers develop a better understanding of pulsed power systems are used to create high-energy-density (HED) matter; 2) to develop a better understanding of a new, compact, and efficient pulsed-power technology called Magnetic Transformer (MTR); 3) to develop an understanding why LTMs are an attractive technology for driving HED physics (HEDP) experiments; 4) to contrast LTMs with the more traditional MagLab’s approach to the HEDP experiments; and 5) to brief review the history of LTMs and some of the MagLab’s approach to the HEDP experiments. This invited tutorial is part of the Mini-Course on Charged Particle Beams and High-Powered Pulsed Sources, held in conjunction with the 44th International Conference on Plasma Science in May of 2017.
Liaison Reports

HUMANITARIAN ACTIVITIES: IEEE SMART VILLAGE

Once again, we can report that IEEE Smart Village continues to move forward on several important fronts despite the COVID Pandemic.

NPSS PROJECTS: ZAMBIA AND ARGENTINA

The two main NPSS-supported projects reported upon last Newsletter, Electrification to Combat Deforestation Areas of Chaco Argentina, and a UNHCR Refugee camp of 15,000 people in Mayawayalua, Zambia, are making deployment plans and fine tuning of business plans and on-the-ground teams for launch. The detailed business plans are complex and need to show paths to both financial sustainability as the result of the initial pilots plus a path to financial scalability to benefit at least a million people. COVID has delayed access but not stopped moving the projects forward. These are both maximum grant projects ($200K) that must show realistically clear paths forward, requiring extra scrutiny up front. Review meetings for finalization of technical and business goals to launch are scheduled to be complete by December 31st.

ISV-ROTARY-GLOBAL TELEHEALTH NETWORK (GTN) PROJECTS: UGANDA AND KENYA

The initial GTN, electrification and Internet projects were designed to service a Boys’ School, Hospitals, Clinics, and a Refugee Camp of 123,000 near the DR Congo border. The projects involve the support of two ISV Entrepreneurs, Renewable Energy innovators (REIs) in Cameroon, and Maa Trust in Kenya, as well as the local Rotary Clubs. Telehealth is a centerpiece of both, designed to extend care to currently unserved or underserved areas. ISV provides the critical electricity and Internet/Internet connectivity, as well as developing future plans for electric vehicles to make remote village mobile clinic visits on a regular basis. All key medical personnel are in-country or at least on the Continent. Each project has very strong on-the-ground leadership from local Rotary Clubs who are well steeped in managing and securing Rotary Global Grant funding for major projects. The grants andClub donations for these projects were over $254K, with ISV providing $70K, a leveraging ratio of 2.6X. Funding through Rotary Grants is complicated and was mastered only by the patience and persistence of Dr. Jack Higgins, MD, of Los Altos Rotary Club and President of the Global Telehealth Network (GTN) partner. Both projects are now fully funded and underway.

STANFORD CONFERENCE ON IDEAL VILLAGES

November 29th–30th, 2021

The initial GTN, electrification and Internet projects were designed to service a Boys’ School, Hospitals, Clinics, and a Refugee Camp of 123,000 near the DR Congo border. The projects involve the support of two ISV Entrepreneurs, Renewable Energy innovators (REIs) in Cameroon, and Maa Trust in Kenya, as well as the local Rotary Clubs. Telehealth is a centerpiece of both, designed to extend care to currently unserved or underserved areas. ISV provides the critical electricity and Internet/Internet connectivity, as well as developing future plans for electric vehicles to make remote village mobile clinic visits on a regular basis. All key medical personnel are in-country or at least on the Continent. Each project has very strong on-the-ground leadership from local Rotary Clubs who are well steeped in managing and securing Rotary Global Grant funding for major projects. The grants andClub donations for these projects were over $254K, with ISV providing $70K, a leveraging ratio of 2.6X. Funding through Rotary Grants is complicated and was mastered only by the patience and persistence of Dr. Jack Higgins, MD, of Los Altos Rotary Club and President of the Global Telehealth Network (GTN) partner. Both projects are now fully funded and underway.

6th Annual Ideal Village Conference: “Post-Pandemic Normal—The Path Forward”

The organization started in 2015, the same year that ISV moved from an independent IEEE Community Initiatives Committee (CIT) to IEEE Smart Village (ISV). Ray Larsen, co-founder of ISV, was invited to present at the first Conference but there was no intervening interest in ISV’s work until this year when we were again invited to speak, and also to chair a one-hour Session called Energy and Environment with three speakers as follows:


Dr. Paul N. Edwards, Director of the Program on Science, Technology & Society at Stanford; Co-Director of the Stanford-Exeter Ralls Initiative, “The Sixth Assessment Report of the IPCC (Intergovernmental Panel on Climate Change Working Group), August 2021”

Dr. Robin Podmore, ISV Co-Founder and Vice President, ISV-Rotary e-Club of Silicon Valley, President “The Rotarian International and IEEE Smart Village Partnership”

These talks were all well received and noted by the organizers as a highlight of the conference. The entire program featured excellent speakers on topics of interest to ISV members. The two-day sessions were:

Wednesday, Sept. 29th, 2021 (Pacific Time; 7:30AM-12:00PM):

Healthcare, Education, Water & Sanitation, Inaugural & Closing Keynotes, Key Takeaways

Thursday, Sept. 30th, 2021 (Pacific Time; 7:30AM-12:00PM):

Sustainable Livelihoods, Energy & Environment, Societal Issues, Closing Keynotes, Key Takeaways

All talks can be viewed on Facebook and YouTube here:

We strongly recommend the Climate Change Zoom presentation by Paul Edwards, but there are many outstanding talks in most other sessions as well. The strongest emphasis was the creation of sustainable businesses and livelihoods by many unique technology avenues, especially some focusing on women’s empowerment for sustainable livelihoods from waste and agricultural products. The reduction of thousands of tons daily of wastes in major cities for land reclamation and recycling by products is especially impressive.

Follow-up Meetings: Due to the strong feedback from over 1200 attendees and thousands of hits on the Facebook and YouTube links, including by interested Silicon Valley investors, the organizers decided to aim for an early follow-up meeting at Stanford to discuss next steps in promoting collaborations. Both ISV AND WHEELS
**LIAISON REPORTS CONT.**

**NPSS NEWS**

**ISV MANAGEMENT AND SOCIETIES GOVERNING BOARD MEETING REPORT**

The management of ISV consists of a GOVERNING BOARD (GB), chartered in June 2020, of twelve Societies and one Council, each with an appointed member. Prof. Jane Lehr is the current NPSS member. Pedro Ray, 2010 IEEE President, is President of the GB. Additional members of the GB are ISV President John Nelson, Finance Vice President Ed Rezek, and two members elected by ISV Entrepreneurs, Jude Ntumy, CEO of Renewable Energy Innovators Cameroon, and Monica LaBiche Brown, President of Africa Development Promise. Additional members of the GB are ISV President John Nelson, Finance Vice President Ed Rezek, and two members elected by ISV Entrepreneurs, Jude Ntumy, CEO of Renewable Energy Innovators Cameroon, and Monica LaBiche Brown, President of Africa Development Promise.

The meeting of October 15th was chaired by Joe Lillie, who recently served as IEEE Board Finance Chair but formerly served three years as IEEE Finance Chair but was heavily approved. Joe also reported as Chair of a GB ad hoc committee charged by President Pedro Ray to review where ISV might best fit "within IEEE in future from a high-level IEEE perspective. Jane Lehr of NPSS served on a Technology Committee that we called the Community Solutions Initiative (CD), to address the need for community engagement and empowerment, not just better mousetrap designs. In 2015 it gained status as ISV, an IEEE-wide non-profit under support of the IEEE Foundation, administered by Power and Energy Society but continuing support depends upon future performance and other factors. ISV is striving to greatly strengthen partnerships (e.g., IEEE and Reza) but also to develop support from private partners and donors beyond the IEEE family.

**NATIONAL COUNCIL ON RADIATION PROTECTION (NCRP)**

Lauriston S. Taylor
Chair of first U.S. Advisory Committee on X-ray and Radium Protection

The roots of the National Council on Radiation Protection and Measurements (NCRP) as a non-profit, Congressionally-chartered, scientific organization go back more than 90 years and are intimately related to the formation of its international counterpart, the International Commission on Radiological Protection (ICRP). In July 1928, with the idea of forming an international organization on radiological protection, the Second International Congress of Radiology invited several countries to send representatives to the Congress to discuss protection problems and prepare initial X-ray protection recommendations. Lauriston S. Taylor, from the National Bureau of Standards (now NIST), was chosen as the U.S. representative to the international radiation protection group. Dr. Taylor’s responsibility was to convey the group’s recommendations to the various constituencies in the U.S. and obtain their approval to organize a national committee that could deal most effectively with the radiation protection problems faced in the United States. In 1932, the U.S. Advisory Committee on X-ray and Radium Protection was established with Dr. Taylor acting as chairman. In 1946, the Advisory Committee was renamed the National Committee on Radiation Protection until NCRP was officially chartered by the U.S. Congress in 1964, at which time it took its current name.

Throughout its history, the Council and its predecessors have functioned as effective advisors to the nation on radiation protection issues and have provided the fundamental guidance and recommendations necessary for the regulatory basis of the control of radiation exposure, radiation-producing devices, and radioactive materials in the U.S. One common theme among all the organizations and regulatory entities and recommending bodies is the philosophy that radiation protection is based on the principles of justification, dose limitation, and keeping the dose to workers and the public as low as reasonably achievable (ALARA). The effectiveness of the ALARA principle is demonstrated in the area of occupational radiation safety at U.S. nuclear power plants. Every plant has a well-developed program for maintaining radiation exposure ALARA that involves the entire workforce. As a result, although the annual occupational effective dose limit is 50 mSv, the actual average annual effective dose is about 1 mSv. NCRP recommendations and guidance documents have had a great influence on the application and implementation of these principles and the protection of the population while permitting the beneficial use of technologies that may lead to radiation exposure. This is evident from the more than 200 reports and commentaries published by NCRP.

The work continues to grow so attracting new volunteers is critical.

HISTORICAL NOTE: IEEE Smart Village grew up from a maverick subcommittee of the IEEE and UN Foundation Humanitarian Advisory Group, essentially what we called the Community Solutions Initiative (CD), to address the need for community engagement and empowerment, not just better mousetrap designs. In 2015 it gained status as ISV, an IEEE-wide non-profit under support of the IEEE Foundation, administered by Power and Energy Society but continuing support depends upon future performance and other factors. ISV is striving to greatly strengthen partnerships (e.g., IEEE and Reza) but also to develop support from private partners and donors beyond the IEEE family.

Special thanks to all involved and especially the new Working Groups in Southeast Asia (India, Bangladesh, Sri Lanka), Africa (Latin America, North America, Oceania, and China); these will be featured in future issues. Ray Loyns, NPSS Liaison to SSG and Humanitarian Projects via IEEE NRC and SIGHT, can be reached by E-mail at ray@larsen@slac.stanford.edu.
Ida Henrietta Hyde and The Micro-Electrode

By Nathan Brewer, IEEE History Center, reprinted from InSight, 15 Nov 2021

Ida Henrietta Hyde was born in Davenport, Iowa, on 8 September 1857 to Meyer and Babette Heidenheimer, who had changed their name to “Hyde” after immigrating to the United States from Germany. From an early age, Hyde took a great interest in education, attending classes at the Chicago Athenaeum at age sixteen. While working long hours, she was able to save up enough money to attend one year of college in 1861, passed the county and Chicago teachers’ exams, and taught in the Chicago area until she was forced out of her position in 1916. In 1918, she took a leave of absence for wartime duties, and extensively traveled for three years, formally retiring in 1920.

In 1918 and 1919 Hyde conducted experiments on unicellular organisms and schizodem egg, and found it necessary to construct a micro-pipette that was more accurate than the existing Barber or Chamber apparatuses. Barber’s apparatus was developed in 1912, and building on his work, she invented a micro-electrode, which consisted of a Barber pipette modified for unipolar stimulation. This consisted of glass tubes about twelve centimeters long and as small as a millimeter in diameter, drawn out to a bent tip, with pipettes containing mercury or an electrolytic solution; or a fine wire that would allow current from a battery to manipulate the micropipette of the mercury. The observations of the behavior of mercury led to the idea that the micro-electrode could be adapted for the injection or extraction of minute quantities of substances from unicellular structures while maintaining electrical stimulation to an individual cell. This ability was an improvement over the Barber and Pott designs, which could not simultaneously stimulate the interior of a cell while drawing from or injecting material into the cell.


While Hyde’s earliest known micro-electrode for intracellular work, her experiments in this area were not widely published, and she received little recognition for the invention in her lifetime. Hyde only published a single paper on the subject in Biological Bulletin, and similar principles were independently rediscovered in the 1940s by Judson Graham and later Ralph Gerhard, who was nominated for a Nobel prize in the 1950s for his work on the micro-electrode.

During her retirement, Hyde was still active in research and publishing until her death on 22 August 1945. She published her paper on the micro-electrode in 1921, and established a scholarship fund at the University of Kansas for women pursuing careers in sciences, which has been awarded to more than one hundred women. Hyde’s broad research career made her a pioneer in many areas related to physiology, her micro-electrode research in particular being an early achievement in engineering in medicine and biology.

REFERENCES AND FURTHER READING

Center for the History of Medicine at Courtenay Library, Harvard University, “Dr. Ida Henrietta Hyde, 1857, and Dr. Myrtle May Cameron,” 2012 [https://collections.library.harvard.edu/exhibits/show/item/1001552-02-01/ida-henrietta-hyde].

Emily Taylor Center for Women & Gender Equity, University of Kansas, “Ida Henrietta Hyde,” [https://emilytaylorcenter.ku.edu/indy/indypersons/idahyde].


Never Give Up on Your Ideas

I was recently reading an article on the Pfizer and Moderna COVID-19 vaccines and how scientists of global origins and different backgrounds are behind their development. These include Dr. Moncef Slaoui, a Moroccan-born scientist, who was the US administration’s point-man in charge of operation Warp Speed, Dr. Noubar Afeyan (the Chairman of Moderna), an Armenian inventor, biotechnologist, and entrepreneur born in Beirut, Lebanon, and Dr. Ugur Sahin and Ozlem Tureci the Turkish/German founders of BioNTech (which makes the Pfizer/BioNTech vaccine). But what attracted my attention the most was the Hungarian-born Biochemist who is one of the pioneers of messenger RNA-based vaccine. Her name is Dr. Katalin Kariko and she is senior vice-president of BioNTech RNA Pharmaceuticals. Early on in her career little interest was shown to her groundbreaking work on mRNA mediated therapies. When she worked in academia no funding agency was interested in funding her research and ultimately, she ended up being demoted from her university position. This dramatic saga of the development of mRHA-based therapy reminded me of the difficulties experienced during the early emergence of low temperature plasma for biomedical applications. In the early 1990s sources of low temperature atmospheric pressure plasmas were developed by a few research groups, mostly to be used for material processing applications such as modifying the surface properties of plastics and non-woven fabrics. Around 1994 it occurred to me that what the plasma was doing to the surface of an inanimate material could also do to the surface of a living organism, like a biological cell. That was when I carried out my first experiments on using non-equilibrium atmospheric pressure plasma for biological applications. This quickly got me in some unexpected trouble. First, no one was pleased with me conducing "biology-related" work in an Engineering Department. Second, as a junior faculty member I was not supposed to stay too far from the main staples of the laboratory where I conducted my experiments. But more discouraging was the fact that no funding agency seemed interested in supporting my research. The first reason given to me was that there was no easy way for the reviewers to determine if this was a viable idea as there was no peer reviewed prior literature to support it. Afterwards, the reasons took more practical nuances such as “we do not fund biomedical related work” or “we do not fund plasma physics related work”, depending on which funding agency I was talking to. In other words, this line of research did not fit anywhere within existing well-defined programs. I eventually got my first funding from AWOS, thanks to a visionary and bold program director by the name of Robert J. Barker. In addition, the editor-in-chief of the IEEE Transactions on Plasma Science (TPS), Steven Gitomer, was receptive to the idea of giving an opportunity for work on such a promising multidisciplinary application of plasma to be published. This helped change things and allowed the emerging research to be widely disseminated. Today, the field of the biological and medical applications of plasma has reached some remarkable milestones thanks to outstanding contributions from many scientists from around the world. Low temperature plasma is now used for wound healing and in dermatology and work is in progress to develop plasma-based cancer therapies. Another fascinating line of research is the use of low temperature plasma in agriculture. In this application, plasma is used to treat/desensitize fruits, vegetables, and legumes for longer shelf life, to modify the wettability of the surfaces of seeds, to enhance the germination speed and yield of plant seeds, and to produce fertilizers on site.

The lesson to draw from the above-described experiences, especially for young researchers, is that innovation often comes with a heavy toll to those who pursue it. However, if you believe in your ideas and if you persevere, the reward can be more than you ever imagined, and sometimes as spectacular and impactful as that experienced by Dr. Katalin Kariko.

Mount Laroussi can be reached by E-mail at mlarouss@odu.edu.
Dr. Eiichi Tanaka

Dr. Eiichi Tanaka, a great pioneer in nuclear medical technology, passed away on August 21st, 2021, at the age of 93. He was born in Himeji, Japan in 1927, considered to be the birth year of nuclear medicine instrumentation when, for the first time, H. L. Blumgart measured the blood circulation time between both arms of a human being using RaC (Bi-214). As a high school student, Dr. Tanaka was noticed that he was the second to have made the discovery. With a practical image reconstruction algorithm, PET became a hot topic and was being studied worldwide. Dr. Tanaka developed Japan's first PET, Potlogica I, in 1979, which was only 4 years after the emergence of the world's first practical PET introduced by Dr. Ter-Pogossian and coworkers. The 1980s were the decade of the development of high-resolution detectors, and Dr. Tanaka realized the commercialization of X-ray CT by EMI made a big impact. Dr. Tanaka was one of the chasers in a very active competition to find an ideal filter for the filtered backprojection method. He found his own answer to this problem, but when it was reported, Dr. Tanaka noticed that he was the second to have made the discovery. With a practical image reconstruction algorithm, PET became a hot topic and was being studied worldwide. Dr. Tanaka developed Japan's first PET, Protogica I, in 1979, which was only 4 years after the emergence of the world's first practical PET.

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CONTRIBUTED ARTICLES
Publicly 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 no later than January 5, 2021, for inclusion in the March 2022 Newsletter.

News articles are actively solicited from contributing editors, particularly related to important R&D activities, significant industrial applications, key 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.

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