GOVERNANCE

2020 APS President Philip Bucksbaum

Philip Bucksbaum holds the Margarette Blake Wilbur Chair in Natural Science at Stanford University, with appointments in Physics, Applied Physics, and in Photon Science at SLAC. He was also the founding director of the Stanford PULSE Institute. Bucksbaum graduated from Harvard in 1975, and went on to the University of California at Berkeley where he received his PhD in 1980 for atomic parity violation experiments.

Bucksbaum is a Fellow of the APS, the Optical Society, and has been elected to the National Academy of Sciences and the American Academy of Arts and Sciences. He is also the recipient of the 2020 Norman F. Ramsey Prize in Atomic, Molecular and Optical Physics, and in Precision Tests of Fundamental Laws and Symmetries. Within APS he has been active in DAMOP and DLS. He has served as a Laser Science Divisional Associate Editor for Physical Review Letters, he was a member of the Physical Review Letters Advisory Board, (A full bio is available at aps.org/about/governance/leadership/board/president, cf.)

APS News talked with Bucksbaum about his plans for the 2020 presidential year and the challenges and opportunities facing the physics community. The interview has been edited for length and clarity.

Q: How did you start out in physics?

In the 1970s, when I was an undergrad at Harvard, there was a lot of excitement in fundamental physics about the Weinberg-Salam model and the fact that the weak interaction and electromagnetism might be two manifestations of the same thing. A number of groups were coming up with ways to test that. In my senior year, I went out to different schools to see where I wanted to go to grad school. At Berkeley, the Commins group was using this cool new technology—tunable dye lasers—to study Weinberg-Salam. It turns out that one of the important tests is searches for parity violation in atomic photo-absorption. So, joining this effort was an easy decision and that’s what I ended up doing for my PhD. I’ve been a laser jock ever since.

At Bell Labs after graduation I took a year on my own such that you could do with lasers beyond precision measurements and I’ve never looked back. I’ve done quite a few decades, transforming physics from the exciting industrial applications of physics—of the same thing. A number of early-career physicists, students, and the general public. A high-light of every March Meeting is the Kavli Foundation Special Symposium: This year’s symposium, themed “Frontiers of Computation: Machine Learning and Quantum Computing” will take place on March 4, from 2:00 to 5:30. The invited speakers are Michelle Girvan (University of Maryland, College Park), Eun-Ah Kim (Cornell University) and Roger Melko (University of Waterloo), John Preskill (Caltech), and Patrick Hayden (Google).

Several pre-meeting events will be held on March 1, including short courses hosted by the Division of Polymer Physics, the Topical Group on Statistical and Nonlinear Physics, and the Division of Soft Matter. In addition to tutorials on topics ranging from noisy quantum devices to advances in medical sensors, the pre-meeting events will include a workshop on creating learning assistant programs (5:00 p.m.–6:00 p.m.), a first-time attendee orientation (5:00 p.m.–6:00 p.m.), and a meet-up for undergraduate students participating in Future of Physics Days (4:30 p.m.–7:00 p.m.).

After the first day full of scientific talks on March 2, the APS Prizes and Awards Ceremony will take place from 5:45 p.m. to 7:00 p.m. to honor the outstanding achievements of APS members. A Welcome Reception will follow from 6:45 p.m.–8:00 p.m. On March 3, meeting attendees will have a chance to mingle with editors of the Physical Review journals at the Meet the Editors Reception (4:30 p.m.–6:30 p.m.). A third reception on March 4, from 7:00 p.m.–8:30 p.m.—the Diversity Reception—will provide attendees with an opportunity to network while learning about APS diversity efforts led by the Committee on Minorities, the Committee on the Status of Women in Physics and the LGBT+ physics group.

Early-career physicists, graduate students, and job seekers will have the chance to attend a lunch-time session on March 2, “Meet Your Future: Careers in the Private Sector,” hosted by the APS

MEETINGS

The APS March Meeting Heads to Denver

BY LEAH POFFENBERGER

From March 2 to 6, more than 10,000 physicists from across the country and around the globe will gather in Denver, Colorado, to participate in the world’s largest physics meeting. Across the five-day meeting, attendees will encounter an avalanche of opportunities to present research, collaborate with colleagues, and interact with other physicists from a variety of backgrounds. This year’s APS March Meeting will be held at the Colorado Convention Center—the only convention center with its own 40-foot-tall bear.

While attendees will have more than 900 sessions to choose from, the March Meeting will offer a number of special events for early-career physicists, students, and the general public. A high-light of every March Meeting is the Kavli Foundation Special Symposium: This year’s symposium, themed “Frontiers of Computation: Machine Learning and Quantum Computing” will take place on March 4, from 2:00 to 5:30. The invited speakers are Michelle Girvan (University of Maryland, College Park), Eun-Ah Kim (Cornell University) and Roger Melko (University of Waterloo), John Preskill (Caltech), and Patrick Hayden (Google).

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ETHICS

APS Efforts to Combat Sexual Harassment in Physics

BY DAVID VOSS

It is clear from a recent report from the US National Academies that sexual harassment is a pervasive problem in the sciences. But a paper published in 2019 in the APS journal Physical Review Physics Education Research presented survey data showing that nearly 75% of women under-graduates studying physics had experienced some form of harassment and a Back Page article in APS News (April 2019) offered personal testimonies of women who had experienced harassment in physics.

“How do you do it this way—one out of every four women who go to study physics as undergraduates being harassed—this should be shocking to everyone,” said Miriam Deutsch, chair of the APS Committee on the Status of Women in Physics (CWP). “It’s horrific.”

Catalyzed by these reports, the APS Board of Directors unanimously approved a statement in July 2019 that carried an unequivocal message: “Harassment and discrimination in the conduct of physics is unacceptable” (see page 3 of this issue).

“The statistics are really disturbing. The statement sailed through the APS Panel on Public Affairs and the Board was very pleased with the wording,” said APS CEO Kate Kirby. Such calls for change are only the beginning and the Society has been reinforcing its statements with a variety of approaches: APS News continued on page 4

Further reading:
PRESIDENT CONTINUED ON PAGE 6

NSF CONTINUED ON PAGE 7
This Month in Physics History

February 8, 1967: Joseph Weber Submits First Gravitational Wave Paper to PRL

This month marks the four-year anniversary of LIGO’s groundbreaking announcement of the first direct detection of gravitational waves, ushering in a new era of multi-messenger astronomy. But for decades after Albert Einstein’s general theory of relativity predicted the existence of gravitational waves, physicists assumed it would be impossible to detect them. Joseph Weber was the first to build an apparatus that could do just that, and while his claims of detection were later discredited, he helped find the field.

Born to Austrian Jewish immigrants in New Jersey in 1939, Weber’s birthname was Yonah, which later morphed into Joseph. He enrolled at Cooper Union, but his schooling was a financial hardship for the family, and he dropped out to join the US Navy. He served as a radar expert and a navigator, and survived the sinking of the carrier USS Lexington during World War II, later taking command of a sub - chaser for an invasion of Sicily in 1943.

After leaving the Navy in 1945, Weber joined the electrical engineering department of the University of Maryland, earning a PhD in physics in his spare time from Catholic University—a condition of his hiring. He chose to study atomic physics and drew on his naval experience working with microwaves to come up with the concept for the bars, outlining his design in a 1952 public lecture in Ottawa.

Among those who read Weber’s paper was Charles Townes, who had been working on a similar concept, as had two Russian scientists, Nikolay Basov and Aleksandr Prokhorov. The maser led to the invention of the laser, and Townes, Basov, and Prokhorov won the 1964 Nobel Prize in Physics for their work. Weber had been nominated but was omitted from the award because, according to Weber later told friends that the snub influenced his decision to hunt for gravitational waves, since it was a field that was “an notoriously difficult, there would not be much competition.

During his 1955 sabbatical year, Weber studied gravitational radiation with John Wheeler at the Institute for Advanced Study in Princeton and came up with a way to potentially detect these faint ripples in the fabric of spacetime. His detector was the so-called “Weber bars”, large aluminum cylinders, about two meters long and one meter in diameter, that would vibrate by a passing gravitational wave. The bars were outfitted with piezoelectric sensors capable of detecting minute changes in the length of the cylinders.

The first bar was housed in his laboratory at UMD, with other bars installed roughly a mile from campus in a makeshift garage. Weber placed another bar at Argonne National Laboratory, the better to capture candidate “coincident events” and rule out false signals due to noise. And he devised his own algorithm to analyze the pulses, despite his lack of experience with statistics—a shortcoming that would later contribute to the dismissal of his claims.

Weber submitted a paper to Physical Review Letters on February 8, 1967 (which was published the following month), reporting on the first two years of operation for his experiment. While the paper primarily placed some constraints on gravitational wave detection, he wrote, “The possibility that some gravitational signals may have been observed cannot completely be ruled out.”

At a 1969 general relativity conference, he went further and announced success in detecting gravitational waves. It caused a sensation and launched Weber to academic fame. He published a paper in PRL that same year, claiming to have detected around two dozen “coincident events” over 81 days. In 1970 he followed up with another PRL paper claiming detection of 311 such events over 14 months.

The problem was that nobody else ever picked up anything other than random noise when they tried...
Ending Sexual Harassment in Physics (July 17, 2019)

assumptions that the study of physics is unacceptable. While sexual harassment is understood to be a pervasive problem at all levels (NASEM report), APS leadership is appalled at the results of a recent survey of women under- graduate and graduate physicists which showed that nearly 75% of them experienced some form of sexual harassment within the previous two years [1]. Not only can this harassment be traumatic to the individual who is subjected to it, harassment also does lasting damage to the scientific enterprise by discouraging participation as well as undermining the codes of behavior needed for science to flourish.

To broadly uphold the important core values of diversity, inclusion, and respect, and to enable full participation by all members of the physics profession, we should all become part of the solution.

We urge all members of the physics community to follow the standards of professional behavior developed by APS members and described in the APS Statement 19-1 - Guidelines on Ethics.

1. Learn and help educate about various forms of harassment.
2. Train in how to effectively intervene when witnessing harassment.
3. Teach, train and mentor effectively, and welcome everyone as a valued colleague in the work of moving our field forward.

To this end, efforts, APS: plays a major role in the leadership of the Societies Consortium on Sexual Harassment in STEM.


established an Ethics Committee, which will promote ethics education to inform the physics community and develop responses to accusations of ethics violations;

is a leader among science societies in advancing federal legislation that enhances U.S. funders’ requirements on combatting sexual harassment in STEM.

offers site visits to physics departments to provide an outside appraisal of the environment experienced by women and minorities in the teaching and learning environment;

established and is enforcing a Code of Conduct at APS meetings that is enforceable and welcoming to all participants and free of harassment;

developed an on-line system—aps.ethicspoint.com—that enables APS meeting attendees to report cases of harass ment confidentially and anonymously.

As stated in the APS Strategic Plan 2019, APS is committed to full and respectful participation by everyone. Physics thrives when all participants are treated with respect, so we must act now to end sexual harassment in our discipline.


Coffee in the classroom 

BY ABIGAIL EISENSTADT

Weber continued from page 2

to replicate Weber’s experiments. Groups at IBM, Stanford Labs, Oxford, Cambridge, and in Scotland, Germany, and China, China, and Georgia, and China, all tried to repeat the experiments with their own Weber bar designs—to no avail. IBM’s Ristenpart and Kuhl now plan to submit a claim publicly at an MFI conference in 2019. Theorists concluded that Weber’s observations couldn’t be correct because, as Garwin declared, “The universe would convert all of its energy into thermal radiation in 50 million years or so, if one were really detecting what Joe Weber was detecting.”

By the late 1970s, Weber’s claims of detection had largely been discredited within the physics community. Weber himself was steadfast in his claims, dismissing one colleague who sought a meeting with the words, “You can’t just walk in off the street and do gravitational wave experiments.” His fame faded and the liquid-liquid research was not conducted.

Weber died on September 30, 2000, while being treated for cancer, having continued his experiments until the end. The Weber bar is now displayed at the LIGO facility in Hanford, Washington, in recognition of his role in launching the search for gravitational waves.

“No one else had the courage to look for gravitational waves until Weber showed that it was within the realm of the possible,” Wheeler wrote in a 2016 obituary.

Weber’s second wife, Virginia Trimble, was on hand in February 2016 for the LIGO announcement and demurred on the question of whether she thought he had really detected gravitational waves. But she echoed the sentiments of many other leading physicists lauding Weber’s pioneering role in getting the field off the ground. “I think if there had been two technologies going forward they would have pushed each other, as collaborators not into a competition,” said Science magazine. “It might have led to an observation sooner.”

Further Reading:


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GOVERNMENT AFFAIRS
Let Foreign Students Boost NC Tech Economy
BY AMBER LAUER

Note: This article was originally published in the Raleigh News & Observer (December 9, 2019).

The collaboration between American and international science students at universities across the US has led to breakthroughs that have transformed the lives of North Carolinians. The biotech and pharmaceutical industries, aerospace and defense, food manufacturing and information technology sectors—which dominate North Carolina’s high-tech economy—depend on the research done at universities and a pipeline of skilled workers.

Unfortunately, the collaboration is in jeopardy, as the number of international students applying for physics PhDs at US institutions is now in a major decline. According to a survey by the American Physical Society, international applications to physics departments outside the top tier dropped 22 percent during the past two years. That’s a serious problem because universities outside the top 15 generate more than 70 percent of the nation’s PHDs.

The application decline is advanced warning of economic risk to the US. Our ability to attract the very best students in the world provides us a critical competitive advantage that imparts innovation and generates the highest caliber talent for our domestic industry. It also funnels wealth back into the communities that support the universities and industries.

Fortunately, US Sen. Thom Tillis (R-NC) is in a position to help put the US on the right track. Under current law, international students pursuing advanced STEM degrees in the US can be denied student visas if they intend to work in the US after they complete their degree. By co-sponsoring the Keep STEM Talent Act, Tillis would enable high-skilled international graduates to study at US universities and provide a path to a green card if they secure job offers from US employers after graduation. Tillis would be showing the US continue to attract the best and brightest students from around the world.

Tillis serves on the Senate Judiciary Committee, which has jurisdiction over the bill. Moreover, he has established himself as a leader on immigration issues, and his platform states that he supports

FOREIGN CONTINUED ON PAGE 7

Physics Funders Get Budget Boost for FY2020
BY MITCH AMBROSE

F ederal agencies that fund physical science programs are receiving budget increases of varying sizes under the spending legislation for fiscal year 2020 that was enacted late last year.

The Department of Energy stands out as among the biggest beneficiaries, with several of its applied energy RD&D programs seeing double-digit percentage boosts. For instance, the Office of Nuclear Energy budget is rising $1.5 billion, making room for a new $329 million program that will support advanced reactor demonstration projects.

Fundamental research is receiving more moderate increases, with funding for the Office of Science rising 6% to an even $7 billion. The office’s annual budget has now grown by nearly $1 billion over the course of the last five years.

This year’s increases are spread across its six disciplinary programs, with most seeing increases in the range of 2% to 7%. However, the Fusion Energy Sciences program garnered an unusual boost of 96% to accommodate a near doubling of the U.S. contribution to the ITER facility in France, reflecting renewed confidence in the project’s management.

Overall funding for non-ITER activities will drop slightly though, squeezing the domestic fusion research portfolio.

The National Science Foundation’s investment is increasing 2.5% to $8.3 billion. The appropriation includes $65 million to launch a new program that will fund construction of midscale research infrastructure. It also includes the $33 million NSF requested to begin its five-year, $150 million contribution to detector upgrades at the Large Hadron Collider in Europe, which will prepare them for the upcoming high luminosity upgrade to the collider’s beams. DOE will contribute $900 million to the detector and beam upgrades this year.

The budget for the National Institute of Standards and Technology is increasing 5% to just over $1 billion. Much of the boost is targeted toward quantum information science and artificial intelligence research, areas that Congress and the Trump administration broadly agree on as top priorities.

Quantum science and AI are prioritized across other agencies as well. For instance, Congress directs the DOE’s Office of Science to allocate $255 million for quantum information science, a 60% increase over last year. The amount includes $75 million for establishing up to five research centers, as called for in the law that launched the National Quantum Initiative. NSF is directed to allocate $50 million for standing up its share of the research centers required under the initiative.

President Trump is scheduled to release his budget request for fiscal year 2021 on Feb. 11. Although Congress is apt to reject any proposals to slash science spending, it has for Trump’s past budget requests, it will face difficult choices this year in how it allocates increases. Under a bipartisan budget agreement reached last year, caps on R&D investment in those areas as well as biotechnology, advanced manufacturing, and next-generation communications to $1 billion over the next five years.

The author is Acting Director of FYI.

FYI has been a trusted source of science policy and funding news since 1989 and is read by members of Congress and their staff, federal agency heads, journalists, and US scientific leaders. Sign up for free FYI emails at aip.org/fyi.

Signal Boost is a monthly email newsletter alerting APS members to policy issues and identifying opportunities to get involved. Past issues are available at go.aps.org/2nr298D. Join Our Mailing List: visit the sign-up page at go.aps.org/2nqGtJP.
actions. “Our Code of Conduct is very important as is the reporting system for cases of misconduct. We believe that if people are pleased with the outcomes so far, but I’m concerned that women still feel reluctant to report these things even now.”

Among the activities in place or underway are:

- **Hiring Policy and Process**: All participants in APS meetings must adhere to a Code of Conduct, which states in part: “We believe that being respectful behavior of any kind will not be tolerated. Harassment includes but is not limited to inappropriate or intimidating behavior or language, unwelcome jokes or comments, unwanted touching or other behavior that makes someone feel uncomfortable or without permission, and stalking.” Violators of the code are subject to actions from reprisals to ejection from the meeting, as well as alerting authorities in the most extreme cases (see APS meetings/policies/code-conduct.cfm).

- **APS Ethics Point**: Violations of the Code of Conduct can and should be reported to an Ethics Point website. This Ethics Point portal to provide a comprehensive and completely confidential mechanism for reporting, even if a report is made online via telephone hotline. As stated in the Ethics Point guidelines, “Reputation, the APS EthicsPoint provides these reports available only to specific individuals within APS who are charged with evaluating the reports and deciding whether to take action in the utmost confidence.”

- **Societies Consortium on Sexual Harassment in STEMM**: APS is one of the inaugural members of the Societies Consortium on Sexual Harassment in STEMM, with APS Director of Programs Menica Flisch serving as the Society’s representative on the consortium’s leadership council (APS News, July 2019). The consortium provides model policies, policy-law guidance, and practical tools to advance professional and ethical conduct, climate and culture in societies’ own operations and STEMM fields broadly, in support of the advancement of all talents and excellence in the fields. (education-counsel.com/societiesconsortium).

- **Legislation**: APS, through its Office of Government Affairs, has been a leader in the efforts to enact legislation that helps federal funding agencies combat sexual harassment in STEM. An example is the bipartisan Combating Sexual Harassment in Science Act, which would establish an Interagency Working Group to coordinate efforts to reduce sexual harassment, direct the NSF to award grants to institutions to research sexual harassment in the sciences, and increase funding for prevention, education, and research, and require updates to the Academies report “On Being A Scientist: Educating the Nation’s Conduct in Research” (aps.org/policy/issues/harassment.cfm). The Act has been traditionally isolated statements on ethical matters, but in November 2018 the Society approved formalization of the goals of preventing sexual harassment, which had its first meeting in June 2019 (APS News, July 2019). Committee Chair Michael Marder says that the committee will have a full and busy portfolio on all ethics-related matters, but two items are underway.

- **We want to do a follow-up to a survey we did 15 years ago,” says Marder. “Back then, nearly half of the early career physicists responded, many within a few minutes, so I think something big was happening. We want to know if things have changed—better, worse, or the same.”

- **The other item is what do about members who have committed harassment? We’ve included in draft policies about inelegibility for awards and revocation of honors or membership, but we don’t have a final version of these in hand as of this writing (apnews.com/apnews/20190709/ethics.cfm).**

**APS Guidelines on Ethics**: In a draft policy, we have written a new statement on ethics, which emphasizes that “The success of the scientific enterprise rests upon two ethical pillars. The first of them is the obligation to tell the truth, which includes avoiding fabrication, falsification, and plagiarism. The second is the obligation to treat people well, which prohibits all forms of sexual harassment and respectful relationships with colleagues, subordinates, and students, and eschews bias, whether conscious or unconscious.” (see APS policy statements/10.1.cfm).

- **Site Visits**: Since the 1990s, APS has been conducting site visits to APS Conferences on Minority Issues have provided, on request, independent appraisals of the environment experienced by women and minorities within a physics department or research lab. The goal is to suggest ways that leadership can institute modifications or changes to address practices that might limit or reduce participation by underrepresented groups. Information on setting up a site visit and a list of past site visits is available at APS.org/programs/women/sitesitevisits.

This is only a partial list of APS activities. Future efforts will include offering bystander training and allies programs at all APS meetings, exploring expanding the APS EthicPoint reporting to situations outside of meetings, and hiring an ombudsperson.

“Here’s the thing. Enrollment of women in physics has increased, but if this number of 79% of women being harassed doesn’t go down by a large margin, then we need a much larger needle of female representation in physics,” says Deutsch. “How much more can women take? If they see this when they are 16 or 20, why should they think it will get better when they are 40, 50, or 60? We need an emphasis on education, messaging, and personal modeling of the best behavior.”

Additional Reading

- L. M. Aycock, Z. Hazari, E. Brewe, K. M. Goertzen, “Sexual harassment at universities, and even request an interview. “Have an updated resume and bring enough copies to pass around. Do your research, find out which companies have posted jobs and will be at the job fair and find out as much as you can about the companies you would like to visit,” says Rennie. “Be assertive and show up!”

**J OB H UNTING CONTINUED ON PAGE 7**

**H ONORS**

**Mount Wilson Telescope Receives APS Historic Site Plaque**

**BY DAVID V OSS**

PS selected the world-famous 100-inch Hooker Telescope at the Mount Wilson Observatory in the San Gabriel Mountains of Los Angeles, California, as one of its Historic Sites. At a ceremony in October, 2019 APS President David Gross presented a plaque marking the site where astronomers Edwin Hubble, Milton Humason, and Walter Baade made world-changing discoveries about the cosmos.

The observatory was founded in 1904, by George Ellery Hale (then-director of the Yerkes Observatory at the University of Chicago) with funding and support from the Carnegie Institution for Science. In 1916, John Hooker, a Los Angeles industrialist and amateur scientist, and gave Carnegie a grant of $45,000 to purchase a 100-inch glass mirror for a large reflecting telescope. The Hooker telescope was completed in 1917 and was the largest optical telescope of its time. It has the 200-inch Hale Telescope was built at Palomar Observatory.

The plaque recognizes a number of significant achievements with the telescope. Hubble joined the Carnegie Institution staff in 1919 and, while working at Mount Wilson, he showed that objects like Andromeda were entire galaxies outside the Milky Way. He and his student Humason discovered a linear relationship between the distances of galaxies and how fast they are moving away from Earth, evidence for an expanding universe. Another astronomer working at Mount Wilson, Walter Baade, studied the stars in the Andromeda galaxy and classified them into different groups based on their age and elemental constituents. This allowed him to make a more accurate estimate of the size and age of the universe.

Mount Wilson Observatory continues as a center of astronomy outreach and the Hooker telescope can be reserved for use by the public. The observatory contains...
QUARKS TO COSMOS (Q2C) theme is “2020 Vision: Frontiers in Physics.”

The APS April Meeting encapsulates the full range of physical scales including a larynx lasers—an un-audible part of the visible spectrum—through exoplanets and everything in-between. It provides an opportunity for scientists to come together and present their research.

**Q:** Some of these issues were discussed at the new APS Annual Leadership Meeting in Washington in January, right?

Yes. This meeting is an expansion of the annual leadership conversation that always happens at the end of January, beginning with the December APS Board of Directors meeting. We’ve expanded it to invite international participants, people from the federal science policy establishment, and have a round table discussion on these issues, and to be able to better make the case for the importance of openness in science.

The APS Board of Directors realizes that this is an extremely important issue. We’ve helped a lot by the fact that those people have direct input to the effective Office of Government Affairs and that office is getting members involved. In fact, thousands of our members are involved in some other chapter or another in advocacy. And so when we speak, we can speak as a community and it’s clear within government that we’re the voice of the physics community.

**Q:** What else is on the agenda for the Presidential Line this year?

An important item is that our CEO Kate Kirby will be stepping down at the end of the year. And of course, she has been so important to APS. She became APS Executive Officer in 2009 before APS engaged in governance reform and she led us through that reform to become a more effective and up-to-date professional member society. And Kate also took on this job of being able to develop a strategic plan, published last year (APS Strategic Plan: 2019-). As president, I chair the APS Board of Directors, and probably the most important job of any board is to hire and oversee the CEO. That’s a job one. So we have a search committee working on this, and we’ve been getting good professional advice to carry out the search.

**Q:** How is the Strategic Plan working out?

Two years ago the priority was making the strategic plan and last year it was launching the strategic plan. And this year we will continue implementing it. In close conjunction with this is a focus on the APS culture—not only research integrity, or the way that we treat each other, as physicists and professionals and fellow humans. You could ask us what should really be the job of APS to worry about that? I would say that yes, if our job was to be effective in advancing its strategic goals and the physics community, then we need to have a healthy culture. What does that consist of? First of all, there are things that are obvious but need work, such as advancing diversity, equity, and inclusion. For one reason or another, the profession of physics is not as inclusive as other academic disciplines. The numbers bear that out. For example, the percentage of African Americans in physics is very low. Women are underrepresented in physics. So, we know we can do better and we want to figure out how to move in that direction as a Society.

Another area related to culture that has great importance is professional ethics. We now have a formal APS Ethics Committee, which is wonderful. They are working hard to oversee APS ethics policies, and provide us with constant guidance, and we expect the broader membership will benefit from that.

**Q:** Journal publishing is a big part of what APS does. How do you see that part of the Society?

Every scientific society’s board of directors is interested in the future of publishing and we are too. Our Physical Review journals are terrific, and physics couldn’t be without publishing at this highest level of science communication. In addition, many of the services that APS provides to the physics community are paid for by our successful publishing operation.

But we are concerned about the future of scientific publishing, and especially how changes in publishing over time may affect the process of academic peer review, and our financial stability is really about the money. For example, something that’s been widely reported in the news is that government agencies like NSF have been asked by the White House to consider the ramifications of the “zero embargo time,” that is, publishing papers with immediate free access to all, with no waiting period. That could have a very harmful effect on publishing, but we have to be part of that discussion and we are—we’ve been actively involved in that discussion as well.

**Q:** What are your thoughts about the future of membership growth at APS?

It is possible that a member of APS as an underaged as I think a lot of people do, but it’s really as a graduate student and postdoc that you come to know the organization. That’s when you start going to meetings. That’s when you start publishing papers. That’s when you start paying attention to the technical exhibit floor at our large meetings and make contact with colleagues.

As an organization, we need to focus more on membership activities on this group. Graduate students and postdocs are so important. They are the future of our fraction of total membership. That’s partly because students get a discount to join. Of course, that’s an important part of the story, but it has to be that we start serving them better because we know that they are important.

One idea we started discussing last year is to have student chapters. It’s a pilot project that is now going on. Eventually I hope grad students may be able to go to a website and find out how to start an APS grad student chapter. We want to help those groups understand what their needs are and then expand from there.

**Q:** One part of the Strategic Plan is financial sustainability. Can you say something about that?

We are concerned about the financial sustainability of our members. For one reason or another, people who are not in universities might not be familiar with the word “development,” which means fundraising and we look for good causes, in this case APS. This is something [Past President] David Gross has been very interested in and has been focusing on. Something I would like to target, and I have, is the Congressional Science Fellows program. This is one of the real gems of what we do.

It’s for people to be placed as a scientists, often at the post-doctoral level, to work for members of Congress. They are not science advisors or APS advocates; they are regular congressional staffers on Capitol Hill who happen to have scientific knowledge and a science perspective, and they get asked to use that knowledge.

But there’s the problem. You have 535 voting members of Congress and only about 40 congressional Science Fellows. Of those, APS supports two. When I was APS vice president, I chaired the committee that estimates the need, and we had such a good final group of prospective fellows. So why don’t we do more? It’s not the lack of applicants and it’s not because Congress doesn’t want them—Congressional offices compete with each other for the best applicants. It’s not the luck of the applicants and it’s not because Congress doesn’t want them—Congressional offices compete with each other for the best applicants. It’s not the luck of the applicants and it’s not because Congress doesn’t want them—Congressional offices compete with each other for the best applicants.
helping APS better meet the needs of the industrial physics community and promoting awareness of the importance of physics to industry. Our efforts are especially evident at the APS March Meeting, where FIAP typically sponsors or co-sponsor sessions around ten sessions. These sessions are organized around FIAP’s flagship “Industry Day,” which has expanded over the years into a multi-day program with events spanning the entire meeting.

Lambert also explained that a major focus of these sessions is to give graduate students and early career scientists exposure to careers in the private sector—something they may not have encountered thus far in their academic careers. FIAP’s career activities involve a collaborative effort with the APS Committee on Careers & Professional Development and the Society’s Career Programs Department, noted Crystal Bailey, the Head of Career Programs at APS. A perennial favorite is the annual “Meet Your Future” session, which involves a panel discussion and Q&A with graduate students who work in the private sector.

Other FIAP-sponsored sessions slated for the March Meeting include “New Ways of Seeing with Data Science,” “Seeing the Energy Future,” “Imaging in Industry,” and “Innovations from Industry.” In line with these efforts, APS has made a priority of “broadening” the APS membership to include more physicists in industry and the private sector—progress in its most recent Strategic Plan (see APS News, March 2019), committing to forming closer ties with industry, offering programs and workshops to address industry interest in physics research topics, and providing more mentorship opportunities and leadership training in industry.

These efforts appear to be having an impact, particularly with the newest generation of physicists. According to Takesuchi, students today are becoming more appre- ciative of the connectivity between physics and industry—particularly in subdivisions like condensed matter physics and materials physics where the industrial applications are especially clear and where students are often directly engaged in graduate school curricula. “It’s changing,” he noted, “but I would say it’s not changing fast enough.” Overall, FIAP stands out as one of the most ambitious APS units, working for greater recognition for and inclusivity of the physicists working in industry and as entre- preneurs, and acting as a conduit for students and early career scientists toward a rewarding career in the private sector. More information can be found at the FIAP website.

The author is a freelance writer in Stockholm, Sweden.

FOREIGN CONTINUED FROM PAGE 4

a strong, merit-based legal immi- gration system based on the needs of America’s economy and work- force.” A recent FIAP spokesperson has stated that the nation is committed to attracting the “best and brightest” students to U.S. universities.

As a postdoctoral associate with a focus on nuclear astro- physics, he has witnessed firsthand the synergy between American and inter- national research, and the research addressing some of our nation’s most pressing challenges. American scientists—brimming with innovative ideas and entrepreneurial spirit and novel and ways to address scientific problems—fit seamlessly into counterpoints whose mastery of scientific material is invaluable in the innovation process. Together, with a common scientific goal, they transcend cultural boundaries and achieve greatness in research to the benefit of our nation’s scientific enterprise.

Locally, immigrants play key roles in our state’s economy. Several Fortune 500 companies in North Carolina boast immigrant founders, including IBM, Siemens, Amazon, NVIDIA, and Sealed Air. Despite that success, North Carolina faces hurdles in boosting its high-tech workforce. According to a report by Burning Glass Technologies, 41 percent of all open positions in the state are related to science, technology, engineering and mathematics. And, alarmingly, the number of people in the states in the job market who have the chance to participate in science, technology, engineering, and mathematics is on the decline from 3.1 million in 2010 to 2.4 million in 2018. A new post for this year’s APS March Meeting is focused on helping APS better meet the needs of the physics community.

The author is a postdoctoral researcher affiliate professor of physics at Duke University.

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Forum on Industrial and Applied Physics and the APS Careers team (11:45 a.m.–2:15 p.m.). Another special event is the APS Careers Workshop: Putting your Science to WORK, a session led by career coach and author Peter Filek on March 5 (2:30 p.m.–5:30 p.m.). The annual March Meeting Job Expo will be held on March 2 from 12:00 noon to 5:00 p.m. another special event is the APS Industry Forum on Industrial and Applied Physics (StPS). FPD offers the opportunity to students to present research, learn about graduate schools and careers, and network with others in the sci- entific community. An event on March 2, Connecting with Success: Networking Workshop for Physicists (5:45 p.m.–7:00 p.m.), will give students the tools to build their professional network and improve their career opportunities. Students can also attend a graduate school fair on March 3 from 10 a.m. to 5:00 p.m. and the graduate school fair recep- tion (2:30 p.m. to 4:00 p.m.). A student reception for both under- graduate and graduate students to meet faculty and mingle will follow from 5:30 p.m. to 8:30 p.m.

Four special events that will delight both physicists and the general public are planned: On March 4 from 8:00 a.m. to 3:00 p.m., Dania Dransfield and Diandra Leslie-Pelecky Hilborn will give a public lecture on materials science and NIASARPHYS titled “From Nanomaterials to NASA: Materials at 200 Miles Per Hour” (7:30 p.m.–8:30 p.m.). On March 4, science and the arts will come together in a staged reading of the play Einstein’s Wife from 8:00 p.m. to 9:30 p.m., and the Rock-n- roll Physics Workshop: Putting your Coffee through more unit beverage. Ristenpart, said the eclipse “Coffee goes through more unit of a cup of wine,” said Ristenpart, “but then we have a good experience. We’ve been able to sustain a higher level chemical engineering textbook called “A Highly Caffeinated Introduction to Chemical Engineering.” In the future, Ristenpart wants to write a textbook for coffee industry leaders who “want to see companies developing more about the science behind the beloved, but deceptive beverage.”

“In my opinion, it is actually more difficult to make a good cup of coffee than it is to make a good cup of wine,” said Ristenpart, “Coffee goes through more unit operations, processes, and steps than wine does.”

The author is the Science Communications intern at APS.

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For more information on the 2020 March Meeting and the full scientific program, please visit march.aps.org.

**Brewing Contained From Page 3**

Natural engineering, sustainability, sociology, microbiology, and— of course— chemical engineering. “One might have a zero academic consideration of coffee in the United States,” said Ristenpart, “but when you see that coffee is not grown here in the States, so there is no cultural or political impact.” The UC Coffee Center continues to teach “The Design of Coffee.” Currently, he is col- laborating with pianist on a third edition of their general education text- book. The two are also authoring a higher level chemical engineering textbook called “A Highly Caffeinated Introduction to Chemical Engineering.”

The final exam is making the best coffee with the least energy. RAGA BEET; KAMAL DAVIS COLLEGE OF ENGINEERING

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Job hunting continues from page 5

As move into your queue to the various employers, and lastly, network with as many companies as possible and network with your peers—to try find out your approach to building their own careers. Also, Fine, Job fairs at DPP and March Meeting for the past eight years, taking over for the American Physical Society in 2012, the past two years have shown a marked increase in both recruiters and job seekers attending the event. “The impetus was the desire to provide a much richer Bailey, Head of Career Programs at APS, attributes much of this success to having an easy-to-use interface and having these representative dedicated to marketing the event and building relationships with employers who continue to come back year after year. “What tends to happen is if an employer is engaged in a relationship with us and if they come once and they have a good experience, they come back and have a good experience. We’ve managed to successfully build some relationships with companies who frequently attend our job fairs, both DPP and March. We really want to see companies strongly represented at these events.”

To sign up for the 2020 March Meeting Job Expo, visit march.aps.org/jobs. Job seekers do not have to be meeting attendees or APS members.

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BY MATTHEW SALTER AND MICHAEL THOENENESSEN

For the past 127 years, the Physical Review journals, published by the American Physical Society, have existed to serve the global physics and physics-related research community. Since their inception in 1893, the journals have set the standard for excellence in scholarly publishing and have continuously evolved to meet the changing needs of authors and readers, introducing innovations such as Reviews of Modern Physics (1939)—the world’s most cited physics reviews journal—and Physical Review Letters (1958)—the world’s most cited physics journal.

In 2020, we commemorate the 50th anniversary of the launch of Physical Review A—another major evolution of the Physical Review journals portfolio in the service of the research community—and will celebrate the proud heritage of our journals as well as looking to the next 50 years of the Physical Review Journals. To celebrate, amongst other activities we plan to:

- Feature landmark articles: Throughout the year each journal will highlight on its website influential papers from its long history.
- 50 for 50 Discount: For articles submitted in 2020, APS is offering a 50% reduction of article processing charges (APCs) for authors wishing to publish open access in the prestigious titles Physical Review A–E. This offer also extends to Physical Review Letters as well as the more recently launched sister journals Physical Review Applied, Physical Review Fluids, and Physical Review Materials.
- Engage the Next Generation: The future of scientific publication rests with the communication preferences of the future scientists. Thus, we will hold author engagement sessions for early career scientists at APS and other major meetings around the world to collect input and feedback to continue to optimally serve the community in the future.

"In 2020, we commemorate the 50th anniversary of the launch of Physical Review A-D—a major evolution of the Physical Review journals portfolio in the service of the research community—and will celebrate the proud heritage of our journals as well as looking to the next 50 years of the Physical Review journals."

Originally, The Physical Review—the largest journal in the portfolio—was published as a single volume of high-quality articles spanning all aspects of physics and physics-related research. This approach worked well for the first 77 years of the journal’s life, but by 1970 it had become clear that the needs of the community would be better met by reorganizing the single printed volume—by then a monthly behemoth several inches thick—into a series of smaller high-quality topical journals each serving a focused research field and allowing readers to locate the newest information most relevant to their research. Thus were born Physical Review A (PRA, General Physics), Physical Review B (PRB, Solid State Physics), Physical Review C (PRC, Nuclear Physics) and Physical Review D (PRD, Particles and Fields). While the main intention of dividing The Physical Review into several smaller journals was to provide more closely focused venues for dissemination of groups of related research fields, it is said that the development was also welcomed by researchers and librarians alike for making it easier to lift printed volumes on and off library shelves.

In the ensuing 50 years, the Physical Review portfolio has continued to grow, both in number of journals and published articles in response to the demands of the community, and now numbers 14 peer-reviewed journals that in 2019 published more than 20,000 research and review articles. Some sense of the rate of growth of the journals can be seen by considering the fact that the December 1995 issue of Physical Review B alone contained more articles than the entirety of The Physical Review December edition in 1969. In addition to growth, the scopes of Physical Review A, B, C and D have continued to evolve to keep pace with the development of physics, which among other things led in 1993 to the creation of Physical Review E (PRE) covering statistical physics, plasmas, fluids, and related interdisciplinary topics out of Physical Review A which was refocused on atomic, molecular, and optical physics. In recent years, the portfolio has continued to grow and diversify with the launch of other focused journals publishing articles in applied physics, fluid dynamics, and materials research.

The Physical Review journals took another important step in serving the research community in 2011 by the introduction of a hybrid open access option to all of the research journals in the portfolio (Reviews of Modern Physics, as a specialty reviews journal is the only exception). Since that time, APS has had the option to make individual articles in the Physical Review hybrid journals available open access immediately upon publication or at the time of payment of an APC. This move continued the Society’s record of leadership in open access publishing that began several years ago with the launch of the pioneering open access journal Physical Review Accelerators and Beams (PRAB), followed by Physical Review Physics Education Research (PRPER) in 2005. In 2011 the APS introduced the highly selective Physical Review X (PRX)—the world’s highest impact open access physics journal. In 2019 this was joined by the fourth and newest fully open access member of the family, Physical Review Research (PRResearch) that set the highest criteria of the main Physical Review journals.

As Physical Review A, B, C, and D and the rest of the portfolio chart their future course into the next half century they will be guided by the APS Strategic Plan: 2019, created by the members, leadership, and staff of the American Physical Society and published at the start of 2019. At the heart of this blueprint is the mission of the APS journals to serve the global scientific community by providing the preeminent international venue for the curation and dissemination of physics and physics-related research. To achieve this goal it will be necessary to further grow and diversify the publishing footprint of the Physical Review journals and develop more publishing options to meet the needs of our authors and allow them to choose the best approach to publish, regardless of institutional and funder mandates. The future is one of challenge and opportunity and will require the Physical Review journals to display the flexibility and capacity to change in response to the needs of the community that have been their hallmark.

"For articles submitted in 2020, APS is offering a 50% reduction in article processing charges (APCs) for authors wishing to publish in the prestigious titles Physical Review A–E. This offer also extends to Physical Review Letters as well as the more recently launched sister journals Physical Review Applied, Physical Review Fluids, and Physical Review Materials."

Over the last 50 years Physical Review A, B, C, and D have established an excellent reputation for quality and integrity continuing the tradition of the original Physical Review. As with other journals in the portfolio, they are well respected in the community because of their high quality peer review and professional, fast, and efficient editorial handling.

The editors and staff of the Physical Review journals are committed to continuing this tradition in the future. We will continue to publish enduring discoveries and tomorrow’s advances in fulfillment of the mission of the APS: “To advance and diffuse the knowledge of physics for the benefit of humanity, promote physics, and serve the broader physics community.”

Matthew Salter is APS Publisher and Michael Thoenessen is APS Editor in Chief.

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