I’m the New Editor of APS News, and I’m Excited for What Comes Next

BY TARYN MACKINNEY

Hello, everyone! Happy June. My name is Taryn, and I’m thrilled to be the new Editor of APS News. I’m taking the reins from David Voss, who was Editor for nearly eight years and led with skill and dedication. I’ll do my best to fill these big shoes. My job is to help tell the stories of physicists, who spend their careers improving the field they love—making it better known, new and old, that inspire new comers and experts alike. How do you do my best to fill these big shoes.

I’m from. My goals have been to invite more people into physics; to teach them the skills they need beyond borders. For more than a decade, I’ve advocated for stronger support of physics in nations whose scientists are underrepresented in the field—nations like Egypt, Pakistan, and Bangladesh, where I’m from. My goals have been to invite more people into physics; teach them the skills they need to conduct research, which is still not taught extensively in many developing countries; and grow aspirations for people to pursue their PhD.

I first met Dr. Hobbs Moore in 1992 at the Saturday Academy for African American Students, a community for African American Students, a community for African American Students, and research scientist at UMich. and research scientist at UMich. when she received her doctorate in physics. For five years afterward, Dr. Hobbs Moore worked as a lecturer and research scientist at UMich. She published more than a dozen papers on protein spectroscopy in prestigious journals, including the Journal of Applied Physics, Journal of Chemical Physics, and Journal of Molecular Spectroscopy.

For five years afterward, Dr. Hobbs Moore worked as a lecturer and research scientist at UMich. She published more than a dozen papers on protein spectroscopy in prestigious journals, including the Journal of Applied Physics, Journal of Chemical Physics, and Journal of Molecular Spectroscopy. In 1977, Dr. Hobbs Moore joined Ford Motor Company as an assembly engineer. She went on to help the company expand its use of Japanese methods of quality engineering and manufacturing. This work proved critical to boosting Ford’s competitiveness during Japan’s domination of the automotive market. She eventually became an executive at the company.

But her passions extended far beyond work. Dr. Hobbs Moore was involved in community science and math programs and was a member of The Links, Inc., a service organization for Black women, and Delta Sigma Theta, a historically Black, service-oriented sorority founded in 1913. She and her husband, Sidney Moore, who taught at the University of Michigan Neuropsychiatric Institute, had two children, Dorian Moore, MD, and Christopher Moore, RN, and three grandchildren.

I first met Dr. Hobbs Moore in 1992 at the Saturday Academy for African American Students, a community for African American Students, and research scientist at UMich. when she received her doctorate in physics. For five years afterward, Dr. Hobbs Moore worked as a lecturer and research scientist at UMich. She published more than a dozen papers on protein spectroscopy in prestigious journals, including the Journal of Applied Physics, Journal of Chemical Physics, and Journal of Molecular Spectroscopy. In 1977, Dr. Hobbs Moore joined Ford Motor Company as an assembly engineer. She went on to help the company expand its use of Japanese methods of quality engineering and manufacturing. This work proved critical to boosting Ford’s competitiveness during Japan’s domination of the automotive market. She eventually became an executive at the company.

But her passions extended far beyond work. Dr. Hobbs Moore was involved in community science and math programs and was a member of The Links, Inc., a service organization for Black women, and Delta Sigma Theta, a historically Black, service-oriented sorority founded in 1913. She and her husband, Sidney Moore, who taught at the University of Michigan Neuropsychiatric Institute, had two children, Dorian Moore, MD, and Christopher Moore, RN, and three grandchildren.

I first met Dr. Hobbs Moore in 1992 at the Saturday Academy for African American Students, a community for African American Students, and research scientist at UMich. when she received her doctorate in physics. For five years afterward, Dr. Hobbs Moore worked as a lecturer and research scientist at UMich. She published more than a dozen papers on protein spectroscopy in prestigious journals, including the Journal of Applied Physics, Journal of Chemical Physics, and Journal of Molecular Spectroscopy.

In 1977, Dr. Hobbs Moore joined Ford Motor Company as an assembly engineer. She went on to help the company expand its use of Japanese methods of quality engineering and manufacturing. This work proved critical to boosting Ford’s competitiveness during Japan’s domination of the automotive market. She eventually became an executive at the company.

But her passions extended far beyond work. Dr. Hobbs Moore was involved in community science and math programs and was a member of The Links, Inc., a service organization for Black women, and Delta Sigma Theta, a historically Black, service-oriented sorority founded in 1913. She and her husband, Sidney Moore, who taught at the University of Michigan Neuropsychiatric Institute, had two children, Dorian Moore, MD, and Christopher Moore, RN, and three grandchildren.

I first met Dr. Hobbs Moore in 1992 at the Saturday Academy for African American Students, a community for African American Students, and research scientist at UMich. when she received her doctorate in physics. For five years afterward, Dr. Hobbs Moore worked as a lecturer and research scientist at UMich. She published more than a dozen papers on protein spectroscopy in prestigious journals, including the Journal of Applied Physics, Journal of Chemical Physics, and Journal of Molecular Spectroscopy. In 1977, Dr. Hobbs Moore joined Ford Motor Company as an assembly engineer. She went on to help the company expand its use of Japanese methods of quality engineering and manufacturing. This work proved critical to boosting Ford’s competitiveness during Japan’s domination of the automotive market. She eventually became an executive at the company.

But her passions extended far beyond work. Dr. Hobbs Moore was involved in community science and math programs and was a member of The Links, Inc., a service organization for Black women, and Delta Sigma Theta, a historically Black, service-oriented sorority founded in 1913. She and her husband, Sidney Moore, who taught at the University of Michigan Neuropsychiatric Institute, had two children, Dorian Moore, MD, and Christopher Moore, RN, and three grandchildren.

I first met Dr. Hobbs Moore in 1992 at the Saturday Academy for African American Students, a community for African American Students, and research scientist at UMich. when she received her doctorate in physics. For five years afterward, Dr. Hobbs Moore worked as a lecturer and research scientist at UMich. She published more than a dozen papers on protein spectroscopy in prestigious journals, including the Journal of Applied Physics, Journal of Chemical Physics, and Journal of Molecular Spectroscopy. In 1977, Dr. Hobbs Moore joined Ford Motor Company as an assembly engineer. She went on to help the company expand its use of Japanese methods of quality engineering and manufacturing. This work proved critical to boosting Ford’s competitiveness during Japan’s domination of the automotive market. She eventually became an executive at the company.

But her passions extended far beyond work. Dr. Hobbs Moore was involved in community science and math programs and was a member of The Links, Inc., a service organization for Black women, and Delta Sigma Theta, a historically Black, service-oriented sorority founded in 1913. She and her husband, Sidney Moore, who taught at the University of Michigan Neuropsychiatric Institute, had two children, Dorian Moore, MD, and Christopher Moore, RN, and three grandchildren.

I first met Dr. Hobbs Moore in 1992 at the Saturday Academy for African American Students, a community for African American Students, and research scientist at UMich. when she received her doctorate in physics. For five years afterward, Dr. Hobbs Moore worked as a lecturer and research scientist at UMich. She published more than a dozen papers on protein spectroscopy in prestigious journals, including the Journal of Applied Physics, Journal of Chemical Physics, and Journal of Molecular Spectroscopy. In 1977, Dr. Hobbs Moore joined Ford Motor Company as an assembly engineer. She went on to help the company expand its use of Japanese methods of quality engineering and manufacturing. This work proved critical to boosting Ford’s competitiveness during Japan’s domination of the automotive market. She eventually became an executive at the company.

But her passions extended far beyond work. Dr. Hobbs Moore was involved in community science and math programs and was a member of The Links, Inc., a service organization for Black women, and Delta Sigma Theta, a historically Black, service-oriented sorority founded in 1913. She and her husband, Sidney Moore, who taught at the University of Michigan Neuropsychiatric Institute, had two children, Dorian Moore, MD, and Christopher Moore, RN, and three grandchildren.
GOVERNMENT AFFAIRS

‘I had no idea when I would see my family again’: Scientists of Chinese Descent Recount Stories of Unjust Arrests

BY TAWANDA W. JOHNSON

Xiaoxing Xi, a Temple University physics professor, was thrust into a nightmare in the early-morning hours of May 25, 2015, after FBI agents pounded on the door of his home. “They pointed their guns at me and my two young daughters and ordered them to walk out of their bedrooms with their hands raised,” he recalled. “When they took me away, I had no idea when I would see them again.”

Xi, along with Amming Hu, associate professor in the Department of Mechanical, Aerospace, and Biomedical Engineering at the University of Tennessee-Knoxville, and Gang Chen, the Carl Richard Soderberg Professor of Power Engineering at the Massachusetts Institute of Technology, recounted heart-wrenching stories about their unjust prosecutions by the federal government during an April 18 webinar sponsored by APS, Asian rights’ groups, and other scientific organizations. The wrongful arrests have devastated their personal and professional lives, harmed the nation’s ability to recruit the best and brightest talent, and hurt international scientific collaborations.

“I’m that hope that listening to the experiences of speakers in today’s webinar will provide the motivation for us all to advocate and support members of our community,” said APS President Frances Hellman.

After Xi was taken to an FBI office, he was fingerprinted and had a mugshot and DNA sample taken, he said. Then, at a Marshal Service jail, he was ordered to strip naked so that an officer could inspect him for hidden possessions—a humiliating ordeal.

Hours later, Xi was charged with sharing US technology amounting to trade secrets with China. “I said immediately, ‘that’s absurd,’” he recalled.

Xi’s newly circulated online, where he was labeled a “traitor,” said. Then, at a Marshal Service jail, he was ordered to strip naked so that an officer could inspect him for hidden possessions—a humiliating ordeal.

Four months later, charges were dropped against Xi when leading scientific experts signed affidavits stating that he had not shared trade secrets with China. His communications with Chinese colleagues represented routine academic collaboration, experts agreed. But the damage was done. The debacle delayed his research, endangered his funding, and seriously harmed his reputation. “I don’t have a chance to clear my name, and try to repair my reputation,” Xi said.

His face now adorns the Norwegian 200-kroner banknote, but he died decades before he was recognized for his work.

PHYSICS HISTORY

June 15, 1917: Death of Kristian Birkeland, King of the Northern Lights

BY ABDIGALI EISENSTADT

Physicist Kristian Birkeland was the first to describe how charged particles from the Sun interact with Earth’s magnetism to create dazzling phenomena like the aurora borealis. But he did so at a cost, sacrificing money, community, and health in fervent pursuit of his goal: understanding the northern lights.

Born in 1867 in present-day Oslo, Norway, Birkeland’s pass for electromagnetic exploration led him from high school to the University of Oxford, where he was labeled a “traitor” by his peers. He then became the youngest faculty member in sciences and mathematics at what was then Norway’s only university—today’s University of Oslo.

But his academic career was just the start of his story. Birkeland had always been interested in auroras, the dazzling, colored lights that snake across the sky, especially in the Arctic and Antarctic. For thousands of years, cultures around the world had built myths about the auroras—some Indigenous people of northern Europe, like the Sámi, saw the lights as the souls of the dead—but scientists had no idea what caused them, and the harsh conditions of the far north deterred most researchers from studying them.

Until Birkeland. In 1896, he launched the first of many research expeditions to study auroras. In the depths of winter, he led a team through the Arctic Circle to map auroras and snowstorms, looking for patterns. The work was grueling and the environment brutal; two people died on the expedition. But Birkeland survived and returned home with reams of data.

After a flurry of analysis, Birkeland established a connection between solar plasma, geomagnetic currents and the aurora borealis. He published his theory, seeking international scientific recognition—especially from England’s most prestigious scientific institution, the Royal Society, whose validation could rocket his career to new heights. But the Society vehemently opposed his theory. One of their past presidents, the revered thermodynamics expert Lord Kelvin, had declared in 1892 that there was no relationship between sunspots and geomagnetism. The Royal Society took Lord Kelvin’s word as doctrine. Birkeland would fight for the rest of his career to gain British recognition for his auroral theories.

After his first expedition, Birkeland began planning a second one, but money was tight. The Norwegian government, which had backed his first trip, had grown frustrated with his shoddy bookkeeping, so Birkeland had to raise his own funds. He decided to invent what he thought would be a lucrative tool: a mechanism that could turn currents on and off quickly at hydroelectric power plants in Norway’s fjords. His design was well-planned but poorly executed. The mechanism exploded in testing.

Undeterred, Birkeland repurposed his switch mechanism into an electromagnetic cannon, or coilgun, that used electricity-powered coils to guide a moving rod to hit a target. The coilgun quickly circulated online, where he was labeled a “traitor.”

Xi, along with Amming Hu, associate professor in the Department of Mechanical, Aerospace, and Biomedical Engineering at the University of Tennessee-Knoxville, and Gang Chen, the Carl Richard Soderberg Professor of Power Engineering at the Massachusetts Institute of Technology, recounted heart-wrenching stories about their unjust prosecutions by the federal government during an April 18 webinar sponsored by APS, Asian rights’ groups, and other scientific organizations. The wrongful arrests have devastated their personal and professional lives, harmed the nation’s ability to recruit the best and brightest talent, and hurt international scientific collaborations.

“I’m that hope that listening to the experiences of speakers in today’s webinar will provide the motivation for us all to advocate and support members of our community,” said APS President Frances Hellman.

After Xi was taken to an FBI office, he was fingerprinted and had a mugshot and DNA sample taken, he said. Then, at a Marshal Service jail, he was ordered to strip naked so that an officer could inspect him for hidden possessions—a humiliating ordeal.

Four months later, charges were dropped against Xi when leading scientific experts signed affidavits stating that he had not shared trade secrets with China. His communications with Chinese colleagues represented routine academic collaboration, experts agreed. But the damage was done. The debacle delayed his research, endangered his funding, and seriously harmed his reputation. “I don’t have a chance to clear my name, and try to repair my reputation,” Xi said.

His face now adorns the Norwegian 200-kroner banknote, but he died decades before he was recognized for his work.

PHYSICS HISTORY

June 15, 1917: Death of Kristian Birkeland, King of the Northern Lights

BY ABDIGALI EISENSTADT

Physicist Kristian Birkeland was the first to describe how charged particles from the Sun interact with Earth’s magnetism to create dazzling phenomena like the aurora borealis. But he did so at a cost, sacrificing money, community, and health in fervent pursuit of his goal: understanding the northern lights.

Born in 1867 in present-day Oslo, Norway, Birkeland’s pass for electromagnetic exploration led him from high school to the University of Oxford, where he was labeled a “traitor” by his peers. He then became the youngest faculty member in sciences and mathematics at what was then Norway’s only university—today’s University of Oslo.

But his academic career was just the start of his story. Birkeland had always been interested in auroras, the dazzling, colored lights that snake across the sky, especially in the Arctic and Antarctic. For thousands of years, cultures around the world had built myths about the auroras—some Indigenous people of northern Europe, like the Sámi, saw the lights as the souls of the dead—but scientists had no idea what caused them, and the harsh conditions of the far north deterred most researchers from studying them.

Until Birkeland. In 1896, he launched the first of many research expeditions to study auroras. In the depths of winter, he led a team through the Arctic Circle to map auroras and snowstorms, looking for patterns. The work was grueling and the environment brutal; two people died on the expedition. But Birkeland survived and returned home with reams of data.

After a flurry of analysis, Birkeland established a connection between solar plasma, geomagnetic currents and the aurora borealis. He published his theory, seeking international scientific recognition—especially from England’s most prestigious scientific institution, the Royal Society, whose validation could rocket his career to new heights. But the Society vehemently opposed his theory. One of their past presidents, the revered thermodynamics expert Lord Kelvin, had declared in 1892 that there was no relationship between sunspots and geomagnetism. The Royal Society took Lord Kelvin’s word as doctrine. Birkeland would fight for the rest of his career to gain British recognition for his auroral theories.

After his first expedition, Birkeland began planning a second one, but money was tight. The Norwegian government, which had backed his first trip, had grown frustrated with his shoddy bookkeeping, so Birkeland had to raise his own funds. He decided to invent what he thought would be a lucrative tool: a mechanism that could turn currents on and off quickly at hydroelectric power plants in Norway’s fjords. His design was well-planned but poorly executed. The mechanism exploded in testing.

Undeterred, Birkeland repurposed his switch mechanism into an electromagnetic cannon, or coilgun, that used electricity-powered coils to guide a moving rod to hit a target. The coilgun quickly circulated online, where he was labeled a “traitor.”
INTERVIEWS

Scientists Don’t Belong on Pedestals: Interview With Science Historian Patricia Fara

BY SOPHIA CHEN

T he past is messy. Politicians, movies, and schoolteachers might have you believe that events unfolded one way, but the truth is far more complex and contradictory, as Patricia Fara well knows.

“Every person who goes back can fish out a completely different set of facts and tell a completely different story,” said Fara, a historian of science at Cambridge University in the UK.

This applies not only to wars and political movements, but also to the lives of scientists, along with their discoveries. Fara has spent her career unearthing new ways of viewing scientific history, and she has written about women’s contributions to science dating back to the Enlightenment period. Her writing often emphasizes the contributions of translators, teachers, and technicians—previously unrecognized people whose work was crucial to the global development of science.

Raised in the London suburbs by her mother, a housewife trained as a nurse, and her father, who was a lawyer, Fara studied physics at Oxford University in the sixties. Sexism in the field was direct and rampant. Men dominated her physics classes, she said, and instructors and students alike parroted messages about female inferiority. After graduating in 1969, Fara left the field to work in computer programming. “I learned very rapidly that I should never, ever reveal to anybody that I had a degree in physics from Oxford, because nobody—neither men nor women—would talk to me, because they’d regard me as completely abnormal,” she said.

Fara made a career of producing educational videos on statistics and computing before pivoting to educational videos on statistics and computer science at Cambridge University and the development of science.

Her writing often emphasizes the contributions of translators, teachers, and technicians—previously unrecognized people whose work was crucial to the global development of science.

In 1993, she earned a PhD in History of Science from Imperial College London and joined Cambridge University’s Department of History and Philosophy of Science that same year. She has written more than 10 books, including Science: A Four Thousand Year History and A Lab of One’s Own: Science and Suffrage in the First World War, and co-authored several more.

Fara, the 2022 recipient of the Abraham Pais Prize for History of Physics, spoke to APS News about her work and the role of science history in today’s world.

This interview has been edited for length and clarity.

How do you choose subjects of study?

My first popular book was about Isaac Newton [Newton, The Making of Genius, 2002]. That was a definite programmatic decision. It was in response to people who kept asking me to lecture on gender studies during my PhD and afterward because I was a woman. Gender studies was relatively new; it was regarded as a woman’s subject, and it didn’t have the importance that it does now. I got so angry about it that I decided I was going to take the most masculine case I possibly could. And that was Isaac Newton.

FARA CONTINUED ON PAGE 7

CAREERS

How to Network After Conferences

BY ALAINA G. LEVINE

ow that you’ve gone to the March and April Meetings, you’re probably wondering what to do with the contacts you acquired and conversations you had. The business cards you amassed will seem like an inconvenience if they sit on your desk for the next five years, accumulating moths, but take heed: There is value to be extracted from those chats and cards.

After all, networking is not a one-time deal—it’s about crafting mutually beneficial partnerships over time and investing in the relationship for the long haul. The first point of contact—meeting someone at a mixer, booth, or in their presentation, or introducing yourself while in line for coffee—sets the tone for the relationship, but it doesn’t end here. There are a few ideas to engage in mindful, strategic post-conference networking to grow your network into a long-term win-win:

• Follow up as soon as you can. Based on what you discussed at the conference, send an email to thank the person for meeting with you. If they had a request, like sharing with them your CV or a recent paper, do so.

• Request a follow-up zoom or phone appointment “to continue the conversation.” Ask for 20 minutes to discuss X further and “explore the potential to collaborate.” The key is to keep the dialogue going, flowing, and growing to nurture the relationship.

• Organize your contacts. If you haven’t used a formal system to manage your contacts, now is the time to do it. You don’t need a fancy piece of software—a Google Doc might be right up your alley—as long as the system you choose aligns with how you collect and process information. Include the basics, like a person’s name, position, organization, and email, but also include contextual reminders you might forget later, like the event at which you met, what you discussed, or the research they’re conducting that’s relevant to your interests.

• Connect on LinkedIn, which is specifically designed for networking and appropriate self-promotion. If you don’t have a LinkedIn profile, create one! Start by pasting parts of your CV, such as education and experience, and expand from there. Consider posting a copy of your paper or poster to showcase your work and help others.

• Check in within the year. Rather than waiting until 2023, touch base with your new contacts a few months from now and perhaps again before the end of the year. Check-ins are easy: “Hi, you might remember me from APS last year…”

Call for Nominations

APS Committee Members

Help steer the progress and development of APS by nominating a fellow member (or yourself) with relevant experience for a seat on an APS Committee in 2023.

Submit your nomination by Friday, July 15, 2022.

Learn more: go.aps.org/apscommittees

MEMBERSHIP UNITS

From Great Plains to Alaska, Physicists in the Northwest Section Prepare for June Meeting in Canada

BY ABIGAIL DOVE

Stretching across the northwestern edge of the continent, the Northwest Section (NWS) is a hub for APS members in Washington, Oregon, Idaho, Montana, Wyoming, Alaska, and western Canada.

Geographical sections are important to APS. They help APS diffuse the knowledge of physics at a regional level, and they let physicists connect in their own neighborhoods. They can also foster connections between nearby laboratories, companies, and schools, from small liberal arts colleges to large research universities.

Established in 1998, NWS is by far the largest of APS’s 10 geographical sections in terms of land area, covering three time zones and almost two million square miles from the Great Plains to the Pacific Northwest to Alaska. It’s also the only geographical section that is bi-national, with members in the Canadian provinces of Alberta and British Columbia.

Fittingly for such a vast region, the section spans a wide range of physics research. One of the largest universities in the region, the University of Washington, has robust programs in nuclear physics and high energy physics. Meanwhile, smaller colleges in the Northwest boast a rich tradition of atomic, molecular, and optics physics research; optics research in particular is popular in under-graduate classes. The region is

NWS CONTINUED ON PAGE 6

Attendees at the APS 2022 March Meeting.

APS NEWS June 2022 - 3
The APS Ethics Committee’s Work in 2021

BY NANN PHINNEY AND JEANETTE RUSSO

The American Physical Society sets high standards for ethical behavior and professional integrity for all APS staff and members. Since 2016, the APS Ethics Committee—composed of 12 APS members with diverse backgrounds—has overseen the implementation of ethics policies for APS, updated the community on best practices, and organized educational events and materials related to ethics.

As the committee’s Chair and staff advisor, we’ve seen firsthand how harmful racism and xenophobia can be to an APS member. In 2021, APS received about 60 complaints, ranging from suspected plagiarism to concerns about journal rejections and appeals, and code-of-conduct breaches at APS meetings. These incidents were reported by APS members, journal authors, meeting attendees, and APS staff.

For each complaint, the APS ombudsperson, relevant APS staff, or the full Ethics Committee reviewed and responded. For some, the ombudsperson—an independent legal expert, external to APS—led a successful mediation. For others, the Ethics Committee reviewed complaints and chose the appropriate course of action, sometimes recommending new policy. In three cases, the professional conduct disclosure policy uncovered potential misconduct.

The report is the first-ever blueprint for cementing biological physics as a discrete field of physics, on par with disciplines such as astro-physics and condensed matter physics, rather than merely an application of physics techniques to biology. The report, assembled by a 13-member committee that included APS member and physicist William Bialek, argues that the field now warrants more funding from funders and educators.

The report is published in early June.

The APS Ethics Committee’s Work in 2021

BY MATT CHEN

The annual APS March Meeting brings thousands of physicists to Chicago every spring, but this year, a group of physicists brought their enthusiasm for physics into the community. "It's not what Chicago can do for APS, it's what APS can do for Chicago," quipped Brian Schwartz of the City University of New York, invoking the classic Kennedy quote. The idea: A Physics Fiesta, hosted at Chicago's Eric Solorio Academy High School.

The APS Ethics Committee’s Work in 2021

BY RUSSELL CEBALLOS AND PATRICK McQUILLAN

Funding isn’t the only challenge: Many physics degree programs lack biological physics education. The committee noted that many physics undergraduates never encounter the subject, despite its value in demonstrating physics’ relevance to present-day problems. "Typical core physics curricula today hardly require undergraduates to learn anything that happened after 1950, while bio-physics and computer science focus on ideas and results from after 1950," the committee wrote. "Should we be surprised, then, to hear people speak of physics as the science of the past, while biology and computing are the sciences of the future?"

Mitch Ambrose is the director of FYI. Published by the American Institute of Physics since 1990, FYI is a trusted source of science policy news that is read by congressional staff, federal agency heads, and leading figures in the scientific community. Sign up for free FYI email at apn.org/fyi.

Tawanda W. Johnson is APS Senior Public Relations Manager.

Funding isn’t the only challenge: Many physics degree programs lack biological physics education. The committee noted that many physics undergraduates never encounter the subject, despite its value in demonstrating physics’ relevance to present-day problems. "Typical core physics curricula today hardly require undergraduates to learn anything that happened after 1950, while bio-physics and computer science focus on ideas and results from after 1950," the committee wrote. "Should we be surprised, then, to hear people speak of physics as the science of the past, while biology and computing are the sciences of the future?"

Mitch Ambrose is the director of FYI. Published by the American Institute of Physics since 1990, FYI is a trusted source of science policy news that is read by congressional staff, federal agency heads, and leading figures in the scientific community. Sign up for free FYI email at apn.org/fyi.

Funding isn’t the only challenge: Many physics degree programs lack biological physics education. The committee noted that many physics undergraduates never encounter the subject, despite its value in demonstrating physics’ relevance to present-day problems. "Typical core physics curricula today hardly require undergraduates to learn anything that happened after 1950, while bio-physics and computer science focus on ideas and results from after 1950," the committee wrote. "Should we be surprised, then, to hear people speak of physics as the science of the past, while biology and computing are the sciences of the future?"

Mitch Ambrose is the director of FYI. Published by the American Institute of Physics since 1990, FYI is a trusted source of science policy news that is read by congressional staff, federal agency heads, and leading figures in the scientific community. Sign up for free FYI email at apn.org/fyi.

Funding isn’t the only challenge: Many physics degree programs lack biological physics education. The committee noted that many physics undergraduates never encounter the subject, despite its value in demonstrating physics’ relevance to present-day problems. "Typical core physics curricula today hardly require undergraduates to learn anything that happened after 1950, while bio-physics and computer science focus on ideas and results from after 1950," the committee wrote. "Should we be surprised, then, to hear people speak of physics as the science of the past, while biology and computing are the sciences of the future?"

Mitch Ambrose is the director of FYI. Published by the American Institute of Physics since 1990, FYI is a trusted source of science policy news that is read by congressional staff, federal agency heads, and leading figures in the scientific community. Sign up for free FYI email at apn.org/fyi.
Physicists Should Explore New Fields

By Daniel Pisano

A stock photo of a biosensor implant. Dr. Zafar's work on biosensors started more than a decade ago, after she taught herself basic biology online.

Since then, Zafar has become a leader in interdisciplinary research in biosensors, device and material physics, data modeling, and nanotechnology. She has received prestigious awards and honors, including IBM Outstanding Innovation Award (2013, 2018), IBM Master Inventor Award (2017), IBM Outstanding Innovation Award (2021) Senior Member IEEE (2014) and American Physical Society Fellow (2009). For Zafar, the important thing is to keep learning. She advises other physicists to go outside their current field: "It opens opportunities to work on problems that are not only interesting, but can play an essential role in addressing urgent global issues, such as climate change, health, or poverty.

And better still, says Zafar, it’s enjoyable: “I’ve also learned finding a new area to be a fun process.”

Daniel Pisano is APS Director of Industrial Engagement.

For the Physics Fiesta’s finale, everyone feasted on Chicago deep dish pizza, tamales, and traditional Mexican drinks like horchata and agua de jamaica. “Many of the families came up to me to thank me at the end of the night,” said Victor Izu, principal of Solorio. “I could really see the excitement in the young people. I thought to myself, I think we’re planting real seeds here. I’m totally confident that there are kids who are going into the sciences because of this event, because of the fun night we had.”

Encouraged by the success of Physics Fiesta, Adenwalla, and Livestock Are Aces, they are looking forward to working with more APS members and units to plan similar community-based outreach events at future APS Meetings, including next year’s, which is slated to take place in Denver.

“Watch out, Las Vegas!” said Schwartz.
also home to TRIUMF, Canada’s premier particle accelerator, located in Vancouver.

The tri-region, consisting for APS geographical sections, most of NWS’s activity centers on its annual meeting. Each meeting is designed to be a gathering of participants and features a slate of talks by leaders in different fields, along with presentations and a poster session. For NWS Chair Andrew Dawes, a professor at Pacific University in Oregon, the annual meeting has personal significance: It was the first physics conference he ever attended as an undergraduate. He described the NWS Annual Meeting as an excellent way to hear updates from a broad range of physics fields and compare notes with other researchers in the region.

“I’ve discovered a lot of great connections that I wouldn’t have necessarily made at bigger events,” he explained. “As a professor here, it’s so valuable to see what’s happening at similarly sized and scaled institutions. The NWS Annual Meeting is accessible to smaller institutions, so we can see what types of research work, what types of programs work, and how different departments are thriving and growing.”

The meetings are also accessible to a wider range of people, given the lower costs associated with regional travel. To this end, the executive committee has changed the meeting location from year to year, choosing host institutions in different areas in the region to encourage participation and to tailor their talks to a broad audience—a vital skill. Students who attend also get plenty of opportunities for career development. This includes careers outside academia, paths that are often unfamiliar to young scientists.

Overall, NWS stands out as a lively and inclusive geographical section, offering members—especially students—professional development, learning opportunities, and community. Visit the NWS website to learn more.

Abigail Dove is a freelance writer in Stockholm, Sweden.

**by a candidate for an APS honor or award, one of those candi- dates was disqualified.**

Also in late 2021, the committee, for the first time, received requests for revocation—in other words, appeals for individuals who have been found to have violated APS’s ethical behavior to be stripped of APS honors, leadership positions, or membership. The committee is reviewing these requests now.

much work remains. For example, the committee must clarify policies regarding ethical behaviors in others, as well as clarify penalties for people who have committed violations. Some actions don’t warrant a revocation. The committee must develop clearer processes and guidelines for revocation and ensure that members know these procedures. This is difficult work. Committee members agree that

For those on the fence about attending, the meeting location may be the only reason they take the train. Dawes highlighted an additional benefit that will bring together physics department chairs from several institutions to discuss ongoing challenges in higher education—namely, demographic change and dips in enrollment from the COVID-19 pandemic.

Students make up more than 50% of NWS’s ranks, and the Annual Meetings are designed to be extremely student-friendly. The meetings enable students to present their research outside their own schools, often for the first time, and the wide range of fields represented at the meetings can help students learn to tailor their talks to a broad audience—a vital skill. Students who attend also get plenty of opportunities for career development. This includes careers outside academia, paths that are often unfamiliar to young scientists.

Overall, NWS stands out as a lively and inclusive geographical section, offering members—especially students—professional development, learning opportunities, and community. Visit the NWS website to learn more.

Abigail Dove is a freelance writer in Stockholm, Sweden.

**fortable, and gray areas abound. On multiple occasions, the committee has had to navigate uncharted territ- ory, relying heavily on the expertise of the APS oversenior. We are listening and learning. But it’s also vital work. After all, APS’s ethical guidelines reflect the Society’s enduring goals: to promote truthfulness and respect and ensure that the physics commu- nity remains in good standing.**

If you believe you have witnessed or experienced an ethics violation, review the APS Guidelines on Ethics at www. aps.org/policies/ethics5/5.1. To report an ethics violation at an APS event, visit your aps.eventpoint. com to report another form of ethics violation, email ethics@aps.org.

Nan Phymin is Chair of the APS Ethics Committee, Vice Chair, Russia is APS Corporate Secretary.

**n the session concluded with a panel discussion on measurement in physics. The discussion was nuanced and memorable, moving beyond metacognition, discrimination, or “bias against,” to include the shortcomings of in-group favoritism, or “bias for.” I shared a bit about being informed by the daughter of Dr. Dorian Moore, a few months ago—that to her children, Dr. Moore referred to me as their brother, and that she talked about me the day she passed away. She hadn’t wanted to tell me about her illness because she didn’t want to distract me from my studies. To me, this was a sign of her deep, endearing and protective nature around her.**

After the webinar, I posted a question on the event’s LinkedIn page, Don Coleman, the former associate provost at Howard University and symposium chair. APS Past-President Dr. S. James Gates, a co-panelist of mine, and a collaborator of mine, sent the following email to me:

"In early 1994, Dr. Hobbs Moore stopped volunteering. . . As I learned later, she was losing her 24-year-old battle with cancer."
I had not thought of Isaac Newton as particularly masculine. Why do you call him that?

As far as I was concerned, he was the furthest removed from anything to do with women. There were few women talking to him about physics and maths, which are very masculine subjects. I don’t think Newton’s work—a man who had ever written a book about him.

I used to give lectures after I was teaching the course. The Newton biography, it was an account of how he became so famous, and how his reputation shifted over the centuries. There wouldn’t be a clutch of elderly men in the audience who would stick their hands up and say something like, “Why don’t you understand gravity,” or whatever it was. I just glared at them and said, “Yes, I do. I have a degree from Oxford in physics.” It was extremely satisfying, because it shut them up.

Sometimes the most repeated stories about women are not even historical fact, such as the story of Archimedes. Archimedes was a woman, when he saw the apple fall from the tree. Why are these stories so popular?

Particularly in Europe and the Americas, they’re foundational stories based on stories from the Bible and the mythological stories of the ancient Greeks. The same story gets reworded and retold for different contexts. The Newton story is the same story as James Watt inventing the steam engine when he watched a kettle boil, and the Archimedes story is the same as that of Archimedes jumping out of his bath and shouting, “Eureka!” when he’d worked out how to find the volume of a crown. People grew up with these stories, and they’re very comforting.

In your book Pandora’s Breeches (2020), you outline that women’s stories suffer from suppression and in many cases, the tempting feminine myths that we tend to repeat without solid evidence.

A common story is victimization. We create these great women that were suppressed, and we forget what other women were actually doing. One famous example is Rosalind Franklin. She emerged as the woman who was completely marginalized and banished by Watson and Crick, who stole her photo of DNA and took all credit for the discovery. Franklin was totally subverted by Crick and Watson.

Many people like to think of great scientists of the past as qualitatively different from other people. That’s something, for example, that people do with Marie Curie, for example, focus on her love affair with Pierre Curie, and they make her very beautiful. There was also a film about Mary Anning, the geologist, which I haven’t seen. They made her have a lesbian love affair with the wife of another geologist. There’s absolutely zero evidence of that.

Do you think that scientists have an obligation to teach their audiences about the history of their scientific training?

Yes. It’s really good for them to learn about the history of their subject, along with some aspects of philosophy, which will teach them about ethics. History also teaches them how to write and make persuasive arguments, which they need for writing papers and grant proposals.

It’s also an opportunity not just to regurgitate facts, but to express opinions. Our questions don’t necessarily have a right answer, as long as you back up what you’re saying. That’s very important for students to learn. For example, I might ask the question, would Charles Darwin have formulated the theory of evolution by natural selection if he hadn’t been on a voyage on the Beagle around the world? Nobody can know the answer to that question, but my students and I could come up with the answer, and are adament that they’re right.

I think it’s because she seems to have been a nice, hardworking, ordinary woman. She had three children, and she didn’t have any amazing science. But that’s not as dramatic as talking about Rosalind Franklin being totally subverted by Crick and Watson.

The Nobel Prize. So presumably, she was actually doing. One famous example is Rosalind Franklin. She was one of the founding mothers, if you like, of the tobacco mosaic virus. She was steeped in knowledge about DNA for about a year and a half at the King’s College, in London, when she got the Nobel Prize for science. She’s virtually unheard of in the UK. I think it’s because she seems to have been a nice, hardworking, ordinary woman. She had three children, and she didn’t have any amazing science. But that’s not as dramatic as talking about Rosalind Franklin being totally subverted by Crick and Watson.

So what is your opinion about the word “genius”?

It’s the secular equivalent of saying that somebody is a saint. People were elevated to sainthood before they were more than a year, and extraordinary achievements. Isaac Newton’s cottage where he was born in Lincolnshire has become a shrine for scientists who visit ODU’s “Indo-US STEM Education and Research Center and India’s Aligarh Muslim University, and it would be a shrine for scientists of the Ohio Supercomputer Center. I invited a few faculty members and students to attend the course, but news traveled fast, and before long, more than 100 people had signed up. They came from universi- ties across the world—Bangladesh, Egypt, Ethiopia, India, Mexico, Morocco, Pakistan, Palestine, Saudi Arabia, the United Arab Emirates, and the United States.

From the very first day of the course, it all began falling into place, despite being separated by thousands of miles. Participants found common interests and sought ways to help one another, even forming a WhatsApp group to discuss assignments and work out technical problems. The last day lasted four hours and ended at 4PM—15pm in Mexico, from where students participated, and 6am in Bangladesh, home of partici- pant Malihba Ahrabi, and many time zones in between. Better still, the online format enabled participation that might have otherwise been difficult for some participants. One partici- pant, Dr. Rahila Nagma in India, listened to lectures while her two young children slept nearby; Habib Abudharam Ameen, a student from Addis Ababa University in Ethiopia, periodically battled internet issues but was undeterred. Both excelled on the exams.

Beyond diversity in national origin, language, and background, the participants brought a diversity of physics experience. Whether experimentalists or theorists, undergraduates or seasoned pro- fessors, all had unique expertise, and all sought to learn.

The lectures covered atomic and plasma physics (including computations in atomic structure and B-matrix method), astronomy, and spectroscopy, all complemented by hands-on computational workshops on research. There was plenty to learn, but the participants were eager, capable, and sincere. I was thrilled when they received their certificates.

It’s hard to overstate the signifi- cance of opportunities for this course, which would have seemed unthinkable just a few years ago. But now more than ever, the physics community has the tools it needs to support the best and brightest minds, no matter who they are or where they’re from—to make physics education and research truly global.

The pandemic seemed to have expanded the benefits of APS mem- bership to international scientists. I read about internationally twice a year before, and I’ve helped international partici- pants of these courses, and students and faculty around the world, to become APS members for free under the Matching Membership Program. When I served on APS’s Forum on Underrepresented Countries, I strongly advocated for free membership for physicists in under-represented countries in Arab countries, Asia, and beyond. But more must be done. I believe this October 2023 course will serve as an example of effective teaching and collaboration in the global physics community—a commu- nity that, like physicists’ passion for their work, knows no borders.

Dr. Sultana Nahar is a profes- sor of astronomy at the Ohio State University. Co-author of the text Atomic Astrophysics and Spectroscopy, creator of the NORD- ALMUN-Data, co-director of the STEM ER Center, and adjunct professor of physics at Aligarh Muslim University and Cairo University.

We’ll need your help. This pub- lication is, after all, for you. What do you love to read? What stories do you hope to tell? We want to publish interesting ideas and fresh perspec- tives, and we need our readers to plant the seeds.

So when you send a letter to the Editor, I’ll be on the other end, eager to work with and learn from you.

Taryn MacKinney is the Editor of APS News. You can reach her and the APS News team at tmackinney@aps.org.

We’re thrilled when you receive their certificates.
I suspect that many of you, when you think about diversity in physics, feel as I did for much of my life. We say to ourselves something like, “I am a good person and I have tried hard to be inclusive and to respect others, but there are societal obstacles not of our own making and there is nothing I can do.”

I wanted this article to sound judgmental, and I don’t want to hold myself up as a role model. In fact, I’m embarrassed that it took me almost 45 years to realize that assuming there’s nothing I can do is both morally untenable and self-defeating. This problem is higher on our ordered list when I was chairman of the Harvard Physics Department in 1992, and it dealt with gender diversity.

By this time, I had been teaching at Harvard for over 15 years. Helen Quinn was at Harvard when I arrived as a postdoc, and we had many discussions about the dearth of women in physics. There was a problem, but I didn’t see how I could help. I thought my job as a physicist was just to do good physics, and I thought my job as a teacher was just to organize a subject in a deep and interesting way (which I now suspect I was not very good at). This is why I saw a problem in my physics, but I didn’t see a problem in my physics culture. Our high energy theory group in the 1980s included Shelly Glashow and Steve Weinberg, so we had our pick of men who wanted to do particle phenomenology, and many of them ended up working for me, including four amazing women: Sally Dawson, Ann Nelson, Lisa Randall, and Lisa Gross. I also engaged, and gave lectures (which I was never very good at). I was lucky to be at an institution where I could give physics courses with no need to do particle phenomenology, and I also enjoyed.

Ann Nelson’s class in particular had a positive influence on the culture of the department. For example, they initiated a “Papert Show” in which second-year students made anonymous fun of the faculty (represented by silly puppets) to give first-year students the real scoop about the department. This wonderful tradition is still going on. But the men who graduated in physics loved their time in the Harvard physics department. This was not right.

Meanwhile, I was having a wonderful time teaching undergraduate courses, too. Many undergrads hung out in my office, and I got to know many of them well. Again, some of the women I met said how difficult the physics culture was for them, but it wasn’t getting through my thick skull.

This changed when, in 1992, I saw data showing that the Harvard Physics Department. This was just not right.

So what’s wrong with saying, “there is nothing I can do”? We do face societal obstacles, and we must do everything in our power to break them down. Many children who could become outstanding scientists cannot imagine careers as physicists, and far too many minority kids could not afford to pursue a physics career even if they dreamed of it. And it’s an understatement to say that one of our major obstacles is not trying to change this. I know many of you are working hard with outreach and teaching to chip away at this problem, but we also put up a daunting obstacle of our own making. Perhaps subconsciously, we see physics as survival of the fittest, and we look for the apes repudiating to them, and in which for the best.

This isn’t surprising. We’re drawn to physics because we want real answers to real questions. We aren’t satisfied with answers that are quantitative and inexpressible in the language of mathematics. And we submit our the ultimate test—quantitative comparison with experiment. So naturally, we tend to quantify our thinking about physics. I think the way we think is like separated events comes first. You can quibble about the details of my spherical cow—watching is that if you want to quantify what makes a great physicist, you must use a space with many dimensions, a different dimension for each of the possible ways of thinking that may be important. I sometimes imagine a spherical cow model of physics talents in N dimensions where N is large and talent in each dimension increases from 0 at the origin to 1 near the boundary. The, N-dimensional version of the positive octant of a sphere. This, I learned from Wikipedia, is called an “orthant.” Each point in my N-dimensional orthant is a possible set of talents for physics. Great physicists are out near the boundary, far away from the origin. If we assume that the talents are uniformly distributed, you can see that only in my spherical cow model, the fraction of possible physics talents within a of the boundary grows N times for small . If N is very large, as it is in physics, then that means there’s a lot of space near the boundary—so there are a huge number of ways of being a great physicist, including many ways we haven’t seen yet. Diversity is critical to the future of physics, I believe, because it’s imperative that we explore this vast space of physics talent, and that means encouraging people who are different and who think and act differently.

You can quibble about the details of my spherical cow, but I’d be happy if this helps you recognize how damaging it is to rely on one-dimensional, ordered lists of people. Such a list represents only some arbitrary, one-dimensional projection from some higher dimensional space. This is why I think that working for diversity in physics isn’t just a moral imperative—it’s also the most useful approach for the field of physics.

So what can be done? If you teach, you probably have to grade, but I think you should give students sub-grades for several ways of excelling, and you should keep track of each separately. This makes it easier to encourage a diverse set of students and to explain that the final grade is a somewhat arbitrary combination. You should get to know your students as people and celebrate their uniqueness. Instead of forcing a younger colleague into a predetermined mold, encourage them to develop, be proud of, and effectively display their unique strengths. Sometimes this also means working to help your older colleagues accept new ways of thinking.

At the national level, you need to learn about the out standing minority physicists in your own subfields. Invite them to give talks. Nominate them for prizes. The most important thing you can do for diversity is to hire diverse faculty. I have seen this effect for women in my own department. We still have a long way to go, but our women faculty have made big changes to the department’s culture and student morale. I look forward to the day when our department is equally diverse racially and culturally, which I believe will happen if we work harder to consider candidates as individuals with multiple skills rather than numbers in a ranked list.

Meanwhile, selection committees need to avoid overly rigid definitions of subfields, so they can search broadly. They need to avoid confusing aggressiveness or fakelness with ability. They need to apply an appropriate implicit bias factor for candidates who look like the selection committee and current department. They must look beyond the “old-boy network” and instead make a special effort to identify promising candidates who have not risen through the usual channels. None of this is easy.

There are certainly some rare super-superrrrrrrrrr superstars who are so far out in the space of physics talent that they’re clearly unique. If you find another Ann Nelson or Ed Witten, you should hire her independent of her minority status. But most candidates, like most of us, will just be “ordinary” good physicists who have a combination of skills that, with time, will sometimes be the right skills to solve important problems.

While I care deeply about these issues, I know my own view is narrow, personal, and probably outdated in many ways, because the landscape changes with time. So let me close with a quote from a Physics Today article by Ann Nelson, my former student and an extraordinary scientist and person, whose passing was an incalculable loss to physics: “If your career is established and you are not making an explicit and continual effort to encourage, mentor, and support all young physicists, to create a welcoming climate in your department, and to promote the hiring of diverse faculty members, you are part of the problem. This is a critical issue of civil rights in our field. I’ve tried to argue here that this is more than a civil rights issue. It’s the best way to ensure that physics will continue to be great. So what is your assignment?”

Your first job is to do great physics and enjoy it and communicate your excitement to the next generation. But you owe it to this field that we love to work to increase its diversity.

The most important thing is to keep at it! This is a job for optimists. Progress will always be slower than we’d like. But progress won’t happen at all unless the good people who think that there’s nothing they can do actually wake up—and start doing.

Dr. Howard Georgi is a theoretical particle physicist and the Mallinckrodt Professor of Physics at Harvard University. This article is adapted from his talk at a conference of the Kavli Institute for Theoretical Physics in February 2022.