

ANNUAL LEADERSHIP MEETING

APS Sharpens Focus on Ethical Conduct in Physics

BY DAVID BARNSTONE

The APS Council adopted comprehensive guidelines for scientific integrity and professional conduct in April 2019. But for much of its history, physics had no formal standards of ethical behavior.

"Prior to about 1991, the APS didn't have any particular statements about ethics," said Frances Houle, Chair of the APS Ethics Committee, who provided an overview of the committee's work at the 2021 Annual Leadership Meeting on February 5. "I think it was just assumed everybody would hold themselves to very high standards."

That assumption was challenged by two separate, "completely shocking" instances of data fabrication in 2002 by scientists at Bell Labs and Lawrence Berkeley National Laboratory. In response, Houle convened a Task Force on Ethics with former APS CEO Kate Kirby, then a physicist at the Harvard-Smithsonian Center for Astrophysics, and other colleagues. The group worked to refine the



Frances Houle

Society's existing ethics statements and survey its members about their experiences, which they described in a 2004 *Physics Today* article.

"As we analyzed the data, we really began to understand that treatment of people was also a major issue in physics," said Houle. The revelation led to a statement on the treatment of subordinates and the formation of a new task force in 2006 focused on incorporating ethics education into physics curricula.



Michael Marder

For the next decade, the Society's work on ethics remained relatively quiet. The APS Panel on Public Affairs (POPA) issued a handful of statements. Then, in 2016, the American Geophysical Union published a draft of their ethics guidelines.

"For the first time, treatment of people, especially harassment, was elevated to the level of scientific misconduct held by fabrication,

ETHICAL CONTINUED ON PAGE 6

MEETINGS

April Meeting 2021 Promises Exciting Online Events

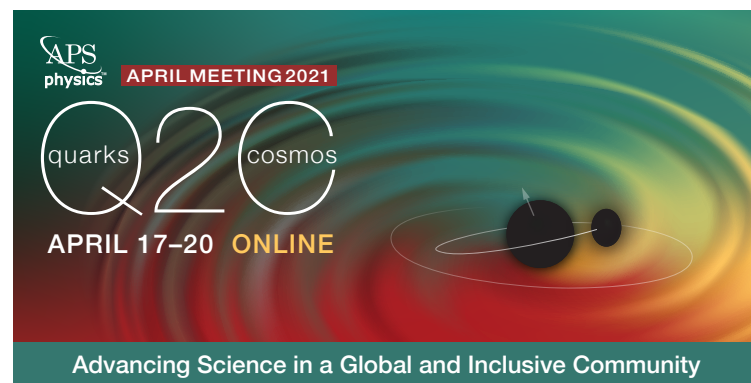
BY LEAH POFFENBERGER

For the second time, the APS April Meeting is making its way online from April 17 to April 20, exploring physics across the conference theme of "Quarks 2 Cosmos." The four-day meeting will feature scientific talks and special events sponsored by 20 APS units and committees. Among the highlights is the Kavli Foundation Keynote Plenary, featuring Andrea Ghez, Reinhard Genzel, and Roger Penrose, the 2020 recipients of the Nobel Prize in Physics. All times listed for events

at the April Meeting are in Central Daylight Time.

Before the conference officially kicks off on Saturday, April 17, several pre-meeting events will be offered on Friday, April 16. A special workshop, which requires additional registration, will have two sessions, one at 11:00 AM and the other at 2:00 PM, to discuss searches for beyond-the-Standard-Model interactions with precision measurements. A Q&A session

APRIL MEETING CONTINUED ON PAGE 4



Advancing Science in a Global and Inclusive Community

INDUSTRIAL PHYSICS

Taking Your Next Steps: From Physics Degree to Industry Career

At some point during their undergraduate experience, all physics students will have to make a decision about what to do next. This point typically comes during their senior year before receiving their bachelor's degree. Do they attend graduate school or enter the workforce?

For insight into how one physicist made this choice, Dan Pisano, APS Director of Industrial Engagement, interviewed Audra Macie, Senior Principal Engineer at BAE Systems, Inc., in Nashua, NH. Audra is an early-career physicist who chose to enter the workforce after receiving her bachelor's degree in physics and astronomy from Smith College. (See the sidebar on p.5 for more information about BAE Systems.)

Dan: How do you find a position in industry after having been in school for more than 16 years?

Audra: When I was looking for a job during the last year of my

undergraduate program, I attended career fairs, not only at my school, but also at the big engineering schools nearby because I knew that technology companies would not be targeting Smith College. After I landed my first job, I found opportunities on LinkedIn by staying connected with recruiters. I have also kept an up-to-date LinkedIn profile. Additionally, I have found great opportunities through professional networking at different conferences.

Dan: While in school, there are some classes in which you occasionally work in teams, but in most classes, you are an individual contributor and complete assignments working solo. Is the working environment in industry collaborative? Do you work alone or on a team?

Audra: Throughout my career, I have worked in a variety of roles allowing for collaborative and individual work. I have had



Audra Macie

assignments where I was working largely by myself, only providing work products to one other person; however, there have also been times when I have spent half my day designing new algorithms with a team in a conference room. In this case, we have split up the assignments and worked individually on pieces of a larger product. I have also had opportunities to lead different portions of my programs, which has afforded me the opportunity to work collaboratively with different engineering specialties, subcontractors, and customers.

Dan: In academia, you frequently get the impression that professors can work on what interests them the most. What is it like working in industry? Do you get to work on projects you like?

Audra: In my experience, there will be assignments you like and

INDUSTRIAL CONTINUED ON PAGE 5

PLANNED GIVING

APS Legacy Circle Profile: Erol Oktay

BY DAVID VOSS

Plasma physicist Erol Oktay knows the importance of collaboration. Now retired, Oktay was for many years involved in one of the world's most complex and collaborative endeavors—the International Thermonuclear Experimental Reactor (ITER) being built in France to prove the feasibility of fusion as a large-scale and carbon-free source of energy based on the same principle that powers our Sun and stars. And as a member of the APS Legacy Circle, he values the way physicists can come together to support their professional society through the APS planned giving programs.

"I've been a member of APS for over 50 years," says Oktay. "I decided I should go ahead and support the field of plasma physics and fusion. I started talking to people in the community and decided that the best way would be through APS and the Division of Plasma Physics."

"I THINK THAT THE PHYSICS COMMUNITY SHOULD BE MORE AWARE OF THE APS LEGACY CIRCLE AND THAT THERE ARE QUITE A LOT OF PEOPLE WHO CAN MAKE THIS KIND OF CONTRIBUTION."
—EROL OKTAY



Julianne and Erol Oktay

Oktay received his PhD degree from the University of Michigan in 1969 with a thesis on how lasers interact with laboratory plasmas. After five years of research at Massachusetts Institute of Technology and the University of Maryland, he joined the US Department of Energy (which was then called the Atomic Energy Commission) and worked in the Controlled Thermonuclear Fusion Division until his retirement in 2011.

"My activities in this group involved program management with responsibilities of oversight for fusion programs at Los Alamos National Laboratory, the Princeton Plasma Physics Lab, Oak Ridge National Lab, and General Atomics

OKTAY CONTINUED ON PAGE 2

OKTAY CONTINUED FROM PAGE 1

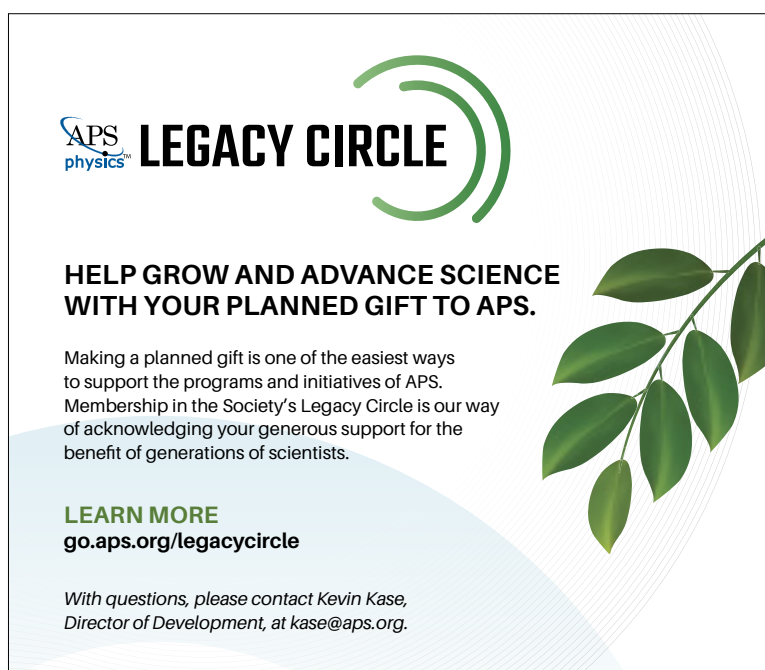
in San Diego,” he explains. “In addition, I was involved with the International Energy Agency (IEA) and bilateral collaborations with all major fusion labs in the European Union (France, Germany, Belgium, and Italy), and in UK, South Korea, Japan, Russia, China, and India. My position for the last five years of my government career was Acting Director, ITER and International Division in the Office of Fusion Science.”

In early 2020, Oktay and his wife, Prof. Julianne Oktay, established with APS the “International Fusion Research on Burning Plasma Physics Fund,” which supports students and early career scientists at US universities to take part in international workshops and research activities. They have made a multi-year gift to support this effort and made a legacy gift to further this important work for years to come.

The Oktays are members of the APS Legacy Circle, which recognizes donors who support the APS mission through this kind of planned giving. By including APS in their estate plans, the members create an enduring legacy that will benefit researchers, educators, students, and the general public.

Oktay would like to see more people involved in the Legacy Circle. “We also contribute to the Baltimore Symphony Orchestra, and they have a Legacy Circle that is quite big,” he says. “I think that the physics community should be more aware of the APS Legacy Circle and that there are quite a lot of people who can make this kind of contribution.”

For more information about joining the Legacy Circle, please visit go.aps.org/legacycastle or contact Kevin Kase at 301-209-3224 or email kase@aps.org.



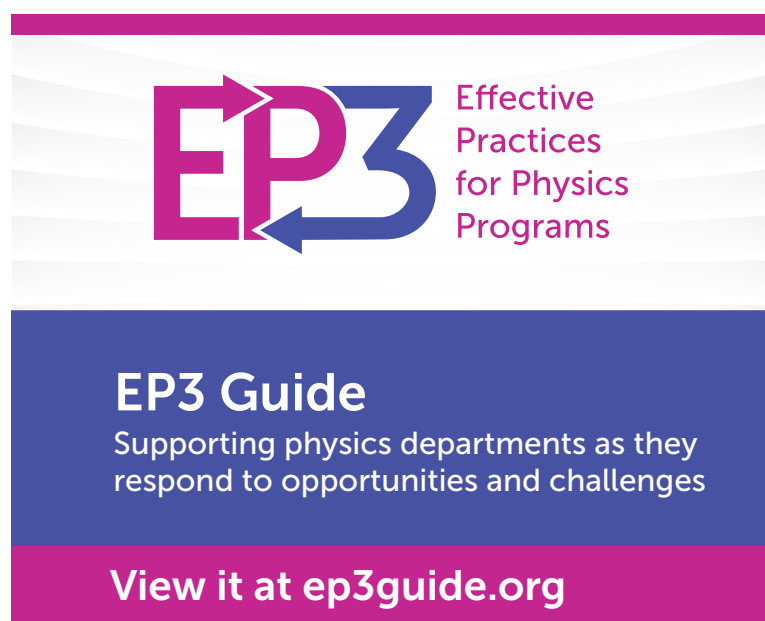
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THIS MONTH IN

Physics History

April 6, 1938: Discovery of Teflon

The history of science is rife with serendipitous discoveries that can profoundly impact our daily lives. That includes the discovery of a novel polymer, later trademarked as Teflon, by an American scientist named Roy J. Plunkett.

Born in Ohio in 1910, Plunkett grew up in poverty and attended Manchester College in Indiana, where his roommate was future Nobel laureate Paul Flory (honored for his contributions to the theory of polymers). Like Flory, Plunkett went on to earn his PhD from Ohio State University. His thesis was on the mechanism of carbohydrate oxidation. In 1936, after receiving his doctorate, he joined E.I. du Pont de Nemours and Company (now known as DuPont) as a research scientist, where he worked for the rest of his career.

Plunkett's early research at DuPont's Jackson Laboratory in New Jersey involved developing new chlorofluorocarbon refrigerants—preferably something non-toxic and non-flammable to replace less-desirable refrigerants like sulfur dioxide and ammonia. He was experimenting with tetrafluoroethylene (TFE) gas, stored in 1 kg canisters at temperatures conducive to dry ice until they were ready to be chlorinated for the experiments.

On the morning of April 6, 1938, Plunkett asked his research assistant, Jack Rebok, to set up their experimental apparatus with one of the TFE cylinders used the day before. Typically, when a canister's valve was opened, the gas would flow out under its own pressure. But this time, nothing happened. Yet the weight of the canister had not changed. Realizing that there simply wasn't any gas left in the cylinder, a puzzled Plunkett tipped it upside down, and a white-ish powder fell onto the lab bench.

“We scraped around some with [a] wire inside the cylinder... to get some more of the powder,” he later recalled. “What I got out that way certainly didn't add up, so I knew there must be more inside.” Eventually the two men decided to cut open the cylinder and found even more of the powder packed into the bottom and lower sides.

Plunkett often told audiences that his education and training had prepared him to recognize novelty. He realized that the TFE gas had polymerized—something not predicted by prevailing theory at the time—into a waxy solid known as polytetrafluoroethylene (PTFE), with the iron surface inside the container acting as a catalyst. While he initially considered the experiment a failure, PTFE proved to have some remarkable properties. It was corrosion- and high-heat-resistant, for instance, and had very low surface friction.



Chemists Roy Plunkett (right) and Robert McHarness (center) and technician Jack Rebok re-enact the discovery of fluorocarbon polymers.

CREDIT: HAGLEY MUSEUM AND LIBRARY

“He recognized almost at once that the material was different and that it had potential and DuPont saw it too,” Plunkett's wife, Lois, told *The New York Times* in 1994.

It fell to other chemists and engineers to find a good use for PTFE, which was initially extremely expensive to produce and could not easily be shaped. The first application was on the Manhattan Project, where its corrosion resistance properties proved useful as a coating on valves and seals in the pipes holding highly reactive uranium hexafluoride at the uranium enrichment plant in Oak Ridge, Tennessee.

The Teflon trademark was registered in 1945 by Kinetic Chemicals, a DuPont partnership with General Motors, and was soon producing more than two million pounds of the branded PTFE each year. By the 1950s, scientists had invented copolymers that kept most of the desirable chemical and mechanical properties of PTFE, yet were more easily molded or extruded, thereby opening up more practical applications. All this, in a field that had been considered mature and relatively uninteresting scientifically.

In 1954, French engineer Marc Grigoire invented the first PTFE-coated nonstick cooking pans (brand name: Tefal) at the suggestion of his wife. The first nonstick cookware appeared in the US in 1961, introduced by Marion A. Trozzolo, who had noted its usefulness for his scientific tools. Hundreds of manufacturers all over the world now offer some version of nonstick cookware.

Today, Teflon is used in a wide range of industrial applications: in windshield wipers; as a stain repellent in carpets, furniture and clothing; in lightbulbs; in glass coatings; and

HISTORY CONTINUED ON PAGE 7

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Staff Science Writer..... Leah Poffenberger
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ANNUAL LEADERSHIP MEETING

Science Communicators Discuss Rebuilding Trust in Science

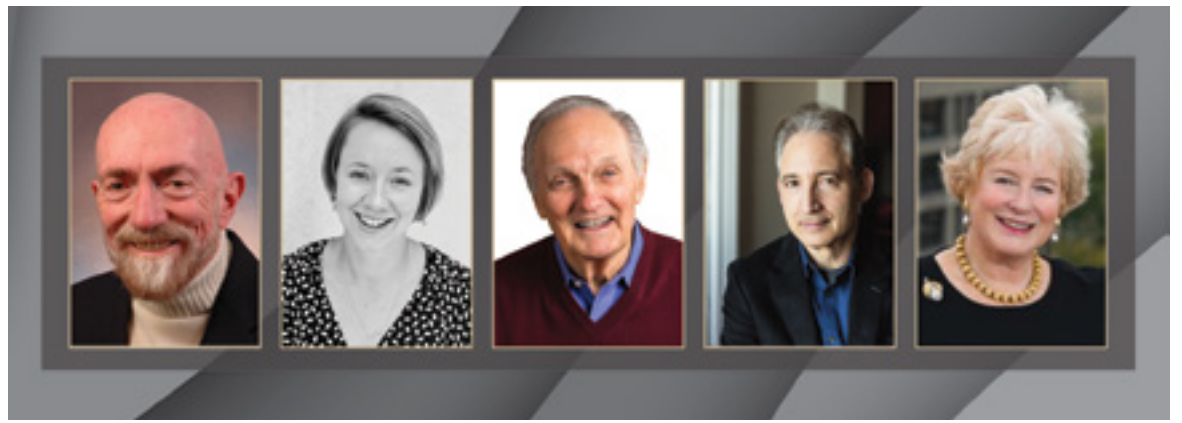
BY LEAH POFFENBERGER

From February 4 to 6, the 2021 APS Annual Leadership Meeting brought together a number of prominent leaders in science to address issues facing the physics community. A session on Saturday, February 6, titled "Communicating Science to Nonscientists in Post-Election and Post-Pandemic America," gathered panelists at the forefront of science communication to discuss the growing challenge of communicating science in an increasingly polarized society.

Nobel laureate Kip Thorne (California Institute of Technology) started the session with a brief presentation that introduced some of the barriers to communicating science to nonscientists, especially skeptics. Thorne then participated in a panel discussion, moderated by World Science Fair Co-founder Brian Greene (Columbia University). Other panelists lending their unique perspectives to communicating science were: Alan Alda, actor, writer, and founder of the Alan Alda Center for Science Communication at Stony Brook University; April Burke, congressional lobbyist for LIGO, Fermilab, and other science organizations; and Cailin O'Connor, UC Irvine philosopher of science, expert on science communication, and author of *The Misinformation Age: How False Beliefs Spread*.

According to Thorne, both the ongoing COVID-19 pandemic and the Trump presidency highlighted problems in America that must be addressed: widespread confusion about, mistrust of, and resistance to science. Rebuilding trust in science, in particular skeptical adults, requires the contribution of all scientists making an effort to connect with non-scientists. Thorne says that for scientists to be effective communicators, they must "eschew arrogance" and create messages about science that can inspire, while conveying how science works. For communities that are particularly resistant to the messages of scientists, Thorne emphasized the importance of connecting with people on a personal and local level, recruiting well-liked public figures who aren't scientists to discuss an issue, and focusing on solutions, rather than fear, on topics like climate change.

To kick off the discussion portion of the session, Greene asked the panelists to reflect on how to communicate about uncertainty in science. Thorne recommended talking about the best knowledge we have, while O'Connor acknowledged that some areas, especially those that aren't politically controversial, can benefit from discussing uncertainty in science, but in other areas, like vaccines, scientific uncer-



Annual Leadership Meeting speakers (Left to Right): Kip Thorne, Cailin O'Connor, Alan Alda, Brian Greene, and April Burke (BRIAN GREENE PHOTO CREDIT: ELENA SELBER)

tainty can be weaponized. O'Connor also discussed the impact that the internet and social media have had on the spread of misinformation.

Burke provided insight on how aspects like uncertainty in science, skepticism, and economics play roles in lobbying in Congress to support the scientific endeavor. In influencing the thinking of members of congress, she says that uncertainty can be important to discuss: that's why scientists want funding to search for answers. For skeptical staffers or members of Congress, Burke recommends finding something everyone can both agree on, such as positive economic or technological impacts, to help further the argument for funding scientific research.

Greene then raised the question of how to train scientists in techniques that might help communicate truth in the face of misinformation. Alda, known by many for his acting career but famous in the science community for his dedication to teaching scientists to communicate at the Alan Alda Institute, suggested getting into the minds of those one is attempting to reach and speaking to the audience in their language about what concerns them. At the Alda Institute, he says they often have scientists experiment with improvisation to learn how to quickly establish connections with another person and learn what they care about. Once the connection is made, the

next step is to build a message that specifically fits that audience.

The panel discussion also touched on themes such as the role of scientists in society and in a democracy, the necessity of improved science communication education in college curricula, and how to make a field like physics more relevant in people's everyday lives. At the same time, the panel suggested that a key to communicating about physics isn't only its everyday uses, but its potential to present the mystery and beauty of science and inspiring wonder.

The full recording of this session is available online at www.youtube.com/watch?v=NlhmMBVFF10.

GOVERNMENT AFFAIRS

APS Members Advocate for Key Science Policy Issues During First-Ever Virtual CVD

BY TAWANDA W. JOHNSON

The 2021 APS Congressional Visits Day (CVD) was one for the Society's record books, as the first virtual CVD was held with more than 60 APS members from around the country participating—including some currently living abroad—in more than 80 congressional meetings. Based on members' accounts, their experiences were both positive and productive.

To prepare for this year's unique, all-virtual, two-day event, the APS Office of Government Affairs (APS OGA) staff made several key adjustments designed to help APS members have the most effective meetings possible. For example, APS OGA staff worked with APS Communications staff to develop a new website hosting the one-page summaries of APS's science policy priorities, which was accessible by congressional staffers. They also

set up a virtual lounge that allowed APS members to communicate with one another between meetings and ask questions and provide real time feedback to APS OGA staff.

During their meetings, volunteers advocated for six science policy priorities, which were determined with input from APS members and leaders. They asked Congress to: include at least \$26 billion in relief funding in the next COVID-19 relief bill for key federal science agencies; prioritize robust funding increases for those science agencies; bolster research capacity at emerging research institutions to broaden STEM participation; overturn a recent EPA rule that eliminated particular methane emissions regulations; and support the following bills: the "Securing Helium for Science Act," the "Keep STEM Talent Act," and the "Combating Sexual Harassment in STEM Act."

"The organization of the virtual CVD was seamless. I was so impressed with how clearly the team laid out where I had to be, how to prepare, and where to go," said Laura Ríos, Assistant Professor of Physics at California Polytechnic State University. "The hard work that was put in, particularly in creating the one-pagers to share with our congressional representatives, will make future in-person meetings that much more impactful."

Andrea Liu, Hepburn Professor of Physics at the University of Pennsylvania and former Speaker of the APS Council, described a similar positive experience during the virtual CVD.

"I thought the virtual visits went very well! The first staffer we spoke

ADVOCATE CONTINUED ON PAGE 7



Andrea Liu



Jay Mathews



Laura Rios

APS Honors

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 3, 2021

Dannie Heineman Prize for Mathematical Physics
Deadline: June 1, 2021

Edward A. Bouchet Award
Deadline: June 1, 2021

George E. Valley, Jr. Prize
Deadline: May 3, 2021

Julius Edgar Lilienfeld Prize
Deadline: May 3, 2021

Maria Goeppert Mayer Award
Deadline: June 1, 2021

Prize for a Faculty Member for Research at an Undergraduate Institution
Deadline: June 1, 2021

LeRoy Apker Award For Undergraduates
Deadline: June 1, 2021

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.

LEARN MORE: aps.org/programs/honors

APRIL MEETING CONTINUED FROM PAGE 1

at 12:00 PM will cover the APS Innovation Fund, a program that provides funding to advance collaborative projects that support the APS mission. Physics faculty may also be interested in the 2:00 PM session titled “Managing Threats to Your Department: Building a Thriving Physics Program” that will provide information on the Effective Practices for Physics Programs (EP3) Guide and Toolkit for Departments Under Threat.

Saturday morning at 8:30 AM, April attendees will have a chance to hear from the newest Nobel laureates in Physics at the Kavli Foundation Plenary. Ghez, Genzel, and Penrose will speak on the various aspects of black hole research for which they shared the Nobel Prize. At 10:45 AM, the first of the scientific sessions start, with 21 parallel tracks. Meeting attendees also have a chance at 12:00 PM to learn from *Physical Review* editors about serving as a referee for the *Physical Review* journals. At 12:40 PM, the APS Division of Particle Physics will host their annual Grad Slam, showcasing grad student research with lightning talks.

Sunday, April 18, will include many more opportunities to hear the latest in research, from the continuing search for dark matter to applications of quantum computing. A special student-only session, “Physics Crossing: Virtual Tours and Career Workshop,” at 10:30 AM will allow attendees to network with other student members, representatives from companies and laboratories, and APS staff. The session will also include a career workshop on preparing for careers outside of academia.

At 12:00 PM, attendees will have an opportunity to meet and chat with the editors of the *Physical Review* family of journals. Sunday evening, the National Society for Black Physicists and the National Society for Hispanic Physicists are hosting a reception at 5:30 PM. An LGBT+ Roundtable will be held at 6:30 PM.

At 8:30 AM, Monday’s sessions will start with a plenary and panel discussion of science on a global scale, featuring Young-Kee Kim (University of Chicago), Fiona Harrison (California Institute of Technology), JoAnne Hewett (SLAC—National Accelerator Laboratory), and Luisa Cifarelli (University of Bologna). From 1:30 to 3:30 PM, student members can attend a Graduate School Fair, to chat virtually with representatives from various institutions. Another student event at 3:30 PM, Meet Your Future: Career Panel and Networking, will give students insights into preparing for non-academic careers.

The final day of the conference will feature another plenary session, starting at 8:30 AM, titled “Advancing an Inclusive Community,” with speakers Geraldine Cochran (Rutgers University, New Brunswick), Brian Nord (Fermilab, University of Chicago), and Dara Norman (NOIRLab). Parallel scientific sessions will continue through the day, ending at 5:45 PM.

For the complete scientific program and to learn more about special events at the 2021 April Meeting, visit april.aps.org.

MEMBERSHIP UNITS

The APS Division of Particles and Fields

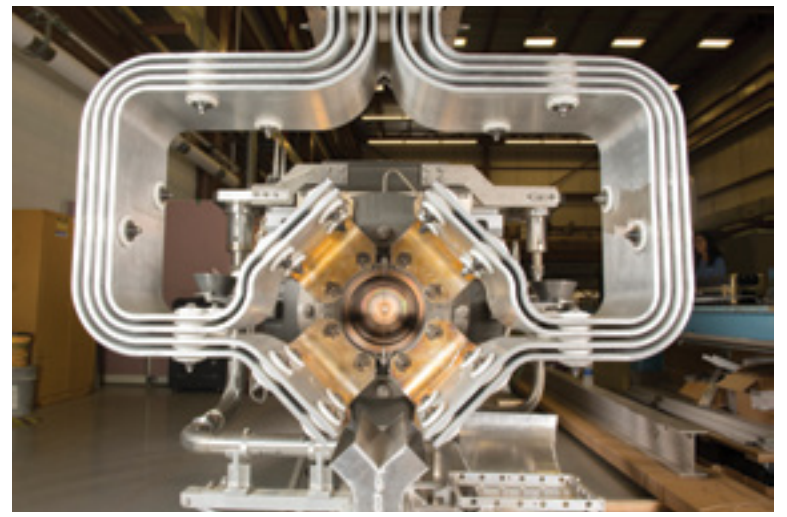
BY ABIGAIL DOVE

With over 2,600 members, the APS Division of Particles and Fields (DPF) is a home for physicists interested in fundamental particles and fields, their structure, and their interactions and interrelationships, as well as the design and development of high energy accelerators and other instrumentation for high energy physics.

This area of research spans the very small to the very large. As DPF chair Tao Han (University of Pittsburgh) put it, “we study the smallest building blocks of the universe and their interactions. This has a fundamental connection with early universe cosmology and the Big Bang.”

Ongoing research in the physics of particles and fields is advancing on three major frontiers: the energy frontier, the intensity frontier, and the cosmic frontier. The energy frontier involves the use of particle accelerators to explore high-energy subatomic collisions. Such collisions produce phenomena not seen since the immediate aftermath of the Big Bang, thereby providing clues about topics ranging from the origin of mass to the existence of other dimensions.

The intensity frontier involves the use of accelerators to study more rare and subtle phenomena, in particular, neutrinos—electrically neutral particles that are among the most abundant particles in the universe, yet very difficult to detect



A neutrino horn capable of handling one megawatt of particle beam is prepared at Fermilab in advance of the Deep Underground Neutrino Experiment. Neutrino physics is one of many areas of interest to members of DPF.

CREDIT: FERMILAB

because they almost never interact with other matter. Measuring the mass and other properties of neutrinos has critical implications for understanding matter/antimatter asymmetry and the origin of the universe.

Finally, the cosmic frontier is centered on the study of visible matter, as well as the dark matter, and dark energy that constitute 95% of the universe, using a combination of accelerator experiments, telescopes, and other astronomical observations.

Underscoring the fundamental importance of this work, Han pointed out that the two most recent Nobel Prizes in Physics were

awarded for research with a close connection to particles and fields. The 2020 Nobel Prize in Physics (see *APS News* November 2020) was awarded for discoveries about black holes: Roger Penrose demonstrated mathematically that black holes are a consequence of the general theory of relativity, and APS Fellows Reinhard Genzel and Andrea Ghez discovered a supermassive black hole at the center of the Milky Way. Earlier, the 2019 Nobel Prize in Physics (see *APS News* November 2019) was awarded to APS Fellow James Peebles for his theoretical framework about the shape and

DPF CONTINUED ON PAGE 7

FYI: SCIENCE POLICY NEWS FROM AIP

NSF Expansion Proposal Gains Steam in Senate

BY MITCH AMBROSE

The Senate is gearing up to consider legislation that may propose the most significant restructuring of the National Science Foundation since its establishment in 1950. Called the Endless Frontier Act, the version of the bill introduced last year proposed to rename NSF as the National Science and Technology Foundation and add a directorate to the agency charged with advancing a set of “key technology focus areas.”

Senate Majority Leader Chuck Schumer (D-NY), a lead sponsor of the bill, announced in February that it will be the “centerpiece” of a broader legislative package aimed at increasing US competitiveness with China. Schumer said he is aiming for the package to be bipartisan and plans for the Senate to vote on it this spring. He did not indicate if the Endless Frontier Act has been modified since last year but said it would propose to “surge resources” into NSF.

Last year’s version proposed that Congress allocate \$100 billion to the new directorate over five years, well outstripping NSF’s current annual budget of \$8.5 billion. The additional funds would be channeled toward an assortment of university-led research centers, test beds, and consortia, and a portion would be allocated through the agency’s existing directorates.

Unlike NSF’s other directorates, the technology directorate would have authorities analogous to those used by the Defense Advanced Research Projects Agency, which allows its program managers considerable leeway to drive toward targeted R&D outcomes. Typically, NSF has used external peer review of grant proposals to steer its programs.

The bill has received mixed reactions in science policy circles, with some observers arguing it could dilute NSF’s traditional focus on fundamental research and that it places an outsized emphasis on university-led research. Others, such as MIT President Rafael Reif, have defended the bill, noting it has provisions that protect NSF’s existing directorates and arguing that bold changes to the US research system are needed in the face of increasingly stiff technological competition from China.

Schumer has said his three goals for the overarching legislative package are to invest in US innovation and manufacturing capacity; strengthen alliances with NATO, Southeast Asia, and India; and push back on “predatory practices” by China that have led to job losses in the US. In addition, he has said it could include “emergency funding” to implement the recently enacted CHIPS for America



Act, which authorized an array of semiconductor R&D initiatives and a subsidy program to support domestic chip production. He added it would also seek to alleviate the current acute shortage of chips worldwide, which is slowing production in the automotive industry, among other sectors.

“I want this bill to address America’s short-term and long-term plan to protect the semiconductor supply chain and to keep us number one in things like AI, 5G, quantum computing, biomedical research, storage,” Schumer remarked.

His push comes as competing ideas are being circulated for how to supercharge the US research system. For instance, the final report of the congressionally chartered National Security Commission on Artificial Intelligence, released in March, proposes creating a National Technology Foundation rather than overhauling NSF.

Meanwhile, President Biden has ordered a review of national supply

FYI CONTINUED ON PAGE 6

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ANNUAL LEADERSHIP MEETING

Federal Policies to Strengthen Science

BY DAVID VOSS

At the APS Annual Leadership Meeting in February, several experts came together virtually to discuss the science policy landscape. The session, titled “Federal Policies to Strengthen Science in Service to the Nation,” featured two panels with online discussion moderated by science journalist Miles O’Brien.

In the first panel discussion, “The View from Capitol Hill,” physicist US Rep. Bill Foster (D-IL-11) and former Rep. Bart Gordon (D-TN-6) tackled legislative challenges and opportunities in restoring science to a place of prominence in the government. The discussion covered topics such as the COVID pandemic as a “Sputnik moment” to spur investment in science and the need to keep open scientific channels of communication even in the midst of global economic competition. Climate change and alternative energy innovation, immigration reform to retain global talent, and science education were also major topics.

The second panel, “Moving Forward in a More Competitive Landscape,” had a conversation about the global situation in science policy. The members of the panel were Sir Peter Knight (Imperial College London), Neal



Lane (Rice University), Sethuraman Panchanathan (NSF), and Ellen Williams (University of Maryland). The panel agreed that we are in a Sputnik moment and confronted by the twin crises of the pandemic and global climate change. Meeting these challenges will require supporting domestic scientific talent and attracting the best and brightest from abroad. At the same time, global scientific cooperation in basic research needs to remain open, while continuing to protect economic assets like intellectual property. Moves by the Biden Administration, such as elevating the OSTP Director to a Cabinet position, are a source of encouragement for the panel.

A video recording of the entire event can be found via the Annual Leadership Meeting website: aps.org/meetings/leadership.

INDUSTRIAL CONTINUED FROM PAGE 1

assignments you don't like. The best thing you can do is advocate for yourself with your functional manager to ensure that the assignments you get are aligned with your career goals and interests. That being said, I have found my teams to be one of the best parts of my job. Even if I happen to have an assignment that isn't my favorite, having a great team makes coming to work fun! I also ensure that I participate in employee-run committees to pursue work culture initiatives that I am passionate about. I lead a committee that sponsors different events in the office to build community and comradery. Due to COVID-19, the committee has had to increase our creativity to help those who are working remotely to feel connected to their colleagues working in the office.

Dan: You mentioned that you completed your master's degree after you started working. I have known quite a few early-career physicists who have earned advanced degrees to increase their subject knowledge in the area in which they were working. Was that the case for you?

Audra: I earned my master's in Space Systems Engineering from Johns Hopkins University. I chose the degree because it allowed me to further my skills as a systems engineer and to take electives from the applied physics department. I started my program in the spring of 2018, and I completed my degree in December of 2020. My current employer has a generous continuing education reimbursement program that paid for three classes per year. To be fair to my previous employers, they also offered continuing edu-

cation programs in which they either fronted or reimbursed the cost of classes up to a certain dollar amount each year. It was certainly challenging at times to balance work and school, but it was so worth it to be able to keep progressing in my career and to continue my education at the same time. My hope is to transition into a role that will more fully utilize my new degree in the next year.

On behalf of APS, I would like to thank Audra Macie for the opportunity to interview her for this article. For physics students who are nearing a decision about next steps in their careers, it is imperative to obtain accurate information about your possible options. Audra provided insightful information to help students make the right decisions for themselves. For those who are APS members, the IMPact mentoring website (impact.aps.org) offers opportunities to be mentored by industry professionals who are experts in various corporate fields. — Dan Pisano.

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EDUCATION

The National Mentoring Community Conference Celebrates Mentorship with Online Meeting

BY LEAH POFFENBERGER

Each year, the APS National Mentoring Community (NMC) brings together mentors and mentees at the NMC Conference as an opportunity to build connections, grow new skills, and learn how to get the most out of mentor-mentee relationships. The 2021 NMC Conference, held from February 18 to 21, continued the tradition with an online format, allowing NMC members to safely gather and connect for a full weekend.

The NMC facilitates mentoring relationships between African American, Hispanic American, and Indigenous undergraduate physics students and local physics mentors. It also seeks to provide students from marginalized ethnic or racial groups with opportunities,

connections, professional development, and peer support. The NMC conference is an important mechanism by which students and mentors are provided with resources and training. This year's conference was organized in partnership with the National Society for Black Physicists, the National Society for Hispanic Physicists, and Oklahoma State University.

The Virtual NMC conference began on February 18, with a series of community building and networking sessions before transitioning to a more traditional conference format the next day. Workshop sessions, split into mentor- or mentee-focused topics, gave attendees a number of opportunities to gain new skills or learn how to get the most out of

mentor-mentee relationships. The conference also provided numerous opportunities for networking and community building through GatherTown, a program that lets users move an avatar through a virtual space to initiate conversations. Three plenary sessions focusing on challenges in physics, ranging from the search for dark matter to creating a more equitable field, featured accomplished women in astrophysics: Chanda Prescod-Weinstein (University of New Hampshire), Jedidah Isler (Dartmouth College), and Brittany Kamai (UC Santa Cruz and Caltech).

The first plenary, titled Dark Matter in the Disordered Cosmos,

NMC CONTINUED ON PAGE 7



Chanda Prescod-Weinstein



Jedidah Isler



Brittany Kamai

ANNUAL LEADERSHIP MEETING

Physics Slam Showcases Research by Student and Early Career Award Recipients

BY DAVID VOSS

At the APS Annual Leadership Meeting in February, nine students and early career scientists were invited to present rapid-fire three-minute talks on their research. Each of the speakers was a recipient of one of the over 20 student and early career awards given by APS every year. This first Physics Slam was organized and moderated by 2018 APS President Roger Falcone (University of California, Berkeley), who was also chair of the APS Apker Award selection committee.

Michelle DiBenedetto (University of Washington) received the 2020 Andreas Acrivos Dissertation Award in Fluid Dynamics and discussed her work on studying the transport of microplastics in the ocean as a function of the particles' sizes and shapes.

Eleni Katifori (University of Pennsylvania) received the 2021 Early Career Award for Soft Matter Research. She presented her work on modeling living transport networks, such as vascular systems, so that the lessons learned can be applied to other structures such as information networks.

Jaroslav Trnka (University of California, Davis) received the 2021 Henry Primakoff Award for Early-Career Particle Physics. He presented his recent work on a new geometric framework for understanding particle scattering in quantum field theory called the Amplituhedron.



Jeremy England (Georgia Institute of Technology) received the 2021 Irwin Oppenheim Award. In his talk, he discussed three kinds of self-organization in “life-like” systems such as simple robot groups or spin glasses: self-replication, novelty detection, and many-body dynamical coordination.

Bryan Boudouris (Purdue University) was awarded the 2021 John H. Dillon Medal. Boudouris described a new kind of macromolecule called a radical polymer which provides the opportunity to design new kinds of amorphous organic electronic devices.

Nicholas Poniatowski (University of Maryland, College Park) was recipient of a 2020 Leroy Apker Award. He presented results of experiments on the resistivity of an electron-doped cuprate that suggest that the high temperature metallic phase behaves like a low density metal.

Elise Koskelo (University of Cambridge) was recipient of a 2020 Leroy Apker Award. Koskelo

described how measurement noise in a thermoreflectance imaging system can be used to maximize resolution through the phenomenon of stochastic resonance.

Yuan Shi (Lawrence Livermore National Laboratory) received the 2020 Marshall N. Rosenbluth Outstanding Doctoral Thesis Award. Shi described how quantum computers operating at cryogenic temperatures could be used to study the behavior of stellar plasmas millions of degrees hotter.

Scott Baalrud (University of Michigan) received the 2020 Thomas H. Stix Award for Outstanding Early Career Contributions to Plasma Physics. He presented a new kinetic theory to understand a state of matter intermediate between plasma and condensed matter.

The entire Physics Slam session can be viewed on the Annual Leadership Meeting website: aps.org/meetings/leadership. For more information on APS honors go to: aps.org/programs/honors.

ETHICAL CONTINUED FROM PAGE 1

falsification, and plagiarism,” said Houle, who served as POPA Chair at the time and led the development of the new guidelines approved by the Board and Council in 2019. The two-year endeavor established a standing Ethics Committee, which includes representatives from the Committees on Education, Minorities in Physics, Status of Women in Physics, and Scientific Publications.

Under the leadership of its inaugural chair Michael Marder, the Ethics Committee has developed new policies and procedures for the disclosure of professional conduct in the consideration of individuals for APS honors and leadership positions within the Society. The committee also outlined a process by which a transgressor may be stripped of APS awards, prizes, or Fellowship, removed from an official leadership position, or excluded from APS meetings. The APS Revocation Policy was approved by the Council and the Board in November 2020.

According to the new policy, APS will not conduct its own investigations of alleged misconduct. A revocation request must include supporting evidence “from a credible body,” such as an academic institution or governmental agency. The Ethics Committee would then conduct a preliminary review and decide whether to elevate the case to the Board, which would in turn decide whether to convene a Revocation Panel that would provide the accused an opportunity to respond to the request. Three of the four panelists would need to vote in favor of revocation for action to be taken.

Educating the community on ethical best practices and how to create positive change from within will be a key focus of the committee in 2021, and beyond. To that end, new subcommittees on Research Integrity and Ethics Education have been established. Committee members are also analyzing new survey data of early career and

student members collected by the AIP Statistical Research Center that follows up on the original task force surveys conducted in the early 2000s.

“The proceedings of the Ethics Committee have gone slowly and deliberately, but we understand there is passion and desire for change,” said Marder, acknowledging concerns of members that the development and enforcement of ethical standards in physics is long overdue.

“I am delighted that the American Physical Society has embraced the issue and is hard at work examining our profession from inside to out,” said APS CEO Jonathan Bagger.

The ethics session at the Annual Leadership Meeting included a panel with representatives from industry, a national lab, and academia. Thom Mason described his experience developing an ethics policy while Director of Oak Ridge National Laboratory. The policy was initially drafted by the lab’s lawyers and focused on legal and compliance factors like conflict of interest disclosures.

“This was not only a legal issue. There are many things that may be legal but still aren’t right,” said Mason. So he convened a committee of research staff at all levels of the organization, from early career scientists to corporate fellows, to put forth their own policy. “What they came back with was actually a much higher standard that demonstrated the research staff were not satisfied to simply meet the letter of the law.”

“As physicists, we must hold ourselves to the highest ethical standards,” said Bagger. “I look forward to working with the Ethics Committee and the APS membership as we work to define the standards to which we will hold ourselves and each other accountable.”

The author is APS Head of Public Relations.

FYI FROM PAGE 4

chains in critical technologies and voiced support for providing tens of billions to the US semiconductor industry. He has not yet commented on the Endless Frontier Act or the AI commission’s recommendations, though those proposals generally align with aspirations he voiced during his campaign to spend hundreds of billions of dollars on R&D in cutting-edge industries.

The author is Director of FYI.

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PROGRAMS

APS Chapters Pilot Program Holds First All-Chapters Events

BY LEAH POFFENBERGER

In October 2020, APS launched a new effort to support graduate students, post docs, and early career scientists at their home institutions. The effort, APS Chapters, welcomed its first eight participating institutions in November to begin shaping the program and helping pinpoint what APS resources Chapters members are most interested in.

The eight institutions participating in the Chapters pilot are: Drexel University, Florida State University, The Ohio State University, University of Central Florida, Rochester Institute of Technology, The University of Texas at Arlington, Los Alamos National Laboratory, and Lawrence Livermore National Laboratory. Since their selection, each of the Chapters has elected officers and begun organizing events for their Chapter members. APS has also organized two all-Chapters events: a workshop for Chapters officers on December 16 and a virtual networking event on February 24, featuring trivia games and a scavenger hunt.

“In many institutions, there is no community for graduate students, postdocs, and early-career scientists who are interested in career development in physics-related fields. [T]he increasing need to connect with others due to the pandemic led to this new Chapter being created at an ideal time,” said Dina Zohrabi Alaei, Treasurer and Secretary for the Chapter at RIT. “APS Chapters are a great opportunity for them to [improve] their professional and social skills, and mental health.”

A primary mission of APS Chapters is to support individuals in building inclusive and equitable communities and to create a space of learning for all. The program also seeks to connect each Chapter to APS staff and resources for professional development or to meet other needs and interests. The December 16 workshop



served to further this goal, bringing Chapters officers together alongside staff representatives from six different areas of interest to Chapter members: Careers, DEI Efforts, Women in Physics, Public Engagement, Government Affairs, and Journals. Former APS CEO Kate Kirby, Past APS President Philip H. Bucksbaum, and Director of Project Development Theodore Hodapp were also in attendance.

“The point of the workshop was for Chapter participants to get to know who does what at APS and to have informal conversations. I wanted them to understand what APS has to offer...we have so many resources and activities for graduate students and postdocs to get involved in” said Farah Dawood, Chapters Program Manager.

The Physical Review journals staff, for example, is offering training for authors and referees. “I represented the journals during the kick-off event last December and interacted with the representatives of the chapters at that event,” said Warren Lin, APS Head of Editorial Development. “Currently we are in the process of planning a training session with The University of Texas at Arlington Chapter in April.”

While the December event focused on getting to know APS, the February event provided an opportunity for Chapters members to get to know each other—both bonding with their own Chapter and meeting members of other Chapters. Using Gather.town, a platform that gives each person an avatar they can use to move about a virtual gathering space, attendees were able to kick back and have

fun interacting and competing in trivia and scavenger hunts. In the future, the Chapters program hopes to hold similar online events for networking, as well as introducing new activities to bring members together across different Chapters to share their ideas and experiences.

In the coming months, each individual Chapter will be putting on their own events, specific to their own needs, with help from the APS staff and departments they connected with during the December workshop.


“The APS Chapters can fill an important need for some of our most valuable APS members, graduate students and postdocs just starting out their careers in physics,” said Bucksbaum, who was influential in starting the program during his presidential year. “APS Chapters provide an opportunity to meet and discuss physics, provide resources for activities like seminars and retreats, and also participate in many other activities of the Society.”

The application period to create an APS Chapter as part of the pilot re-opened in early April. Graduate students, post-docs, faculty, or staff members are welcome to apply to start a Chapter at their institution. Chapters are open to graduate students, postdocs, and early career members at their respective institution, with the only requirement being at least five members of a Chapter are also members of APS.

To learn more about the APS Chapters Program or to get information about starting an APS Chapter, visit aps.org/membership/chapters.cfm.

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ADVOCATE CONTINUED FROM PAGE 3

to, from Senator Pat Toomey's office (R-Pennsylvania), loved the APS webpage with all the one-pagers on it—he had never seen that before. Working from that webpage was actually easier than using physical handouts since they could easily find the right one, and we didn't have to worry about running out," she said. "There are certainly benefits to in-person meetings, as well. It's a little easier to read a person's reaction in person than on Zoom and to tailor the message accordingly. More importantly, it builds camaraderie and enthusiasm on the CVD team to walk around and spend the time together during breaks and meals."

Added Jay Mathews, Associate Physics Professor at the University of Dayton, "This is my fourth year in a row of participating in CVD, and every year, I am glad I participated. I had productive and interesting conversations with some of the congressional staffers. However, I missed going to the Capitol, getting lost in the House and Senate office buildings, taking the underground tram between the House and Senate side, and eating lunch in the congressional dining rooms. The other missing piece was all of the interaction between CVD participants and APS staff, especially the debrief meeting at the National Press Club at the end of the day."

Callie Pruett, Senior Strategist for Grassroots Advocacy, said she was thrilled with the enthusiasm and professionalism displayed by the volunteers during the virtual

meetings. A concurrent letter-writing campaign with APS advocates produced more than 600 letters to Congress.

"As we all know, it's hard to replicate in-person interactions, but our members expertly navigated the challenges and delivered incredible results," said Pruett. "I am so grateful to our advocates for putting forth so much time and effort into making sure that the voice for physics was loud and clear on Capitol Hill this year."

There is already movement in the 117th Congress on several of the issues advocated for by APS members. Specifically, US Rep. Joe Neguse (CO-D-2nd) recently reintroduced the "Securing Helium for Science Act" that, if enacted into law, would provide researchers supported by federal grants the ability to continue to purchase helium from the Federal Helium Reserve at a discounted rate for eight years after its sale. The "Combating Sexual Harassment in STEM Act," which would, among other goals, establish an interagency working group to coordinate efforts to reduce sexual harassment involving personnel supported by grants, is also scheduled to be reintroduced this year. President Biden's broad immigration bill includes policy provisions that are aligned with the two key visa and immigration provisions of the "Keep STEM Talent Act," a bill APS has supported.

During CVD, APS OGA was especially thankful that so many members of Congress took time

out of their busy schedules—and likely put aside Zoom fatigue—to virtually meet with APS volunteers. Joining those meetings were six congressional members: Sen. Ben Ray Lujan (D-NM); Rep. Lizzie Fletcher, (D-TX-07th); Rep. Van Taylor (R-TX-3rd); Rep. Pete Sessions (R-TX-17th); Rep. John Moolenaar (R-MI-4th); and Rep. Judy Chu (D-CA-27th).

"We extend our deepest thanks to these members of Congress for making science a priority and for taking the time to meet personally with our teams," added Pruett.

Mark Elsesser, Interim Director of APS OGA, said he, too, was elated at the success of this year's virtual CVD and looks forward to the staff being able to offer in-person meetings again.

"It was exciting to see the Government Affairs team and APS members partnering in a brand new way to advance our policy priorities in a safe environment during the pandemic. The innovations we made during this year's CVD allowed our members to have effective meetings virtually, but we also greatly appreciate the value of in-person meetings, as noted by our volunteers, and are eager to return to those interactions in the future," he said.

To learn more about key science policy issues and to take action on them, go to APS OGA's Action Center at aps.org/policy/issues/.

The author is Senior Press Secretary in the APS Office of External Affairs.

NMC CONTINUED FROM PAGE 5

featured Bouchet Award winner Prescod-Weinstein, speaking about her research as a theoretical cosmologist working to untangle the mystery of dark matter. She recounted the first time she thought about dark matter as a problem to consider—during a conversation in 2009 with Vera Rubin. Prescod-Weinstein encouraged students to think about the problem of dark matter, especially in her area of emphasis, the study of axions. "We have no idea what dark matter is, but that's a great problem for theoretical physicists," she said.

Prescod-Weinstein also described her personal origin story, and her path to her current field in physics, which forms part of her new book *The Disordered Cosmos*. She emphasized to students that you don't have to look a certain way or follow one set path to be successful. "You might not see people who look like you in particle physics, but that means particle physics desperately needs you," she said. To conclude her talk, Prescod-Weinstein also discussed the importance of diversity and inclusion efforts that extend beyond STEM to "materially change the conditions that marginalize people."

Isler, an astrophysicist and founder of the STEM En Route to Change (SeRCH) Foundation, spoke at the second plenary focused on how mentoring can change the world. Her talk, titled *Mentoring as World Building: Co-Creating Futures from the Hyperspace*, used literary ideas to discuss the role mentoring can play in creating a more just ecosystem in STEM and support people from marginalized groups in the field. She defined mentoring as: "a mutually respectful and beneficial relationship that allows for transfers of knowledge in both directions...that co-constructs a desired future."

The idea of world building is that students—or anyone in STEM—can bring together their unique experiences as well as a vision for the future and come up with a way to make that world possible. Isler says that mentors have a role in this by helping their mentees figure out how to build this world, rather than dictating what it is. She also discussed the concept of "hyperspaces": places for marginalized communities to come together, taking a break from often oppressive spaces, and have exchanges that generate change in the broader culture. Isler closed her

talk with a message for students in attendance: "You are powerful, you are capable of building your own world that involves liberation, and all of that is part of what makes you critical to scientific inquiry. You can't do it by yourself—none of us can. Assemble a team that is responsive and excited about what it is you're doing. Feel empowered to hold on to that vision."

The third and final plenary featured Kamai, ShutDownSTEM co-founder, who spoke on "Elevating Society by Transforming the Way We Do Physics." Kamai, a native Hawaiian astrophysicist, framed the talk, which described her journey through physics, around Polynesian voyaging. Her destination, she said, was understanding the entire universe, and her vessel is physics and astrophysics. "My journey was influenced by academia, STEM, and the culture that exists inside and outside of these spaces," said Kamai. She described several tools that helped her navigate through STEM: Hana club, a group she founded with other friends and academics for co-working and support, and Operation Voice, her method of reclaiming her voice in academia.

Kamai also discussed the controversy surrounding Maunakea, a dormant volcano on the island of Hawai'i that is both sacred land and the site of telescopes for astrophysics research. "I started thinking: Where are the other indigenous physicists?" said Kamai. "I then started the Society of Indigenous Physicists...a space to have unique conversations...and engage with indigenous leaders to co-create with each other." She also co-lead ShutDownSTEM, which partnered with groups Isler and Prescod-Weinstein are part of, to stop business as usual in STEM on June 10, 2020, as a means of committing science to making steps towards eradicating anti-Black racism. APS, *Nature*, Caltech, and NASA were among the institutions that made changes to policies as a result of the shutdown. Kamai ended her talk by encouraging students to find spaces they feel heard and use their voices, acknowledging the work mentors in attendance are doing, and calling for all STEM practitioners to take responsibility in society and step up as leaders.

The NMC conference was sponsored by: NSBP, NSHP, OSU, and Kenton and Amy Brown. To join the NMC, visit aps.org/programs/minorities/nmc/.

DPF CONTINUED FROM PAGE 4

makeup of the universe and to Michel Mayor and Didier Queloz for the first discovery of a planet outside our solar system.

In addition to this international recognition of the field, another point of pride for DPF is its commanding presence at the APS April Meeting, where it sponsors a mix of dedicated sessions on particles and beams as well as joint sessions in partnership with other APS units such as the Divisions of Astrophysics (DAP), Nuclear Physics (DNP; see *APS News* January 2021), Gravitational Physics (DGRAV), and Physics of Beams (DPB), encouraging cross-talk and collaboration between these closely related branches of physics.

This year's April Meeting is scheduled for April 17–20 in a social distancing-friendly virtual format. The agenda is headlined by three plenary sessions: "Science on a Global Scale," "Advancing an Inclusive Community in Science," and the Kavli Foundation Keynote, which will feature the three 2020 Nobel laureates in physics.

Additionally, DPF is sponsoring or co-sponsoring four focus sessions on topics including conceptualizations of future muon collider

facilities, precision measurements with leptons, and quantum sensors and computing, as well as 14 invited sessions, including talks detailing the latest results from the CERN Large Hadron Collider, recent advances in theoretical physics, new frontiers in dark matter research, and presentations of the division's 10 annual awards.

The years 2020–2022 mark an especially important period for DPF with the organization of the division's decadal study, the Particle Physics Community Planning Exercise. Also called "Snowmass" after the typical site of the gathering in Snowmass, Colorado, this study provides an opportunity for the particle physics community to come together to identify and document a scientific vision for the next decade of research in the field of particles and beams in the US and abroad. Subsequently, the Particle Physics Project Prioritization Panel ("P5") uses the input from Snowmass to define a 10-year strategic plan for particle physics research in the US. This also involves identifying top priorities for the US Department of Energy and the National Science Foundation, two of the biggest funders of particle physics research.

This kind of planning is essential for particle physics in particular, with its reliance on shared equipment and projects that can last several years to decades.

Because of the COVID-19 pandemic, this year's community summer study meeting will be postponed until summer 2022, to be held at the University of Washington's Seattle campus, with many working groups also holding satellite virtual meetings.

Looking inward, the DPF executive committee has two major goals for the division. First, to continue to advance the field of particle physics, and second, to engage the research community—particularly the next generation of young scientists. To this end, DPF has no shortage of opportunities for peer support, collaboration, and inspiring mentors.

Overall, DPF stands out as a powerhouse within APS, promoting research, global collaboration, and exchange of ideas at the forefront of one of the most high-profile areas of physics. More information on this unit can be found on the DPF website.

The author is a freelance writer based in Stockholm, Sweden.

HISTORY CONTINUED FROM PAGE 2

even in certain hair products. In the medical sphere, it is used as a graft material in surgeries and as a coating on catheters, since it keeps bacteria and other infectious agents off the surface. Teflon is also a common ingredient in weather-resistant paints.

The city of Philadelphia awarded Plunkett the John Scott Medal in 1951 to honor an invention that contributed to the "comfort, welfare, and happiness of human kind." Those who attended the ceremony even received complimentary Teflon-coated muffin tins. He was also inducted into the National Inventors Hall of Fame in 1985.

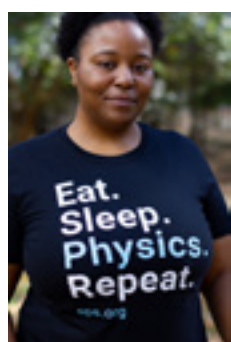
Plunkett went on to head up production of the gasoline additive tetraethyl lead, as well as freon

production, before his retirement in 1975. Eventually he was diagnosed with cancer and died on May 12, 1994, at home in Texas. He was 83.

Further Reading:

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Plunkett, R.J. "The History of Polytetrafluoroethylene: Discovery and Development," *High Performance Polymers: Their Origin and Development. Proceedings of the Symposium on the History of High Performance Polymers at the American Chemical Society Meeting, New York, April 15-18 1986*. R.B. Seymour and G.S. Kershenbaum, eds. New York: Elsevier, 1986.



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THE BACK PAGE

APS Annual Leadership Meeting: Past President's Address

PHILIP H. BUCKSBAUM

In an ordinary year, this address from the Just-Past President of APS would be delivered to the leadership at the dinner following a day of the leadership convocation meetings.

It would be traditional for me to say that I'm the only thing standing between you and dessert. Or something like that.

But this hasn't been an ordinary year, has it? Not for me, and not for any of us.

One year ago, on Saturday morning, February 1, 2020 I stood before a live audience, including many of you leaders of the APS to deliver my "2020 Vision".

I spoke about the honor and privilege of leading this special organization, and about the boundless opportunities we have as physicists to explore the universe and discover new knowledge.

I spoke about the need for APS to serve better the youngest members of our profession, our students, to see to it that they had every opportunity to succeed. The new APS Chapters are starting to address this need.

I also spoke about the challenges that science was facing.

About our collective shock when some of the highly respected members of our field were led away in handcuffs and accused of federal crimes in their conduct of research.

I spoke about the potential erosion in the public's trust in us, the scientists, and even the public's trust in the science itself.

I spoke about the culture of science, how the wonderful freedom we enjoy to pursue our own curiosity to advance scientific knowledge carries an obligation, and how we needed to rededicate ourselves to the highest ethical standards to earn back that public trust, and reinforce the core values called out in our own APS Strategic Plan. Council Speaker Andrea Liu and I even crafted the first draft of a Board Statement on that topic during that Leadership weekend last year.

And, those of you who were there, listened, and nodded, and applauded. Remember?

What were we thinking? We had no real vision of the 2020 we were about to face.

Where were you when the storm hit? For me, the weather changed on the Saturday morning only four weeks later, February 29, 2020 at 9:55 AM as I headed into a string quartet performance at Herbst Theater in San Francisco, and just before silencing my phone I got a curious email from someone I didn't know at the Stanford Medical School.

It said, "You have to cancel the March Meeting." I remember thinking, what is this? The March Meeting is only a day away. I was planning to head to Denver shortly myself.

About eight hours later, following a day of phone calls among the March Meeting Chairs, former APS CEO Kate Kirby and her senior management team, and the Board Executive Committee and amid news bulletins about the rapidly evolving public health crisis, we sat down on Zoom. As Jim Gates already recounted in his opening address (*APS News*, March 2021), we considered the science, and we recounted the news, and we weighed our options. And we pulled the plug on the March Meeting 2020. I never went to Denver, and probably neither did you.

For us, it was a heart-wrenching tragedy done to avert a still larger catastrophe. And it was the right move. I would do it again, I think we all would.

But of course, the larger catastrophe was not really averted anyway, not in the US nor in the world—it was just too large. And it's still with us.

But then something happened that gave me great courage and great hope: Our community came together. Through spontaneous grass-roots efforts and with tireless help from APS Chief Information Officer Mark Doyle and APS staff running mostly on adrenaline, large blocks of the March meeting happened anyway, on-line.

And the APS meetings staff under Director of Meetings Hunter Clemens took that ball and ran with it, creating a virtual April Meeting, and a virtual DAMOP meeting, and much more. This virtual Leadership meeting, too.

Rather than move to Washington DC as my wife Roberta and I had planned to do this year, to enjoy a Stanford Spring



Philip H. Bucksbaum

term in Washington on special leave to focus on the work of my APS Presidential year, I was stuck at home as nearly all of us were. Well, that is, the fortunate ones.

Stuck at home, but I was busier than ever.

In frequent teleconferences and other communications to agencies and Congress and OSTP, we helped the government assess the harm done to the research community by the pandemic, and we advised on mitigation strategies to keep grad students and postdocs employed and grants running, even though labs were shut down.

When some other proclamations and orders came out of the previous administration that hurt our community, such as wrong-headed directives to close our borders or cancel visas to the students and postdocs who are vital to our work, policies that blamed the pandemic economic stress on foreign scientists stealing American jobs, of all things.

When that happened, we pushed back. And then I got to see again the real value of the APS members coming together.

We leaders wrote Presidential Letters and drafted Board Statements.

Our members made thousands—thousands—of contacts to their government representatives directly, in letters, phone calls, and even in op-ed articles.

We even led our fellow learned societies in the natural sciences to organize, to cosign briefs in support of court challenges.

In short, by coming together, we made our voices heard. I could not be prouder to be a member, and even more, to be an elected leader, of such an organization. Our APS Office of External Affairs led by Francis Slakey last year really stepped up their game, and the enthusiastic actions and much of the shoe leather came from you and the rest of the membership. Thank you for that.

In the summer of our pandemic distress, our dark days got still darker, as the country reacted in horror over the deaths of George Floyd, Breonna Taylor, and others at the hands of police. This led to great introspection across the country. And as physicists and Americans, we can no longer ignore our own cultural blind spots, when the fraction of African Americans in physics is far less than in the general population, and the fraction in APS is even lower than that.

Soul searching is surely not enough. This was another call for our community to come together.

Here my successor Jim Gates came through with a brilliant leadership idea to start a new workshop initiative to change the climate in physics—DELTA PHY. At the same time, APS-IDEA took off, a grass-roots effort to share best practices among Physics Departments seeking diversity, equity, and inclusion. IDEA was seed funded by the APS Board through our Innovation Fund, an initiative of the Board that was made permanent this year.

This theme of coming together is so much a part of who we are as physicists and as an American Physical Society. Part of the genius of the APS election system is the strong cooperative spirit it generates among the leadership, and I have benefitted tremendously from the six APS Presidents who precede and succeed me: Laura Greene, Roger Falcone, David Gross, Jim Gates, Frances Hellman, and Bob Rosner. And the Council speakers during that time, especially Dan Kleppner, Tim Gay, John Rumble, Andrea Liu, and Baha Balantekin.

I am eternally grateful also to former APS CEO Kate Kirby and her fabulous senior management team. Kate's tireless advice and good judgement has been crucial during my year. Kate's retirement coincided with the end of my Presidential year, so the most important task I faced as President and leader of the APS Board was finding her replacement as CEO, a task made that much more difficult by the pandemic restrictions for travel and meetings. I couldn't be more pleased with the appointment of Jon Bagger to the CEO position, and I know that APS remains in good hands. Here again, leaders in our community came together to undertake that search.

As we approach the 1-year anniversary of the March Meeting cancellation in 2020, there is much, much, left to do together.

2021 President Jim Gates has a strong vision, and his focus, the Cultural Climate of Physics, is so important for our future to regain and reinforce that public trust that we need. I know you share my enthusiasm and look forward to working with him.

The change in administrations in the White House has eliminated some of the stress in our community. For example, President Biden has announced his intention to renew the New Start Treaty with Russia, an important step towards reducing the threat of nuclear war, a very big concern in the physics community.

In addition, the head of the White House Office of Science and Technology Policy will sit at Cabinet level under President Biden, which will get science into the conversation in white house policy areas. It's about time.

Another result is that we may have seen our last Presidential Annual Budget with double-digit decreases in science funding, something that was an annual occurrence in the past administration.

And at long last there may even be a light at the end of that long COVID tunnel, as vaccines roll out across the world.

But there is still much to do together.

Research security and unfair foreign competitors in science are still top concerns in the administration and Congress, and we must make sure that scientists are part of the policy discussions on how to respond without harming the international engagement that makes science work.

At the same time, science funding, and the state of STEM education in the US have renewed visibility as the lamp of scientific understanding leads the way out of the pandemic into a potential "New Sputnik Moment."

So as I depart, I can't help but feel energized. We have new leadership in the APS, new leadership in the country, new opportunities to support and broaden the physics community and promote its values to our nation and the world. Tomorrow, sessions will highlight some of those opportunities.

Best of all, BEST OF ALL, 2020 is now in the past. So let's resolve to make the most of 2021 by working together for physics.

Thank you all for your tremendous support and help and work over the past year, and for the privilege of serving as your President.

I look forward to our meeting in person in the near future.

The author served as APS President in 2020. He holds the Marguerite Blake Wilbur Chair in Natural Science at Stanford University, with appointments in Physics, Applied Physics, and in Photon Science at SLAC. This article is adapted from his presentation at the 2021 APS Annual Leadership Meeting (aps.org/meetings/leadership).