Navigating the EP3 Guide to Enact Change

BY EDMUND BERTSCHINGER

The Effective Practices for Physics Programs (EP3) Initiative aims to "support physics programs with collections of knowledge, experience, and proven good practice for responding to challenges and engaging in systematic improvement" via the EP3 Guide, available online at ep3guide.org. EP3 is led by the APS, in collaboration with the American Association of Physics Teachers (AAPT).

Work produced is a direct product of the work of the physics community itself. The content of each Guide section is contributed by disciplinary experts, synthesized by a team from the EP3 Task Force, and reviewed by more experts from the community. To date over 290 individuals have provided contributions and reviews for the EP3 Guide, including more than 2,400 individual strategies for departments to consider and implement.

One recently published section is particularly important to the mission of APS and the long-term well-being of departments: Equity, Diversity, and Inclusion (EDI). Many physicists are calling upon their organizations and leadership to address long-standing problems in the recruitment, retention, and success of their members including students, postdocs, employees, and visitors. The EDI recommendations of the EP3 Guide provide a valuable resource for organizations and individuals seeking to improve program outcomes.

But don’t approach this thinking that organizational change follows an algorithm. Unlike most physics research, it requires learning about oneself as well as others, both past and present. Like physics research, this is an iterative process of discovery. The EDI Guide has the depth of a graduate-level thesis informed by research in the social sciences.

APSACT CONTINUED ON PAGE 7

Effective Practices for Physics Programs

ANNUAL LEADERSHIP MEETING

Inclusive Expansion of the Physics Community

BY ABIGAIL EISENSTADT

To reach new physicists, the physics community must cultivate an understanding of who physicists are, what they do, and why they do it, according to a session called “Broadening Our Community” at the 2023 APS Annual Leadership Meeting on January 27. Matthew Thompson, Chair of the APS Forum on Industrial & Applied Physics, began the session by acknowledging the need to honor all voices and all disciplines across physics. Moderator Ben Zwickl (Rochester Institute of Technology) then gave a brief presentation on how scientists can do so, introducing a two-part framework projected on expanding the community and promoting diversity, equity, and inclusion in the physics community—and to contextualize those answers based on their diverse experiences in academia and industry.

When industrial physicist Larry Woolf (General Atomics), an active member of APS’s EP3 Task Force, left academia over 30 years ago, he stopped publishing papers and attending scientific conferences. Since papers and conferences are some of the main ways scientists connect in the physics community, Woolf said this transition came with some sense of loss. Lack of connection with the physics community also stems from the biased belief that academic physics is the only “true” type of physics, said Meghan Anzelc (Spencer Stuart), a data and analytics industry expert. Echoing Anzelc, Zahra Hussaini, a physics sociologist, emphasized that the physics community has faced many obstacles in the past several years, herding our ability to respond to climate change, inequality, and other pressing issues. At this year’s APS Annual Leadership Meeting on January 27, a session called “Addressing Global Scientific Challenges” delved more into this nuanced topic, asking: How can scientists work together to identify and overcome challenges to global science?“The challenges that science and scientists face today are indeed global. They are complex. They are existential and navigating towards solutions is not a simple task,” said Miles O'Brien, a science and technology correspondent on PBS NewsHour, who moderated the session.

He began the discussion by asking William Collins, Director of the Climate and Ecosystem Division of Lawrence Berkeley National Laboratory and a member of the Intergovernmental Panel on Climate Change (IPCC), whether the problems science faces today are truly more difficult than those in the past. “The challenges have gotten greater, precisely because we’ve delayed trying to solve the problem,” Collins said.

But he remained focused on the past several years, highlighting the value of starting with conversation and present. Like physics research, it requires learning about oneself as well as others, both past and present. Like physics research, this is an iterative process of discovery. The EDI Guide has the depth of a graduate-level thesis informed by research in the social sciences.

ANNUAL LEADERSHIP MEETING

Improving Global Science for the Benefit of Humanity

BY ABIGAIL EISENSTADT

The University of California, Berkeley’s Cherry Murray (University of Arizona) noted that today’s global problems of climate change, inequality, and so forth are inherently connected. “In order to do solutions, we need every nation in the world to work on these at the same time.”

Reducing inequality among nations, O’Brien then asked Omololu Akin-Ojo, founding director of the ICTP-East African Institute for Fundamental Research, how disparities impact the way global solutions help countries. Funding, building capacity, and digital connectivity are additional limitations when tackling problems in Africa, Akin-Ojo said. Murray added that international scientific collaboration has faced many obstacles in the past several years, herding our ability to respond to climate change, inequality, and other pressing issues. At this year’s APS Annual Leadership Meeting on January 27, a session called “Addressing Global Scientific Challenges” delved more into this nuanced topic, asking: How can scientists work together to identify and overcome challenges to global science?“The challenges that science and scientists face today are indeed global. They are complex. They are existential and navigating towards solutions is not a simple task,” said Miles O’Brien, a science and technology correspondent on PBS NewsHour, who moderated the session.

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GLOBAL CONTINUED ON PAGE 3

Inclusive Expansion of the Physics Community

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GLOBAL CONTINUED ON PAGE 3

Interested in watching sessions from the 2022 APS Annual Leadership Meeting? See the playlist on the APS YouTube Channel: go.aps.org/aps-alm22
Many things and for academics, it is often motivated by curiosity. Clarke & Esposito is managing recruitment. The American Physical Society is recruiting to major in applied physics. Academics often think about how they might reach or in the broadening of diversity, equity, and inclusion. As the session ended, the 2 foot, 1.825-pound primary mirror to collect light from objects in space, as well as several advanced instruments, including a wide-field camera, a high-resolution spectrograph, and a high-speed photometer. HST’s last light was pushed from 1983 to 1986 due to engineering challenges, and further delayed until 1990 in the wake of the Challenger disaster (see APS News, January 2021).

The telescope began in 1978, featuring a 7.8-meter (25-foot) diameter mirror and cost $2 billion (in 2022 dollars). It was first conceived, Congress at long last approved funding for such a project, even after funding was initially denied. The primary mirror was designed to bring light into focus on a particular point, but it was later identified to be a spherical aberration: a flaw in the mirror’s curvature that caused light to come in from different parts of the mirror to focus at slightly different locations. The telescope was first deployed from the space shuttle on April 24, 1990: Launch of the Hubble Space Telescope (HST).

The concept of a space telescope dates back to 1946 when astronomer Lyman Spitzer Jr. in history’s most ambitious undertakings in the field of space science. The Hubble Space Telescope has been continuously maintained and serviced by NASA engineers and astronomers from around the country. The telescope was first conceived, Congress at long last approved funding for such a project, even after funding was initially denied. The primary mirror was designed to bring light into focus on a particular point, but it was later identified to be a spherical aberration: a flaw in the mirror’s curvature that caused light to come in from different parts of the mirror to focus at slightly different locations. The telescope was first deployed from the space shuttle on April 24, 1990: Launch of the Hubble Space Telescope (HST).
**Beyond CRISPR: New DNA Tools Rewire Genes to Fight Disease Like COVID-19**

BY JULIA OSTMANN

When Emmanuelle Charpentier and Jennifer Doudna won the Nobel Prize in Chemistry in 2020, their CRISPR gene editor had revolutionized medicine, agriculture, and genetics in just a few short years. But already, plans were in the works to move beyond CRISPR’s simple scissors, which snip genes out of a DNA double helix.

At the 2022 APS March Meeting, scientists revealed powerful new methods for untangling DNA, rewriting RNA, and even making their surfaces more resilient.

They announced their latest progress on the first artificial immune system and CRISPR–Cas12a toggle switch, and shared unexpected nanopore tools for gene mapping and parasitic disease diagnosis, at a press conference during the meeting.

Using proteins to interfere with CRISPR offers one of the most promising pathways toward building custom genetically controlled circuits. Two groups are investigating how to program the right genes to activate at the right time—and potentially shut down disease.

The COVID-19 pandemic revealed that vaccinations, while effective, cannot be developed and deployed fast enough to prevent a global health crisis from wrecking havoc. “There is a delay in building up herd immunity,” said Yiming Wan, a doctoral Biomedical engineering student at Stony Brook University.

“By properly adapting and combing genetic editing tools with synthetic regulatory circuits, we may be able to develop a genetic medicine that is significantly faster—protection not just the healthy, but also patients or elderly people whose immunodeficiency means traditional vaccines work less well.”

“In other words, we may be able to develop a programmable, targeted artificial immune system,” said Wan. The technique could improve treatment of diseases from COVID-19 to cancer to Zika.

Wan and his collaborators are testing a new method for turning gene expression on and off using a Cas33d RNA enzyme. Their goal is to create a new CRISPR-based platform that allows a scientist to program a viral defense mechanism against RNA viruses like SARS-CoV-2.

Biophysics PhD student Yanyu Xu of Cornell University and his team study CRISPR programming using a slightly different protein, Cas9a.

“Recent progress in CRISPR–Cas systems shows their potential as a new generation of genetic editing tools—especially when using a catalytically ‘dead’ version of Cas proteins,” said Xu.

But there are major problems when using Cas9a in particular. So the researchers developed a series of instructions for a tool that toggles between gene-on and gene-off, while maintaining cell stability in both states.

O’Brien asked Collins whether it feels frustrating to be met with minimal action from policy leaders when sharing urgent information on climate change.

“My takeaway from this is that we need to broaden the channels of communication, so just communicating with world governments is not enough anymore. We need a hearts and minds proposition that reaches out to the activists in the world—the younger people,” said Collins. The people who interact with the IPCC have not moved the needle significantly in 30 years, he added.

Such outreach must also highlight the economic benefits that good climate solutions can bring, said Murray. She emphasized that reduction of inequality and preservation of biodiversity were other outcomes with positive economic consequences that could come from international action on climate change.

The panel also discussed how to reconcile competition and collaboration in the scientific field and how to geopolitically enforce collaborative policies to stop climate change. O’Brien then asked panelists to explore how APS can have an impact facilitating such change.

“APS must look at these things holistically,” said Morgan. APS can contribute to the resolution of intersected global challenges by educating physicists to be broader in their thinking, she offered. APS could encourage the physics community to engage in transforming energy infrastructures and support cross-hemispheric scientific collaboration, Collins added. APS has a valuable role in lobbying the US government to advance scientific enterprise, said Editor-in-Chief of Science & Diplomacy William Colglazier (AAAS), mentioning APS’s various forums that inform its involvement on public and social issues. Accessibility of meetings through hybrid options like that at APS further scientists’ ability to connect globally, said Akin-Ojo. He added that APS can also work with the government to limit the difficulties associated with citizen- ship for international researchers applying to receive funding in the United States.

Wrapping up the session, O’Brien asked panelists to prioritize these suggestions. Motivating new students for physics-based solutions to the climate challenge, fostering international collaboration, and communicating solutions to policymakers were among Collins’ top picks. Murray included improving science education for all children. Colglazier also brought up continuing to internationalize with the global scientific hub and facilitating dialogues with other physics societies. Akin-Ojo said continuing to train young scientists in Africa and other countries as an investment in future generations.

APS CEO Jonathan Bagger concluded: “It is imperative that all physicists from all parts of the planet be engaged in developing solutions to challenges that are both local and global in nature. That means that physicists worldwide must not only have access to the latest scientific research but also to the larger scientific community to establish the collaborations and connections necessary to tackle these issues.”

The full recording of this session is available on YouTube.

The author is a science writer at the American Association for the Advancement of Science. She was previously an APS science communications intern.
It would be the first CRISPR-Cas12a toggle switch ever, said Xu. “We can create programmable genetic toggle switches that mimic their electronic counterparts, and can help build more complex synthetic genetic circuits.”

A group at California State University, Long Beach (CSULB) also wished to unwind and explore DNA.

“Nanopore sequencing involves measuring the electrical signal of DNA molecules as they pass through a tiny hole. This gives information about the shape of the molecule,” said CSULB biophysicist Alexander Klotz, who leads the investigations.

When you attach a protein, the blocked ion flow through the hole produces a map of the DNA. The team heated up DNA until only the adenine–thymine (AT) bonds melted. Then they added a special protein that only links up with the melt bonds—showing exactly where AT lives on the DNA strand.

“It will be the first time that this protein is used to uncover genomic information,” said Klotz’s student Nathan Howald, who ran the experiment. “The technique fills gaps in several technologies. It combines the portability of a nanopore, the speed of genomic mapping, and the potential to work on all types of DNA.”

Nanopores can also help pierce the armor of Chagas’ disease, and other parasitic diseases. The parasites have unusual DNA looped thousands of times like chain mail.

“We used this chainmail DNA to learn about the physics of a new type of mechanical–chemical bond, and provide preliminary data that may be used to diagnose parasitic infections in the future,” said Sierra Breyer, the student who led the work.

Biophysicists have tried to simulate pulling the chain-mail DNA through a nanopore, but experiments seemed impractical or even impossible. Breyer broke the chain mail into smaller links to understand what holds them together physically.

“The new results set off a controversy about the role of friction within molecules,” said Breyer.

From nanopores to CRISPR, toggle switches, the cutting-edge tools we need to solve some of the most dangerous illnesses lie within the basic physics of our human code.

Julia Ostmann is a science writer at the Global Alliance for Genomics and Health. She was previously a science writer at APS.

Illustration of a nanopore translation of microtubulin extracted from a trypanosome parasite (above).

Credit: Sarama/Benjamin Alex Klotz

These society-wide APS prizes and awards recognize achievements across all fields of physics. Please consider nominating deserving colleagues for the following:

**APS Medal for Exceptional Achievement in Research**

Deadline: May 2, 2022

Dannie Heineman Prize for Mathematical Physics

Deadline: June 1, 2022

Edward A. Bouchet Award

Deadline: June 1, 2022

George E. Valley, Jr. Prize

Deadline: June 1, 2022

Julius Edgar Lilienfeld Prize

Deadline: May 2, 2022

Maria Goeppert Mayer Award

Deadline: June 1, 2022

Prize for a Faculty Member for Research at an Undergraduate Institution

Deadline: June 1, 2022

LeRoy Apker Award for Undergraduate Achievement

Deadline: June 1, 2022

Serving a diverse and inclusive community of physicists worldwide is a primary goal for APS. Nominations of women and members of underrepresented minority groups are especially encouraged.

**FYI: SCIENCE POLICY NEWS FROM AIP**

**DOJ Raises Bar for Research Integrity Prosecutions, Discards ‘China Initiative’ Label**

**BY MITCH AMBROSE**

In his February, the Department of Justice retired the “China Initiative” label for its efforts to counter economic espionage and malign influence by the Chinese government and raised the bar for prosecuting cases involving academic research. DOJ indicated it will exert more oversight of investigations and criminal prosecutions for such cases and will consider seeking civil or administrative penalties for those that lack clear national security or economic security implications.

The changes result from a review of the China Initiative conducted by DOJ National Security Division head Matt Olsen, who the Senate confirmed to his post in May last year. Olsen explained in a Feb. 23 speech that he concluded DOJ’s prosecutions of university scientists he said were linked to the Chinese government had created a “chilling atmosphere” that is damaging the U.S. research system. They had also created a “negative bias” that, in some cases, was “arbitrary” and “unscientific.”

DOJ launched the China Initiative in 2018 to focus resources on cases involving other overt or “non-traditional espionage” by the Chinese government, and many cases pursued through the initiative have been overtly unpatriotic. However, cases involving academics have sparked outcry because few involve allegations of theft or espionage, resting instead on charges that researchers’ nondisclosure of ties with institutions in China were tantamount to criminal schemes to exploit federal funding agencies. While DOJ secured a conviction against Harvard chemist Charles Lieber for lying to investigators and failing to report income he received from a Chinese university, pressure on the initiative has mounted as other nondisclosure cases have fallen apart. Some scientists charged by DOJ but later exonerated have called for the government to be held accountable for upending their lives, including MIT engineering professor Gang Chen and University of Tennessee– Knoxville technology researcher Anming Hu.

Chen has argued that DOJ failed to seek and turn over evidence that he did not violate disclosure policies on a 2017 grant application
UNIT PROFILE

APS Membership Unit Profile: The Topical Group on Energy Research and Applications

BY ABIGAIL DOVE

Given the urgency of the climate crisis, the development of technologies to support renewable and sustainable energy is one of society’s most pressing scientific challenges. The Topical Group on Energy Research and Applications (GERA) is a home for researchers interested in using the principles of physics to develop new ways to generate, transmit, store, and efficiently use energy with as minimal an impact as possible on the Earth’s environment.

Broadly, current energy science and technology research has four main areas of focus: (1) energy sources, including but not limited to solar energy, wind energy, geothermal energy, electro- and photoreaction-based fuels, hydrogen energy, and energy harvesting devices; (2) energy storage, which encompasses everything from batteries to fuel cells to supercapacitors to carbon capture and storage; (3) energy utilization, including energy conversion technologies, energy transport, energy transmission grids, and increasing the scalability of such technologies; and (4) sustainability, which covers topics ranging from atmospheric and climate science to increasing the energy efficiency of buildings, transportation, and industrial processes.

A range of these topics might suggest, GERA’s membership—now over 700 people—constitutes a highly interdisciplinary group. Energy research engages not only physicists but also chemists, engineers, and materials scientists, making GERA an important entry-point to APS for researchers with an academic home outside of physics. Furthermore, within its disciplines, energy research draws upon many areas of the field, including condensed matter physics, materials physics, polymer physics, nuclear physics, and computational physics. Within APS, GERA cooperates most closely with the Divisions of Condensed Matter Physics (DCMP; see APS News April 2019) and Polymer Physics (DPOLY).

Beyond different academic specialties, GERA encompasses an impressive diversity of sectors where energy researchers work. “Energy research is very multidisciplinary as a portfolio, and GERA attracts researchers from academia, national labs, and industry. We have fundamental science up through applied research represented,” explained GERA chair Marina Leite (University of California, Davis). To this end, GERA has also forged a close relationship with the Forum on Industrial and Applied Physics (FIAP; see APS News February 2020), both to build connections with energy researchers working in industry and to expose students and early career scientists to the wealth of career options available in the clean energy arena.

Mirroring the rapid development of the energy research field, GERA is a fast-growing unit, with membership rising almost 50% in the past 15 years, and now nearly 80% of the group’s members are postdocs and above.

GERA CONTINUED ON PAGE 7

PHYSICS

Nuclear Fusion: How Excited Should We Be?

BY PAUL NORMAN AND LEE PACKER

This article was originally published by The Conversation.

What is your vision for this storied journal?

Joseph Kapusta

I am honored and humbled to become only the fourth Lead Editor of PRC in 15 years. The journal has a history of being superbly managed. We have an amazing team comprised of a Managing Editor, 12 Associate Editors, and 1 Assistant Editor. They have the expertise to handle all areas of nuclear physics. They, along with a rotating Editorial Board of 15 members, are what makes PRC the most prestigious nuclear physics journal in the world. Having served as an Associate Editor for many years, I am very proud of this journal.

What is your vision for the journal?

PRC must maintain its high standards for quality so that it is the journal of choice for researchers. As its editor, it is my role to help maintain and honor its conscientious referees.

I want to continuously build and replenish our referee base by bringing on board early career physicists who are publishing creative research in nuclear physics. We are planning to hold monthly Zoom meetings for authors and referees to provide brief tutorials or information sessions on the editorial process, to answer questions, and to seek comments and feedback so that we can continually improve the journal.

What research are you working on for PRC now?

I am a theorist. My group and I are focusing on the high baryon density matter produced in heavy ion collisions in the Beam Energy Scan II at the Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory (BNL). A big challenge in our field is to seek comments and feedback so that we can continually improve the journal.
to open, which leads to a loss of gas and subsequent disintegration. Since the other paper did not discuss how these three causes impact gas marbles, Baudoin and his colleagues saw a path forward for their research.

They focused their experiment on creating an insoluble gas marble able to withstand popping from any of the usual culprits. First, they used Baudoin, B. and co-author Alexis Dacheux (Université Lille) to establish a baseline for bursting. They created particle rafts and injected gas into water to form freestanding microparticle-supported water bubbles. After the water gas marbles formed, they ruptured. Through analysis, the team determined that this rupture was caused by evaporation.

Drainage was less of an issue for the water gas marbles, because the microparticles were acting as small capillary bridges. Essentially, these particles were attracting the liquid, creating a surface tension effect larger than that felt from gravity on this micro-scale. Surface contact did not play a role.

The intuitive next step, according to Baudoin, was to try to prolong the water-based gas marbles’ lifespans by counteracting evaporation. They decided to add a hygroscopic substance to the water-based gas marbles’ liquid, creating a surface tension effect larger than that felt from gravity on this micro-scale. Surface contact did not play a role.

Baudoin’s presentation, moderator Jacco Snoeijer (University Twente) opened the online chat for questions. Participants discussed how the composite film bubbles without microparticles might behave in the Space Station, what the maximum achievable size could be for the bubbles, and whether microparticles’ size and dispersion were considered during the research. Other questions included where and how the bubbles were stored for the year and how small the bubbles could be made.

Snoeijer concluded the lively conversation by thanking participants for their attendance and commending Baudoin for his presentation on a “beautiful phenomenon.”

The author is a science writer at the American Association for the Advancement of Science. She was previously an APS science communications intern.

Meanwhile, several Republicans in Congress blasted the decision. Senate Judiciary Committee Ranking Member Chuck Grassley (R-IA) has asked DOJ to reconsider, saying that the agency had acted unreasonably to “accommodate unfounded perceptions.”

The author is Director of FYI.

Published by the American Institute of Physics since 1949, FYI is a trusted source of science public news that is read by congressional staff, federal agency heads, and leading figures in the scientific community. Sign up for free FYI emails at�� aps.org/fyi.

In particular, Georgia Tech, suits her perfectly. “I can’t think of anything that gives you as much freedom of thought and ideas. I don’t have to deal with the bureaucratic side. I don’t have to worry about getting my paycheck,” says Matsumoto. “I got a good idea and no one’s going to say you can’t do that, and you can work with people around the world or anywhere that you want.” She finds her work, as she presses forward with her research, “very creative in their own way.”

The opportunity and, indeed, the research opportunities that are something that is always on her mind. “An important part of research that people tend not to talk about is that you have to be able to make things work. We are used to being told that the person who is ‘good enough’ to analyze people aren’t creative. But you have to be incredibly creative and resourceful and ingenious to get any research project working—it’s always going to break, whether it is theory or experiment, and you’re going to have to come up with something more out of the box thinking you have, the easier it is to find you way out of the dead end into something interesting. It may not have been what you were planning but it will be interesting nonetheless.”

Matsumoto is in the middle of five-year NSF-funded project entitled “What a Tangled Web We Weave:” That examines the mathematics of textiles and knitting. She’s still polishing the mathematical proofs for one aspect that addresses what type of knots can actually be knitted. The other aspect of the project is equally fascinating—APS Chief External Affairs Officer, said about the brief: “APS stands with physicists, and we are a voice for physicists, and we are very willing to take our message to court in support of Professor Xi.”

Relatedly, APS was encouraged by the recent release of the Biden Administration’s implementation guidance for National Security Presidential Memorandum 33 (NSPM-3). The guidance document provides federal science agencies direction on key areas of research security. Published as a report by the National Science and Technology Council, the guidance document is built on the three primary provisions for agencies that APS had advocated for. They include: establishing a body of research to assess threats; providing a pathway to enable researchers to correct past disclosure mistakes; and involving the Department of Justice only “when warranted.” Additionally, the guidance document states that “when warranted” requires that “Agencies must implement NSPM-3 provisions to ensure that research security. The guidance document also recognizes that the discriminatory manner that does not stigmatize or treat unfairly members of the research community, including members of ethnic and racial minority groups.”

We are optimistic that this guidance will address the need for a more appropriate use of the judicial system to research security concerns, and that those efforts must continue.

“I’m proud of the role that APS has played in this, and we hope it helps us reach this better place. As we move forward, APS will continue to engage with the government on matters related to research security. We are all working together to have our community once again feel comfortable with engaging in international collaborations and to restore the US as the destination of choice for international physicists,” he said.

The author is APS Senior Public Relations Manager.
students or early career scientists, signifying the vibrance of this field at a time when innovation in clean energy is crucial more than ever.

Additionally, GERA is composed of over 20% women, placing it among the top physics organizations in terms of diversity, but still with ample room for growth.

GERA is well-represented at the annual APS March Meeting. At this year’s hybrid meeting in Chicago, GERA hosted three invited sessions and one focus session covering topics such as advances in thermal energy conversion, the interface between energy and climate, nuclear and fusion science, computational modeling of materials for energy applications, and advancements in the field of multi-messenger astronomy. Discussions of fuel-agnostic engines for a decarbonized future, updates on fusion energy development, and nanotechnology-enabled energy storage paradigms.

A particular point of pride for GERA is its annual March Meeting Energy Research Workshop, which takes place the day before the main conference, and which brings together around 100 participants from the United States and abroad, the workshop is an all-day event featuring talks on key topics in the field, round-table discussions, and plenty of networking opportunities. GERA’s Student Advisor Program encourages graduate students and upcoming senior researchers and upcoming new names in order to promote everyone in our field doing great work,” noted Leite. The meeting is unique in that it brings together people from all areas of clean energy research, rather than just those working on one specific problem.

For APS members interested in learning more about research and applications outside of APS Meetings, the Physical Review Journal PEX Energy promises to be an excellent resource. “There is an open access and highly selective APS journal will waive all publication fees until 2023 in order to encourage researchers to publish their work there. On a symbolic level, the launch of an open-access, peer-reviewed research journal provides important recognition for the clean energy subfield of physics. It also provides a hub for cutting-edge clean energy research in all its diversity, which may otherwise have been dispersed across multiple journals focused on particular subfields of physics.

While GERA and PEX Energy are not formally affiliated, some members of PEX Energy’s editorial staff have written for this year’s March Meeting Energy Research Workshop. “The Physical Review Journals have such a well-established history. A high-quality journal dedicated to clean energy research is excellent development in the field,” said Leite.

Looking forward, the GERA exec-utive committee’s principal goal for the group is to elevate participation beyond the March Meeting, partic-ularly among younger researchers. The executive committee is cur-rently exploring the possibility of a quarterly webinar series that keeps the broad, interdisciplinary conver-sation about clean energy activity running year-round, particularly for those who cannot afford the March Meeting. “Young researchers can benefit from having a survey of the larger field presented. It is a good way to give students and international researchers access to talks from prominent voices in the field,” Leite noted.

Overall, GERA stands out as a group with a bright future, pro-moting research and exchange of ideas. “We have our eyes on the most buzzing and interdisciplinary areas of physics, at a time when our planet needs it most. More information can be found at the GERA website.

The author is a freelance writer in Stockholm, Sweden.

**NUCLEAR CONTINUED FROM PAGE 5**

This realization presents a challenge: how to avoid becoming overwhelmed? My advice is to approach this guide the same way one learns a new physics topic: in stages. First read through the online document (using the excel-lent sectional formatting as an outline) to see what is familiar. Pick up a few ideas that you can use to create a teaching framework in a study group to read and discuss the guide in more depth over a period of time. Don’t worry too much about the exact wording of the sections, such as “How to Create and Sustain Effective Change,” remain to be added.

The author is a contributor to the "Equity, Diversity, and Inclusion" section of the EP3 Guide and Professor of Physics and affiliated faculty, Program in Women’s and Gender Studies at the University of Chicago. Michael Wittmann contributed to this article.

Nuclear physics is a well-established field. Examples of the evolution in accelerator-based research include the Facility for Rare Isotope Beams (FRIB) at Michigan State University, expected to begin operations soon, the Electron Ion Collider (EIC) at BNL, which has been approved for construction; the Facility for Antiproton and Ion Research (FAIR), under con-struction; and the future Hadron Collider (LHC), which will likely run well into the 2030’s. In the future, the energy frontier is beginning to allow for the observa-tion of neutron star mergers and to provide information on the properties of these nuclei in their newly nucleon. It is both challenging and exciting.

Where do you see growth in nuclear research?

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Where do you see growth in nuclear research?

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APS Annual Leadership Meeting: Past President’s Address

By S. James Gates, Jr.

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ood evening. I’d like to begin by thanking the cohort of individuals with whom I’ve worked during the past three years as a member of the APS Presidential Line. These are people from whom I’ve learned, leaned on, been advised by, and I am very proud to call these colleagues, but most of all, friends.

These include members of the APS Presidential Line, Past & Present: David Gross, Phil Bucksbaum, Frances Hellman, and Bob Rosner; Board & Council Colleagues, with special mention of Past & Present Council Speakers: Jim Hollenhorst, John Rumble, Andrea Liu, Baha Balantekin, and Robin Slinger; and APS Corporate Leadership: Katie Kirby who retired at the end of 2020; Jonathan Bagger (current APS CEO), members of the Senior Leadership Team, and others. This latter number of people is so large I must beg for forgiveness. Sincerely, this is not out of a lack of recognition, appreciation and truly enormous sense of gratitude, but I would forget to call out the name of so richly deserving APS contributors to the success (I hope) of my presidential administration.

Perhaps, to be added, I am acutely aware that leaders rarely have the luxury of choosing the times of their service, but times always have the demand to choose the service of leaders. My election as Vice President set my service clock in this domain. I had no idea then what would be demanded during times of a national re-awakening about the reality of racial relations, a governmental trajectory threatening the foundations of our discipline, a once-a-century pandemic, and an unexpected acceleration of debilitating trends in the US cultural, societal, and political atmospheres. I have frequently heard the remark that “APS has been passing through the most turbulent times since the 1960’s”

I started my APS Presidential year by stating: For an individual, it has been said that character is destiny. For an organization, perhaps it can be said that culture is destiny. Culture and values are tightly linked. Commitment to living the APS Values—the scientific method; truth and integrity; diversity, inclusion, and respect; partnering, cooperation, and open collaboration; speaking out; education and learning—has guided me, and the organization, through a particularly challenging year.

Long ago, I concluded APS is the vessel in which the culture of the discipline is forged. During these times, my administrative goals have been to use deliberation, dedication to an absolute commitment to hard-work, a high regard for excellence, past experience, probity, knowledge of history, and my decades-long observations of the culture of physicists as guide-stars to formulate policies and promulgate best practices that align with our 2019 Strategic Plan. As part of this, consideration of necessary transformations must be on the radar.

Change, however, is never easy. A look at the letters sent by APS leadership in 2021 reveals that, instead of my usual exhortations to communicate more with the Federal Government and align our messaging, we have seen improving and excising many of those periods of time for such past activities. The diversity of these communications can be garnered from those directed to the US President’s Science Advisor, Department of Defense, the Department of Justice, and the Federal Bureau of Investigation (these latter two most unexpectedly), the Department of Energy, the National Science Foundation, the US Congress, and most certainly our membership and the public. One of the most unusual experiences that occurred was appreciating that APS acquired the capacity and knowledge basis to file a lawsuit. All of this was in addition to the conceptualization, initiation, and implementation of the DELTA-PHY initiative. The initiative was launched as an effort advised by, and I am very proud to call these colleagues, but most of all, friends.

In my inaugural presidential speech (see APS News, March 2021: My Goals for the American Physical Society), I called for APS to be a beacon dedicated to answering a series of questions brought to the foreground by the COVID-19 pandemic. The pandemic has provided us with an opportunity to change our culture consciously and intentionally along several axes. We’ve increased APS’s capacity to foster more effective communication to our community, through our meetings, for example. I am participating in our third Annual Leadership Meeting and I hope all who are doing so will spread the word of your experiences in this meeting. I also hope participants will advocate to fellow APS members to join future APS meetings. We are improving and executing virtual meetings with a global reach. APS is already a global entity. One of the statistics that is indicative and was recently revealed is that APS News welcomes and encourages letters and submissions from APS members responding to these and other issues. Responses may be sent to: letters@aps.org

اضـ The Back Page is a forum for member commentary and opinion. The views expressed are not necessarily those of APS.

A very high percentage of articles published in our journals involve international collaborations. The advantages of an enhanced schedule of virtual meetings are obvious and during the last year as APS President, I have participated in such meetings in Brazil, Poland, among other countries. APS is also very much aware the in-person modality for meetings remains important, but with the examples of the past year the future points to a continued use of hybrid as these extend the accessibility and inclusivity of our activities.

Through our advocacy, I along with APS leaders in the Office of External Affairs and Government Affairs engaged in direct virtual meetings with high level officials about the “China Initiative.” There is also internal advocacy on the need for the Society to be able to demonstrate possible sources of philanthropic support. As the APS 2021 President, I have reached out to the membership in this regard. I am happy to report that to my knowledge, the year 2021 marked the first time there was 100% donation participation by the APS Board.

We’ve implemented strategies to foster Diversity, Equity, and Inclusion (what I call true “Cultural Climate Change”) and to facilitate the open, global, and secure practice of physics through DELTA-PHY, actions of the APS leadership, and statements of public policy. Through ongoing discussions with the APS Ethics Committee, we are making progress on issues related to conflicts of interest and commitment as well as standards of ethical and professional behavior. One of the most pleasurable experiences of the year was to welcome the new APS CEO, Jonathan Bagger, into a leadership capacity and moreover to work closely with him as he set his goals and I was very rewarding to be his partner during this time.

I have always had confidence in the strength of our organization, but never more so than now. Having the opportunity to lead APS as President of the Society in 2021, I enjoyed a unique vantage point—to see the breadth of services APS provides our community, to envision what APS could be in the future, and strategically map out with the help, wisdom, and consultation of my colleagues, foundational steps for the APS to forge for generations to come. It is my sincere wish that every APS member would be able to see this organization from a similar vantage point. APS has proven it can weather storms and emerge better for having done so.

We publish the most highly regarded physics publications in the world. By reviewing our governance structure and considering changes to how we manage and execute on our publishing strategy, we will maintain that stronghold.

We have continued to develop, establish, and maintain innovative and important programs for our membership, often in collaboration with our members.

We have convened! Through our computers, in our home offices, with the help of technology, and with large doses of passion and pride, APS members have worked through this past year, new discoveries, and new research. We will continue to be adaptive and nimble as the organization faces the challenge of coherently engaging those both among the membership and outside the Society to safely gather in the presence of a variable and sometimes ominous figurative “COVID-19 weather.”

These great disruptors—the pandemic, society’s social, and political foment that we all are passing through—are not derailed us from our mission: to advance and diffuse the knowledge of physics for the benefit of humanity. As the premiere physics member organization, we constantly strive to maintain and increase excellence, and I know that we have been successful in doing so this year. I now pass the torch to my respected colleague and friend, Frances Hellman, to continue the way forward as your 2022 APS President.

The author is 2021 APS President. He is currently the Ford Foundation Physics Professor, Affiliate Mathematics Professor at New York University, Watson Institute for International and Public Affairs Faculty Fellow. This article is adapted from his pre- sentation at the 2022 APS Annual Leadership Meeting.

S. James Gates, Jr.