

APS News



A Publication of the American Physical Society

aps.org/apsnews

March/April 2026 | Volume 35 | Number 2

Enrollment in US physics graduate programs declined in fall 2025

A new report confirms that funding uncertainty and visa issues contributed to falling first-year enrollment.

BY BRILEY LEWIS

Federal funding uncertainty has roiled U.S. physics graduate programs over the past year. Now, a new report confirms this uncertainty is impacting enrollment.

Back in April 2025, researchers from the American Institute of Physics (AIP) predicted that funding uncertainty would lead to reduced graduate admissions and enrollment in physics programs. A December 2025 study from the same team confirms these predictions were accurate.

The AIP researchers originally predicted a decline of approximately 13% in enrollment of first-year graduate students, a stark change from prior years, when the field was steadily growing. This prediction was mainly based on the uncertainty surrounding federal grant funding, like the federal funding freeze that impacted National Science Foundation awardees in January 2025 and policy changes that led to



The preliminary data comes from AIP's newest survey of physics departments.

the cancellation of over one thousand NSF grants last May.

Court rulings have reinstated many grants, and earlier this year, Congress largely rejected the sweeping budget cuts proposed by the Trump administration, restoring over \$10 billion in funding

across four key science agencies and billions more for several others.

But many departments still face cuts, and months of funding volatility have had lasting impacts. The

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Brad Marston on science, democracy, and the hard work ahead

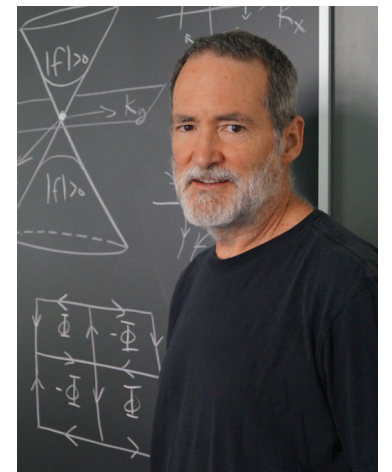
In an interview, the 2026 APS president outlines his career, his goals for the year, and where he finds optimism in challenging times.

BY LIZ BOATMAN

"My older brother introduced me to backyard astronomy," says Brad Marston, the 2026 president of APS. "So at first I thought I would be an astronomer." But then, in high school, his father's friend handed him a copy of Richard Feynman's "The Character of Physical Law," a series of lectures on the laws of physics.

"That really changed my direction," says Marston. As a result, he set his sights on Caltech for his bachelor's, in part, he says, because "that's where Feynman was," but also to learn more about modern astronomy. Marston was even able to spend an "unforgettable night" at the Palomar Observatory, home to a 200-inch telescope — at the time, one of the largest in the world.

Since then, Marston has changed direction multiple times in his career. Starting graduate school at Princeton University, he initially



Brad Marston. Credit: Ariel Green

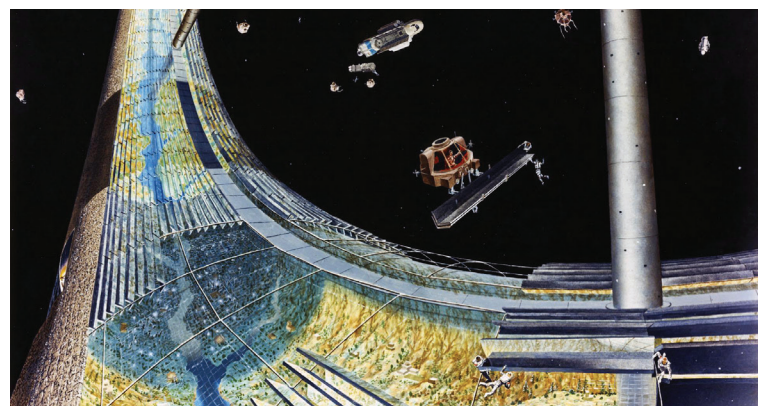
thought he would pursue high energy physics. But high-temperature superconductors, just discovered, drew his attention to condensed matter physics. Years later, his re-

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Science fiction as a science driver

Can scenarios inspired by science fiction help anticipate the effects of future technologies?

BY CHARLES DAY



The Stanford Torus was among several proposed space settlements that rely on rotation to mimic gravity. Artist Donald Davis depicted these and other visionary habitats for NASA in the 1970s. Donald Davis/NASA

One August morning when I was walking my dog in my Capitol Hill neighborhood, I spotted signs posted to the trunks of street trees. The signs featured a photo of a family's lost cat. What surprised me was the poster's request that neighbors check video footage from their doorbell cameras for sightings of the missing pet.

Doorbell cameras are examples of active pixel sensors, in which each pixel consists of a photodetec-

tor connected to one or more transistors. The technology was invented in 1967 by physicist and engineer Peter J. W. Noble, whose employer, U.K. electronics company Plessey, asked his team to develop a camera that could interpret the numbers on paper bank checks.

The decades-long journey from check readers to doorbell cameras got me thinking about how difficult

Science fiction continued on page 3

How a Twisters movie superfan became a broadcast meteorologist

A lifelong interest in weather led Davion Huggins to physics — and, with support from APS' National Mentoring Community, to TV news.

BY SOPHIA CHEN

This October, Davion Huggins, age 24, packed up his life in North Carolina and moved to Fayetteville, Arkansas, to start his dream job as an on-air meteorologist.

His weatherman ambitions began in childhood, when he spotted his first funnel cloud on a road trip. "My mom and grandma were kind of horrified," he remembers. "I was mesmerized."

Not long after, Huggins started delivering pretend forecasts in front of the TV to his family. His father bought him a DVD of the 1996 movie Twisters, which he says he's watched over 300 times. Today, he still carries trivia about tornados in his back pocket: "You can't outrun or outdrive a tornado if it's heading in the same direction as you," he says. "You can get lucky, but we don't advise you to try." The storms can move faster than 60 miles per hour.

On the surface, his career path looks like a straight shot. Huggins attended North Carolina Agricultural and Technical State University, where he studied atmospheric science and meteorology. After graduating in 2023, Huggins went into a master's program in physics at the same university, where he conducted a research thesis on the deadly 2021 Hurricane Ida. He received his master's degree in spring 2025, and by the fall, he landed the meteorologist position at KNWA/Fox 24 in Arkansas. Today, he creates and delivers weather forecasts, sometimes multiple times an evening, as a me-



"Weather never stops, and it's never the same," says Huggins. "The constant motion keeps it interesting, and keeps me coming back." Credit: Davion Huggins

eteorologist on broadcast television.

But like any young person entering the job market, Huggins experienced his share of uncertainty. "I always knew I wanted to be a meteorologist, but I wasn't exactly sure how that would pan out," he says.

One speed bump occurred after his first semester as a master's student. After he received a poor grade in a course, his program reduced his stipend — a challenge many students face. Before the reduction, his stipend already wasn't enough to cover his rent, says Huggins. "It was hard to know what the next step was going to be," he says.

Huggins consulted with Chih-Kuan Tung, a physics professor at NCAT, about his situation. Huggins had worked as Tung's teaching assistant for undergraduate mechanics physics labs. As a TA, Huggins "was very active with the students," Tung says. "He thought a lot about

how to help them."

Tung encouraged Huggins to join the APS National Mentoring Community and served as his mentor. After joining the NMC, Huggins applied for and received money from the BEAM fund, now called EMERGE. "It helped a lot," says Huggins. "It was kind of hard to focus on school when I was trying to make sure rent and groceries were still in the apartment."

Huggins and Tung also met a few times a month throughout his master's program, "talking about everything from life to physics to what the future would look like," says Huggins. He knew that finding a job as an on-air meteorologist would be competitive, so he also used the NMC's resources to learn about other possible career paths. Over the course of their meetings, Huggins

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Quantum year closes with calls to bridge a global divide

Scientists and policymakers gathered in Ghana to close out the 2025 International Year of Quantum Science and Technology.

BY MATTEO RINI

The International Year of Quantum Science and Technology (IYQ) concluded not in Paris, Washington, or Geneva, but on the golden shores of West Africa. Hundreds of scientists, ministers, diplomats, and industry leaders gathered in the tropical gardens of Accra, Ghana, for the IYQ closing ceremony. The choice of venue reflected Ghana's lead in proposing the IYQ designation to the United Nations. At the two-day event held last week, speakers emphasized that the next century of quantum advances must be global in both participation and benefit, reaching far beyond the world's established research hubs.

such as quantum computing, secure communications, and ultraprecise metrology.

"The international year of quantum has been an extraordinary global achievement," said Dougherty. Over the course of the year, more than 1,300 events were organized in over 80 countries, collectively engaging more than a million people. Roughly 80% of participating countries were in the Global South, said Claudia Fracchiolla, Head of Public Engagement with the American Physical Society (the publisher of *Physics Magazine*). "This shows the interest of the Global South to be participants — not just observers —



The second-prize winner of the IUPAP-IYQ2025 Photo Contest, showing Stellenbosch University's optical ground station for the first quantum satellite link in the Southern Hemisphere, connecting South Africa and China.

Credit: Y. Ismail/Stellenbosch University

"Hosting the closing ceremony here in Accra is deeply symbolic. It reflects the growing capacity of the Global South in quantum science and technology," said David Wilfred Ochan, Ghana's representative at the United Nations Population Fund. "Africa's talent and intellectual contribution must be part of the future of frontier science," added Haruna Iddrisu, Ghana's Minister for Education, as he welcomed the ceremony's participants. "The future of quantum must be a shared one," said keynote speaker Michele Dougherty, a space physicist who was the first woman in 350 years to serve as the U.K.'s Astronomer Royal.

The IYQ marked the centenary of the foundational breakthroughs of modern quantum mechanics — work carried out in and around 1925 by Werner Heisenberg, Erwin Schrödinger, and others, which transformed our understanding of atoms, light, and matter. But the year also looked forward, highlighting ongoing advances associated with the so-called second quantum revolution, defined by technologies

of this quantum revolution."

Speakers raced through a whirlwind year of outreach, education, and discussion. "Quantum science can be perceived as distant. The IYQ helped change this perspective," said John Doyle of Harvard University, a past president of the American Physical Society. Dougherty highlighted her "best of IYQ" moments: Harvard's Quantum Shorts: Encore contest, a photo contest by the International Union of Pure and Applied Physics (IUPAP), the Quantum Africa 7 conference in Morocco, and a history of quantum physics meeting in Brazil. The U.K. Quantum Week featured school programs, public exhibitions, and even a display in the Houses of Parliament. In a conversation with *Physics Magazine*, Dougherty noted that quantum science has reached the point where every UK member of Parliament has at least some awareness of it.

A more intimate moment punctuated the policy discussions when Gary Hugh Day read the winning entry of the IYQ Brilliant Poetry

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THIS MONTH IN PHYSICS HISTORY

April 1968: The film *2001: A Space Odyssey* gets (some of) the science right

Director Stanley Kubrick packed the iconic movie with accurate depictions of space and physics, and inspired a generation of sci-fi films.

BY SOPHIA CHEN

On April 2, 1968, the movie *2001: A Space Odyssey* premiered at the Uptown Theater in Washington, D.C. Today, it is a science fiction classic, having inspired many subsequent films: George Lucas borrowed filmmaking techniques used in the movie for depicting outer space in his 1977 movie *Star Wars*. Christopher Nolan cites *2001* as an influence for his 2014 film *Interstellar*.

The movie defies summarization. The plot tells the story of different groups of Earthlings, at different points in spacetime, who independently find a large, opaque slab left by aliens. The movie's first act focuses on a group of apes on early Earth. The second act follows an astronaut as he travels to a colony on the moon. The third and fourth acts follow two more astronauts, whose artificial intelligence system tries to kill them en route to Jupiter.

The characters scarcely speak to each other. The movie features a baffling 10-minute sequence of moving streaks of light, as well as scenes of extensive silence. The central mystery of the movie — *what is the slab?* — is never explained.

When it premiered, a critic at *The New York Times* called it "somewhere between hypnotic and immensely boring." The first time I saw it, in a movie theater in 2018, I fell asleep twice.

But *2001* becomes transcendent upon further viewings.

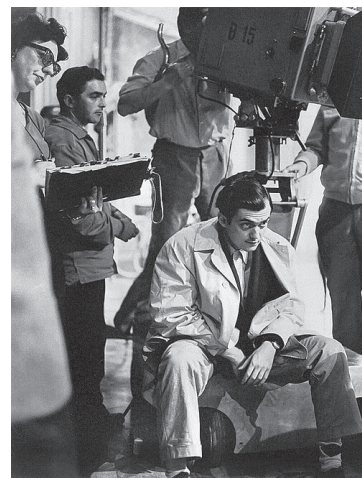
In 1964, Stanley Kubrick, the movie's director, met with the science fiction writer Arthur C. Clarke to begin a four-year collaboration on what would become *2001*. Kubrick wanted to make "the proverbial 'really good' science fiction movie," he wrote Clarke in an initial letter. In particular, he wanted it to explore the deeper philosophical meaning of space travel.

For that, Kubrick wanted the science to be correct. This wasn't strictly necessary; a movie doesn't need to be scientifically accurate to be compelling, and too much technical detail can bog down the story. Sometimes the aliens are tiny and green, and that's that. Sometimes you want a spaceship that can travel faster than light, no questions asked.

But in *2001*, Kubrick's adherence to scientific accuracy is central to the film's emotional power. The science grounds the movie. The characters may be living in disorienting, rotating reference frames, in a vast, unknowable universe, but they still have the same physical limitations as real humans.



In "*2001: A Space Odyssey*," the realistic spacecraft were designed with input from NASA scientists — one of many examples of director Stanley Kubrick's close attention to scientific accuracy. In this scene, astronaut Dave Bowman, manning a spherical space pod, attempts to retrieve the body of a crewmate. Credit: Touring Club Italiano, via Wikimedia Commons (CC BY-SA 4.0)



Director Stanley Kubrick on set for a different film in 1957. Credit: United Artists, via Wikimedia Commons / Public domain

To make the movie realistic, Kubrick not only partnered with Clarke, who was known for scientifically accurate fiction, but also solicited input from space scientists and other technical experts. Some experts worked directly on the production, which took place at MGM's film studios north of London. Frederick Ordway III, a NASA space scientist whom Kubrick met through Clarke, served as a scientific advisor on the film.

Traveling from the U.S. to the U.K. in a pre-Internet, pre-flash drive era, Ordway packed "dozens of trunks full of drawings and technical data," he wrote in 1970 in *The Making of Kubrick's 2001*. He also coordinated the construction of designs ranging from the space pods to the characters' outfits, some of them tailored for the weightlessness of space. Stewardesses on the space shuttle, for example, wear padded hats in

case they hit the ceiling when their Velcro shoes lose traction with the floor. His expertise also informed the production team's "model makers," who built a scale model of the moon, as mapped by a rocket.

To design the spaceships in the film, Kubrick relied on Harry Lange, a German immigrant who was the head of NASA's future projects section and a skilled draftsman and illustrator. Kubrick "was an absolute stickler for detail," Lange told the BBC in 2002 about Kubrick. Working with Lange, Kubrick churned through many iterations of the film's space station and ships. Not all of Kubrick's ultimate design choices were scientific: one version of the Discovery One spaceship consisted of panels that dissipated heat from the ship's nuclear reactor. Kubrick ultimately scrapped the panels because he thought that the viewers would confuse it for wings.

Kubrick also wanted to accurately depict artificial gravity in spaceships. To do this, he commissioned a British airplane company to build a huge centrifuge for \$300,000 at the time. The centrifuge did not actually simulate gravity, as it could only spin about 3 miles per hour, and all the furniture and props had to be nailed down. But combined with camera tricks in the centrifuge, Kubrick creates a disorienting scene where an astronaut gets exercise by jogging along the cylindrical interior of a spinning spaceship.

At one point, Kubrick considered buying insurance to cover the possibility that humans might discover alien life before he finished the mov-

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APSNews

Series II, Vol. 35, No. 2
March/April 2026
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APS News is published 6 times per year by the American Physical Society, One Physics Ellipse, College Park, MD 20740-3844, (301) 209-3200. It contains news of the Society's units, events, initiatives, and people; opinions; and related information.

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Coden: ANWSN ISSN: 1058-8132

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Meet the new lead editor of *Physical Review Letters*

Rafael Fernandes talks priorities for the journal, checks and balances in science, and tips for prospective authors.

BY CYPRESS HANSEN

Rafael Fernandes earned his bachelor's, master's, and doctoral degrees in quick succession, all from the University of Campinas Brazil, all in physics.

Still, he says, his research career has felt like a meandering journey. From black holes to iron-based superconductors to quantum paraelectrics, Fernandes' research interests have led him in many directions. Today, he is a condensed matter theorist at the University of Illinois Urbana-Champaign, where he studies quantum materials.

"Physics is nice because you don't need to have a linear career," he says. "You don't know what you really enjoy, I think, until you start working on a problem and start digging deeper. It's a bit of a self-discovery process."

That exploratory approach now shapes his work as the new lead editor of *Physical Review Letters*, where he's focused on deepening the connections between the global physics community and one of its premier journals. Like any good scientist, he's starting with observation and questions. Lots of questions.

Fernandes spoke with APS News about these questions, the future of the field, and what prospective authors should know about the journal.



Rafael Fernandes at the University of Illinois Urbana-Champaign. Credit: Fred Zwicky/UTUC

This interview has been edited for brevity and clarity.

What was the spark that first brought you into physics?

I was fascinated by astronomy when I was a teenager. I was really interested in books about stars and black holes. I remember reading *A Brief History of Time* by Stephen Hawking and being fascinated by the idea of working on these big questions. Then I did my undergrad studies, and the first astronomy class that I took, I said, "This is not what I expected. I do not want to pursue a career in astronomy, but I do like physics."

Were you drawn to theory?

Oh yeah. I always knew that I was

born with two left hands, so I can't be in a lab. I was always interested in the theory part. The nice thing is that the theories can (and should) be verified experimentally, so I've gotten to work with many experimentalists in my life, too.

When did you get involved in editing?

For a year, I was an editor of the journal *Physica B*. Other than that, I have never had an editing position. But what I'm doing as a lead editor for *Physical Review Letters* is different from what most people think. I'm not handling papers. I'm not deciding whether a paper should be published or not. Our editors do that very, very, very well.

As lead editor, I'm trying to create

Fernandes Q&A continued on page 5

How a four-person faculty renewed a struggling physics department

Guided by an APS-AAPT initiative called EP3, a small team polished its image and reached new students.

BY AARON RAGAN-FORE

In 2020, Donald Walter knew that his physics department needed to address some problems. As the area coordinator for physics within South Carolina State University's Department of Biological and Physical Sciences, he had no doubt that the four-person physics faculty cared about each student's success. But they were struggling to make an impact outside that cohort — and failing to attract new students.

The department graduated a small number of physics majors each year, in the single digits. As a result, the physics area was in constant danger of being shut down, and stuck in a consistent cycle of arguing its value. Like many historically Black colleges and univer-



South Carolina State University physics faculty members Ram Yadav (front left) and Donald Walter (far right) joined a group of physics students in a tour of the Levine Cancer Center in Charlotte, North Carolina, in April 2025. Credit: Donald Walter

sities (HBCUs), Walter says, SCSU is chronically underfunded. "When you're really under-resourced for 20, 30, 40, 50 years, it's hard to build new programs," says Walter.

The physics area also had a PR

problem, even within the university. "Most of the faculty and students in our own department, let alone our own college, [...] didn't really know

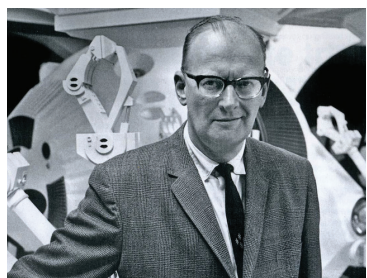
SCSU continued on page 6

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ie, as NASA had recently launched a probe for a flyby mission to Mars. If we met aliens in real life, his thinking went, no one would want to watch a movie about it. (Ultimately, he rejected the premium offered.)

The scientific accuracy also contributes to the movie's continued relevance. HAL, the AI aboard the ship bound for Jupiter, responds to the astronauts in an easy, manipulative tone that evokes the sycophantic words of ChatGPT. The parallels may stem, in part, from Kubrick consulting Marvin Minsky, an AI researcher at MIT, to create HAL. At the time, researchers were developing neural networks that would ultimately become the backbone of the large language models behind ChatGPT.

In addition, when HAL starts malfunctioning, it calls to mind current anxieties over AI. HAL is



Science fiction writer Arthur C. Clarke on the set of *2001: A Space Odyssey* in 1965. Clarke and director Stanley Kubrick collaborated for four years on the film, which Kubrick wanted to be "the proverbial 'really good' science fiction movie." Credit: ITU Pictures, via Wikimedia Commons (CC BY 2.0)

supposedly incapable of error, but the astronauts are using HAL on a mission to Jupiter that no one has completed before. In our world, companies release AI after safety testing, but this testing cannot account for

all the chaos of a real-world setting.

By getting the science (mostly) right, the film can explore Kubrick's philosophical questions. The strange slab becomes a metaphor for questions that science cannot answer.

"I don't like to talk about 2001 much because it's essentially a non-verbal piece," Kubrick once said. "I think clearly that there's a basic problem with people who are not paying attention with their eyes. They're listening. And they don't get much from listening to this film. Those who won't believe their eyes won't be able to appreciate this film."

The movie doesn't have answers. It lays out what's possible with science, and leaves the rest a mystery.

Sophia Chen is a writer based in Columbus, Ohio.

Science fiction continued from page 1

it can be to anticipate future technologies, their uses, and their ramifications. Science-fiction authors eagerly take up that gauntlet. "[A] good science-fiction story should be able to predict not the automobile but the traffic jam," wrote the prolific sci-fi-writer Frederik Pohl, citing an old saying.

Pohl's quote appears in a recent *Nature* article by computer-scientist Iyad Rahwan of the Max Planck Institute for Human Development in Germany and collaborators. In "The science fiction science method," Rahwan and company tackle the problem of anticipating and regulating future technologies, mentioning the so-called Collingridge dilemma: "When change is easy, the need for it cannot be foreseen; when the need for change is apparent, change has become expensive, difficult, and time-consuming."

"[A] good science-fiction story should be able to predict not the automobile but the traffic jam," wrote the prolific sci-fi-writer Frederik Pohl, citing an old saying.

Resolving the Collingridge dilemma is important, Rahwan and company argue. People might be more accepting of genetically modified food now if their concerns had been discussed before the foods were introduced in the 1990s. Likewise, some of the adverse effects of social media on mental health and political discourse might have been foreseen. In fact, researchers at Facebook did evaluate the psychological effects of contagious peer pressure — but only eight years after the company opened its platform to all users over the age of 13.

Rahwan and colleagues propose conducting behavioral experiments in which participants are placed in futuristic scenarios. There, participants become aware of, and interact with, a technology that is both mature enough to be plausibly simulated and immature enough that its realization is not imminent.



Scientists discuss how to defeat the invading Martians in the 1953 science fiction film *The War of the Worlds*, based on the 1898 novel by H.G. Wells. Wells' science fiction inspired a generation of writers and filmmakers, and predicted technological inventions like the laser. Credit: Public domain, via Wikimedia Commons

Increasingly capable virtual-reality equipment makes the researchers' approach increasingly feasible. The bigger challenge, they admit, comes with the scenarios. Present-day participants might not respond in the same way as their future counterparts. The technology might never be developed, or it might go off in a different direction. Or a future society might be too different from today's society for a study to be relevant. With those concerns in mind, Rahwan and company advocate testing only near-term technologies, such as autonomous vehicles, embryo screening, and social-credit systems that monitor citizens and assign them scores on the

basis of their good or bad behavior.

The researchers lay out various ways for simulating future scenarios. One method envisages immersing participants in "a realistic physical simulation of a future situation." The example they give is a human employee obeying the directions of a robot boss (most likely a human actor in a robot suit or a remotely operated puppet). I'm skeptical. Participants would know that they are in a simulation, and that knowledge would be hard for them to ignore.

But we readily suspend our disbelief when we read or watch science fiction. Charlie Brooker's dystopian TV anthology series *Black Mirror* often hinges on modest extrapolations of current technologies, such as artificial intelligence, the Internet of Things, and industrial robots. The opening episode, "Nosedive," of the show's third season explored the

consequences of trying — and spectacularly failing — to boost one's online reputation. I contend that viewers of "Nosedive" were more deeply engaged in the question of social credit than they would have been if immersed in a so-called realistic physical simulation of a future society. For simulations to become as compelling as science fiction, they might have to become as realistic as those in the holodeck onboard the USS Enterprise and other Star Trek spaceships.



Leonard Nimoy and William Shatner as Mr. Spock and Captain Kirk from the television program *Star Trek*, a staple of science fiction. Credit: Public domain, via Wikimedia Commons

In 2019 at the age of 78, Noble wrote a memoir for a local newspaper, the Marshwood Vale Magazine. He closed with a note of hope. "One of my unfulfilled ambitions was to give what I had invented to help give blind people sight," he wrote. "We have the image sensors, but the snag has always been how to connect them to the brain. Maybe it will happen one day."

Noble's remarks remind us that most technologies are developed for profit, like the active pixel sensor, or to make the world better, like artificial retinas. The motives are not mutually exclusive. Rahwan and his collaborators make a strong case for evaluating the social impacts of future technologies before they reach commercial viability. Ironically, their science-fiction-science method will be more successful the closer it resembles science fiction. Once virtual-reality technology has matured, the method could yield its best results when participants are told they are participating in a work of fiction rather than in a scientific study.

Charles Day is a senior editor for Physics Magazine.

At APS' Congressional Visits Day, small moments lead to big breakthroughs

A day after the latest government shutdown, APS members headed to Capitol Hill to advocate for science.

BY COREY FEUER



On Feb. 4, more than 120 APS members, divided into 25 teams, held more than 130 congressional meetings on Capitol Hill to advocate on key science issues. Credit: APS

At a meeting with APS members from Massachusetts, Rep. Jim McGovern showed the group a souvenir of his. “These prayer beads were blessed by the Dalai Lama,” McGovern told them. Then he grinned wryly. “They aren’t working.”

McGovern’s joke reflected a challenging political environment in Washington, D.C. Just months after the record-breaking, 43-day-long 2025 government funding gap, lawmakers started February with a budget lapse, triggering another partial shutdown.

Grassroots activists face a predicament: In a time when everything seems like an emergency, how can you make your advocacy resonate?

On Feb. 4, the APS community rose to the challenge by participating in Congressional Visits Day, an annual event where members travel to D.C. to meet with congressional staff. Over 120 APS members, divided into 25 teams, held more than 130 congressional meetings to discuss topics including R&D funding, STEM workforce development, and graduate student compensation. Participants flew in from 34 states and abroad.

This year’s CVD came after a series of attacks on federal science from the current administration. Over the last year, APS launched a successful campaign to protect funding for federal science agencies, after the White House proposed extensive budget cuts. Congress has largely rejected those cuts in recent

months, restoring over \$10 billion in funding across four key science agencies, and billions more for several others. Members experienced firsthand the bipartisan support for STEM during their meetings.



Congressional Visits Day attendees flew in from 34 states and abroad. Credit: APS

“I had the opportunity to speak with Congressman Ryan Zinke’s office during a coffee event,” said Deborah Good, a physicist at the University of Montana and an executive committee member of APS’ Northwest Section. “As I was leaving, I heard two of his staffers talking to each other about neutron stars. I loved how excited they seemed.”

All CVD participants attend training sessions held by members of APS’ Government Affairs team, during which staff discuss advocacy priorities and review policy data. Participants are also given folders of information, including voting records, funding breakdowns, staff

CVD 2026 continued on page 7

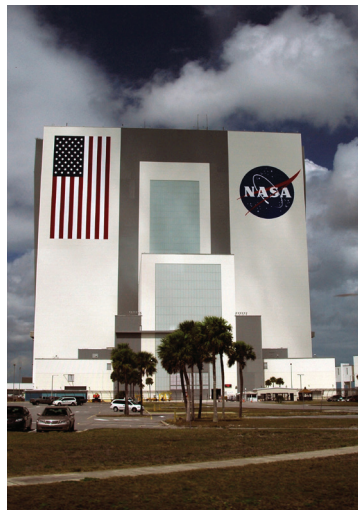
Federal science workforce declines under Trump

The last year was marked by turmoil at science agencies and the administration’s stated desire to shrink the federal workforce.

BY CLARE ZHANG

Federal science agencies shed more jobs in the past year than they did over the last two decades of steady decline, data published by the White House Office of Personnel Management reveals. The number of federal employees in the physical sciences fell 12% from 2024 to 2025, compared to an 8% decline from 1998 to 2024.

In the first full year of the second Trump administration, the White House pushed for cuts to the federal workforce by incentivizing staff to leave through the deferred resignation program, directly cutting probationary staff, asking agencies to submit plans for significant reductions-in-force, and issuing RIF notices. OPM’s most recent data



The Vehicle Assembly Building at NASA’s Kennedy Space Center in Florida. Credit: DVisions - stock.adobe.com

release provides insight into the effects of these efforts at the agency level.

Agencies overseeing science have seen significant job losses since Trump took office, including over 30% at the National Science Foundation and around 20% at the U.S. Geological Survey, the National Oceanic and Atmospheric Administration, and the National Institutes of Health. The Department of Energy and the National Institute of Standards and Technology shrank by 17% and 15% respectively, while NASA lost 12% of its staff. In comparison, the total federal civilian workforce has fallen about 10% since January 2025.

Federal workforce continued on page 7

Marston Q&A continued from page 1

search advisor’s relocation to another university brought Marston in touch with Michael Oppenheimer, an atmospheric chemist.

“We were looking at correlations between carbon dioxide and temperature — not the greenhouse effect but rather the natural fluctuations from year to year, mainly due to the El Niño Oscillation,” says Marston. The team’s observations showed a relationship between these factors. “That wetted my taste for climate research,” he says.

Completing a postdoc at Cornell University, Marston continued working on condensed matter topics, like the theories of quantum magnetism and strongly correlated electron systems. In 1991, Marston carried that focus to a faculty appointment in Brown University’s physics department. Since then, “I continue to be interested in fluid dynamics, turbulence, and climate,” he says — one reason why he jumped at the chance to co-author a recent report on atmospheric carbon dioxide removal, published by the APS Panel on Public Affairs in January 2025.

APS News spoke with Marston about his journey as a physicist, his goals for APS in the coming year, and where he finds optimism in challenging times, like those faced by the scientific community over the past year. This interview has been edited for length and clarity.

What was your early engagement with APS like?

I’d been attending March Meetings — including the famous ‘Woodstock’ March Meeting in New York City, when the discovery of the YBCO superconductor was announced — and giving contributed talks, but I hadn’t really engaged beyond that until there was a push to form what became the Topical Group on the Physics of Climate. That push emerged out of a collision between some senior physicists who were unhappy with the APS climate statement and younger people like me who were thinking about how mainstream physics could contribute to a better understanding of the climate system.

Eventually, I became chair of the topical group, and it’s been thriving.

It feels like a challenging time to take the helm of a major scientific organization like APS. What’s on your mind?

I was just looking back on the statement I wrote when I ran for election. A couple of years have passed, and it already looks out of date because so much has happened.

Each president has a theme for their year, and I was going to focus on climate change and sustainability, but I’ve decided a broader approach is needed now.

I really want to emphasize the interconnections between democracy and science, so I’ve been going back and reading about the Age of Enlightenment, the American Revolution. Looking at how some of the founders of the United States, such as Thomas Jefferson, were so interested in science, and saw strong connections between science and democracy — both rely on facts and a similar approach to addressing uncertainties — that’s something I feel we need to emphasize now more than ever.

There is also a scientist from the 19th century that I’ve found very motivating. Her name is Eunice Newton Foote. She was a distant relative to Isaac Newton. To me, she combines both the scientific mind and advocacy, especially for women’s rights. For example, she made some important discoveries, the most famous of which is that carbon dioxide and water vapor heat up when exposed to sunlight. She was the first person to notice this. Additionally, she attended the Seneca Falls Convention, the U.S.’s first women’s rights convention. She’s been an inspiration for me in thinking about this connection between science and democracy.

What major advocacy issues do you think APS should prioritize as a result of this past year?

I’m really concerned about some recent news. The present administration wants to break up the National Center for Atmospheric Research, which is one of our premier national laboratories, and its mission is purely scientific. I see that as a direct attack on science, and I expect more along those lines will occur. I want to make sure we’re in a position to respond and to speak up for science and the scientific process, to ensure that the federal government continues to support good science.

Also, science is international and benefits greatly from the involvement of people from overseas coming to the United States — students, researchers. The international dialogue of science is extremely important, and we want to ensure that it continues.

One other important goal for 2026 is to focus on K-12 physics education, especially including support for high school teachers of physics. The number of teachers who have

specialized in teaching physics is rapidly declining, and other science teachers often must teach physics classes as well. We will be looking for new ways for APS to support these teachers.

In trying times, where do you find balance and optimism?

I’ve nearly completed the Pacific Crest Trail. This last August, I hiked most of the way across the state of Washington on the trail. I find that it’s very helpful to disconnect from the Internet for a long period of time every so often and recharge. For me, that’s being in nature. I’ll probably be too busy to go on a month-long excursion this coming year, but I’m planning some shorter trips, filling in some gaps in the Pacific Crest Trail that I haven’t finished yet.



“I find that it’s very helpful to disconnect from the Internet for a long period of time every so often and recharge,” says Marston. “For me, that’s being in nature.” Credit: Brad Marston

I also like finding connections between different areas of science. Recently, working with my French collaborators, I found a connection between topology and certain waves in the atmosphere and ocean, known as Kelvin waves. These waves were first found by William Thomson, Lord Kelvin, back in 1879. Quantum physicists ended up rediscovering them in the context of the integer quantum Hall effect. This shows that the siloing of different fields — in this case, fluid dynamics and quantum physics — has had a detrimental effect on the progress of science. I would like to see APS encourage the weakening of these barriers between different fields.

That’s something I think our new Global Physics Summit has a possibility of doing — bringing together so many different fields of physics and physics-related fields. Especially with younger scientists, I hope they will venture out of their own discipline, go to talks in completely different areas, and expose themselves to ideas that might trigger new discoveries. That kind of thing really excites me.

Liz Boatman is a materials scientist and science writer based in Minnesota.

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Enrollment continued from page 1

uncertainty was also heightened by changes to student visa policies, including a month-long pause on issuing new visas last summer. After the pause, incoming students faced increased scrutiny, and more than 8,000 student visas have been revoked since the start of Trump's second term.

More recently, the Trump administration proposed a major rule change to F-1 and J-1 visas — those most commonly used by international academics — that would limit students' enrollment to four years, regardless of the standard time-to-degree in their programs. The administration also added a \$100,000 fee to some H-1B skilled worker visas, used by international students to transition to work after graduating.

AIP's research has revealed dips in enrollment. Preliminary data from AIP's newest survey of physics departments estimates that first-year enrollment has declined 7-9% for fall 2025. This represents around 300 fewer students in physics programs across the country.

"Physics departments' fears that declining funding was going to impact their department's enrollments were true," says Patrick Mulvey, one of the study authors. This study currently includes 60% of departments with graduate programs in physics in the U.S., and will be updated as more departments respond to the survey.

Physics department chairpersons were also asked follow-up questions about their plans for admission. A third of departments said they planned to enroll fewer first-year students for fall 2025, and about half planned to keep admissions steady. The most cited reason for enrolling fewer students was the loss of or uncertainty around federal funding, followed by restrictions imposed from the university.

Students applying in that admissions cycle felt this impact, too. "I was told in an interview for another program that they would be sending me a rejection because they did not have any funding for me," says Natalie Price, a first-year master's student at Wesleyan University. "Grad school admissions

are always going to be competitive, but it was insanely stressful last year, since, as acceptance decisions were being made, funding was being slashed all across the country."



Departments' most cited reason for enrolling fewer students was the loss of or uncertainty around federal funding. Credit: Benjamin Clapp/Adobe Stock

Visa troubles also impacted enrollment, as some international students, facing visa delays, denials, or uncertainty, were unable to follow through on their acceptances of admission offers. Over half of physics departments in the study had at least one student who accepted an offer but didn't enroll; 88% of those students were non-U.S. citizens. (The study does not have previous data to compare to for non-enrollments, so it's unclear if past years had similar patterns.) Many universities offered these students the option to defer enrollment to next year, in the hopes that the visa situation improves.

These enrollment hits weren't distributed evenly. "Doctoral-granting departments as a whole were more likely to experience declines than departments where the master's is the highest degree offered," says Mulvey. "Master's departments rely less heavily on federal funding and international students than the doctoral-granting programs."

Even where students were eventually enrolled, the admissions process was an unusually bumpy road. "The timeline from admitting to the visit to the students having to decide was significantly rushed," says

Claire Williams, a graduate student at the University of California, Los Angeles, who helped welcome prospective graduate students on their department visit. "I definitely felt

bad that they had so little time to think things over."

Some students received offer letters with descriptions of financial support that were less concrete than in past years — another consequence of departments facing funding volatility. "Students that came to the prospective visit were more confused about what they can expect to be paid and how much they would have to TA," adds Williams. "We didn't really know what to tell them, since we couldn't guarantee that there wouldn't be issues in the future."

In the AIP study from last April, many department chairs expressed concern that enrollment may be more challenging in fall 2026, and they are concerned about the effects on both students' and faculty's morale, well-being, and productivity. It's unclear if enrollment will bounce back next year.

"Departments are looking for ways to continue funding students," says Mulvey. "The current volatility around federal funding and student visas makes it anyone's guess as to how this will look in the near or distant future."

Briley Lewis is a postdoc at the University of California, Santa Barbara, and a writer.

Fernandes Q&A continued from page 3

connections between the community and the journal. I always say *Physical Review Letters* is our journal. We created it as a community many years ago, and we collectively made it successful. Now, I'm just trying to continue that legacy. The idea is to build bridges, open doors, establish a vision, strategize, and prioritize.

What are some of your priorities for the journal?

The question that is most important to ask is how *Physical Review Letters* can serve our communities. Are the formats or the restrictions on length or figures meeting the needs of different research communities? Are we missing out on developments or fields that are becoming more interdisciplinary? Are we making sure we are embracing topics that, twenty years ago, wouldn't appear in our journal, but might now make sense here?

There are lots of things to consider, but this is what I do. I am a scientist. I ask questions.

It sounds like the lead editor role requires a scientific approach — observing, asking questions, experimenting.

Very much so. In research, you never want to reinvent the wheel. This position at *Physical Review Letters* is the same. Right now, I'm learning how the process works, learning what other people have done, understanding their impressions, and seeing what has worked and what hasn't. I'm one cog in a big and complex but successful machine.

If you could meet with every prospective author for *Physical Review Letters*, what would you say to them?

Do you have results that you find extremely interesting or truly exciting? If so, send them to *Physical Review Letters*, because that's our journal. We want your enthusiasm in your cover letter. We want people not only in your field but also in adjacent fields to understand and appreciate why we chose to publish your Letter.

Physical Review Letters also has a lot of different ways to publish. You

can include End Matter, which is essentially an appendix where you can add more details about your work. You can also publish a short paper with us and a longer paper with one of our sister journals at the same time. We don't want format restrictions to prevent people from reporting their great ideas. If there's an obstacle, I would like to know about it.

How do you perceive the pace of physics research today?

There's a feeling of things happening much faster, because it's much easier these days to communicate results and make them available. At the same time, I believe research groups are operating in different ways, and balancing each other out.

"I always knew that I was born with two left hands, so I can't be in a lab," says Fernandes. "I was always interested in the theory part."

There are groups that move quickly and seem to be driving the train, and other groups that say, "Wait, let's be skeptical, let's go back and check." I think this is the balance we need to move things forward, because reproducibility is key. Science has this inherent self-correction. That's why it's so important to have referees and to have the community involved in publishing.

When you're not working, what are your hobbies?

I'm a good Brazilian, so I'm a big soccer fan. That is probably where a lot of my free time and energy goes. My daughter loves to watch games with me. At first, she would watch for five minutes and then she'd get bored. But she's learning. Whenever I can, if I ever get free time in Brazil, I try to go to the stadium of my team, São Paulo Futebol Clube. Now I drag my daughter with me so she can appreciate that and 'enter the cult.'

Cypress Hansen is a science writer based in the San Diego area.

"I found my happy workplace": How an APS annual meeting spurred a career at a quantum startup

Elina Potanina, now a sales engineer at Maybell Quantum, reflects on her path into industry.

LIZ BOATMAN

Low-temperature physicist Elina Potanina was excited for this year's Global Physics Summit in Denver, Colorado. "It's just a crazy week and you probably need an extra week afterwards just to rest, but it's so worth it," she says.

Potanina, a sales engineer at Maybell Quantum, traveled from Finland to join colleagues from across the United States and Europe in person. As a sales engineer, she sits "on the border between business, engineering, and R&D," she says, helping her company meet the needs of a rapidly evolving market and customers.

In 2020, Potanina, who had recently graduated with her doctorate from Aalto University in Finland, had just started her first position in industry. She was working for Bluefors, a developer of dilution refrigerators. They're "a special kind of fridge that reaches very, very low temperatures, where we can see exotic phenomena — where, for example, superconducting qubits perform well," she says.



Potanina plays pinball at Qblox's Resonance I event at March Meeting 2024 in Minneapolis. APS annual meetings, she says, are "so worth it."

Credit: Resonance Community

That year, when the March Meeting rolled around, many of Potanina's colleagues were scheduled to attend. But the COVID-19 pandemic ramped up just as the meeting was scheduled to kick-off. Given the public health threat, the in-person meeting was cancelled.

The next year, in 2021, Potanina — more settled in her role at Bluefors — attended her first March Meeting, which was entirely remote. Her presentation went well, but it left her excited for a traditional in-person experience.

Potanina continued on page 6



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IYQ 2025 continued from page 2

Competition, “Spooky Action at a Distance,” which explores quantum entanglement through the lens of a deeply human experience. The poem follows a couple — now separated — who both keep in their living rooms a print of a 1928 painting by L. S. Lowry. Much like entangled particles, they remain linked through the shared image, feeling “a sense / Of being in two places at once, / Unsure where each began, / And the other ended.”



Students at the University of Ghana. Credit: D. Chavez/World Bank/CC BY-NC-ND 2.0

The scientific and technological imbalance between rich and developing countries — often termed the “quantum divide” — was a central theme of discussion. Speakers warned that without coordination, quantum technologies could entrench inequality by concentrating infrastructure, expertise, and economic returns in a few wealthy nations. To promote a more equitable quantum future, they called for shared infrastructure, regional flagship facilities, and coherent national strategies aligned with local priorities. Estelle Inack, a research scientist at the Perimeter Institute in Canada and founder of the start-up yiyaniQ, stressed the need to create — in Africa — suitable innovation ecosystems that nurture talent, protect intellectual property, and offer funding opportunities and fiscal incentives. Carla Hermann of the University of Chile challenged approaches rooted in aid and dependency. “The Global South does not need help in the charity sense. We need partnership. We are asking to have a seat at the table.”

Speaking with *Physics Magazine*, researchers from across Africa said that they applauded the visibility and energy generated by the IYQ. They are now rolling up their sleeves to sustain its momentum. Francis Oduro of Kwame Nkrumah University of Science and Technology (KNUST) — a sprawling public university of nearly 90,000 students in Ghana’s second-largest city, Kumasi — called the year “a game-changer.” Thomas Konrad of the University

of KwaZulu-Natal in South Africa pointed to the recent launch of the African Quantum Alliance (AfriQA), a seven-country network pursuing the development of Africa’s first indigenous quantum-computing capabilities. Meanwhile, KNUST physicist Henry Martin rushed to Kumasi immediately after the ceremony to lead the African International Conference on Quantum Computing and Simulation, a week-long meeting focused not only on science but also on forging new forms of partnership. “We want local cooperation combined with international collaboration,” Martin said.

The median age in Africa is just 19 — less than half that of Europe and the U.S. As such, Africa holds in its youth a formidable resource for global research capacity, one the world cannot afford to ignore, said Gebreyesus Hagoss, an Ethiopian-born theoretical physicist at the University of Ghana. “Now is the time to move from celebration to investment,” he said.

Matteo Rini is the editor of *Physics Magazine*, published by APS.

SCSU continued from page 3

much about the physics program because we’re too busy writing grants, doing research, teaching classes,” he says.

That lack of visibility extended to the university administration. As physics has no accrediting body, Walter and his colleagues were at a loss in seeking external validation of their work to demonstrate its value.

“One of the things we wanted to do was impress upon the higher administration the role that physics plays and how important it is,” Walter says.

Teaching the teachers

Walter’s department was an ideal candidate for the Effective Practices for Physics Programs (EP3) initiative, a joint effort of APS and the American Association of Physics Teachers (AAPT). EP3 stewards a free, and constantly expanding, online guide, providing physics programs with department-strengthening strategies that have worked at other institutions.

The SCSU faculty applied to participate in the first cohort of the EP3 Departmental Action Leadership Institute (DALI) in 2021, with virtual instruction designed to put effective practices into action, delivered over an 11-month span.

In 2024, a newly formed SCSU Action Committee produced a three-phase, five-year plan, based on the instruction. And even though SCSU is only partway through implementing it, the faculty is already applying EP3 lessons. For one thing, the faculty encouraged its students to revive SCSU’s chapter of the Society of Physics Students after a ten-year hiatus — an opportunity for their students to coalesce around, and identify with, the physics community.

The physics faculty also began to engage more with the campus community to build awareness of their activities. For example, during the 2024 partial solar eclipse, “we took a cart out with our physics majors and set up with solar glasses and other general physics displays and toys,” Walter says.

“Another spinoff that we’re working on now that hasn’t gone through yet, is we’re creating a concentration of physics major with an engineering concentration,” he explains, a



Physics majors Andrew Johnson (left) and Christina Jones (right) demonstrate a small, solar-powered motor during the partial solar eclipse in April 2024. The Society of Physics Students distributed solar viewing glasses and staffed physics displays during the event. Credit: Donald Walter

method of attracting more students that doesn’t require hiring of additional faculty.

The physics area’s rising profile has already had an impact: The department has seen an uptick of additional minors.

dean committed \$30,000 to upgrade our physics lab equipment, and so we’ve been able to buy some modern equipment, like photoelectric effect kits and Michelson-Morley interferometer kits, that we couldn’t afford normally.”

“One of the immediate consequences of the site visit was [that] the dean committed \$30,000 to upgrade our physics lab equipment,” says Walter.

On-site visit at SCSU

The DALI program went well enough that Walter and his colleagues requested an in-person, two-day site visit facilitated by the EP3 team in early 2024 to assess their area’s effectiveness — one of several such visits to HBCUs. The DALI team interviewed faculty in physics and other sciences, the provost, the dean, and SCSU students.

The EP3 reviewers had good news for SCSU’s faculty, Walter reports. “They said, ‘You do things that other faculty and other areas don’t — you help them figure out problems with financial aid and [the] bookstore and all that kind of stuff,’” he explains. “We’re small, and so we can do these kinds of things. And the students don’t always give you that feedback.”

Other takeaways were more tangible. In the absence of a physics accrediting body, Walter says, the university administration was impressed by the endorsement and validation provided by the EP3 team. “One of the immediate consequences of the site visit was [that] the

EP3 site visit team member Michael Jackson, a faculty member and administrator at the New Mexico Institute of Mining and Technology, was glad to play a role in supporting physics at SCSU. “The external review team was able to report on the outstanding hands-on educational and research experiences students were receiving — insights the department had previously overlooked,” Jackson says. And with the EP3 Guide and reviewer feedback, the department was able to refine their initiatives to make sure they were actionable and realistic, he adds.

As for his own experience with the APS-AAPT partnership and online EP3 Guide, Don Walter is elated. “Every time I look at it, I realize, ‘Oh, those are great ideas,’” Walter says. “And the beauty is, they’re not just a committee. [The guide] is based on people who actually have implemented some of this stuff. And that’s important.”

Aaron Ragan-Fore is a head of communications at APS.

Potanina continued from page 5

She finally got her chance at the March Meeting in 2022 in Chicago. “Everybody was so happy to meet and talk in person again,” she recalls.

In those two years, however, her company had grown so fast — from roughly 200 employees to nearly 700 — that she was questioning her fit. “It’s just normal,” she says. “People outgrow jobs and teams. Structures change, people change, and leadership changes.”

Preparing for March Meeting 2023, Potanina was thinking about her future, and had her eye on a newcomer in the field of dilution refrigerators: Maybell Quantum. Navigating the meeting’s expansive exhibitor hall in Las Vegas, “I approached the team,” she says. “They seemed like an interesting new player and they had cool merch.” She remembers swapping themed candy from her own company’s booth for casino-themed playing cards and gummy bears.

“There are always people who are afraid to come to the booth and ask for career advice or if we’re hiring, but I think more people should do that,” she says. “It’s nice to have an honest conversation with a student, because we were all students once.”

Potanina’s discussion with the Maybell Quantum staff at their March Meeting booth that day kicked off a conversation about future job opportunities. After a year, she joined them as a remote employee.

“Since then, we’ve established a new entity in Finland ... and now we have an office, employees,” she says. “It’s been a really fast-paced and exciting journey. I found my happy workplace.”

Each year, Potanina looks forward to connecting with her colleagues from the U.S. and Europe at the March Meeting. Beginning last year, APS swapped its long-running March and April Meetings with a combined Global Physics Summit, uniting the branches of physics in one place for the world’s largest gathering of physicists.

This year’s Global Physics Summit took place in a location that’s special to Potanina: Denver, Colorado. Because the city is home to Maybell Quantum’s headquarters, she also had a chance to meet customers and new colleagues in the company’s production facility.

With so many attendees at the event, Potanina was especially excited to work her company’s booth in



Potanina holds an adoptable puppy at the puppy booth that her new employer, Maybell Quantum, sponsored at the APS Global Physics Summit in Anaheim, California. Credit: Elina Potanina

the exhibitor hall — and the chance to talk with early-career physicists about the opportunities in low-temperature physics and the quantum industry.

“If you want to get into the field of quantum computing, you’re not too late,” she says. “The field is still growing like crazy.”

Liz Boatman is a materials scientist and science writer based in Minnesota.

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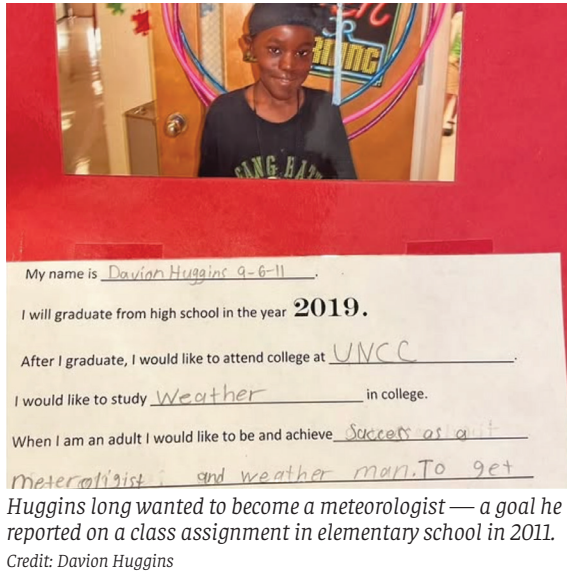
Huggins continued from page 1

seemed more prepared, says Tung.

During the last semester of graduate school, Huggins signed up for a workshop for meteorologists at NCAT, held by the National Association of Black Journalists. He and his friends drove from Greensboro to Charlotte, where they met the chief meteorologist at the WCNC station and watched him deliver the 11:30 p.m. broadcast. “Afterwards, he let us get on the green screen and practice a seven-day forecast,” says Huggins.

After graduation, Huggins searched for open meteorologist positions. In the meantime over the summer, he worked a full-time job on the production line for Lance crackers, making sure the machine packaging the crackers ran smoothly. “It was always messy,” he says. “You had to sweep the floor every 35 seconds, because when everything came out, there would be cheese and peanut butter on the floor.”

But Huggins continued to pursue meteorology in his spare time.



ready. He interviewed, got the job, and made his first on-air broadcast in early November.

Now, he works with a team of meteorologists to create weather forecasts, produce graphics, and present them on air. They also broadcast the weather over radio and on Amazon’s

biographies, and materials to leave behind with offices. The most valuable tools members have, however, are their own personal experiences. When a staffer asked how leaders can support science without huge amounts of funding, Katherine Campbell, an APS student ambassador and undergraduate at Embry-Riddle Aeronautical University, talked about how cultural phenomena like the Apollo space landing and Star Trek inspired those around her to become scientists. Daria Teodora Hărăbtor, an APS student ambassador and Harvard University undergraduate from Romania, used her experience to highlight the importance of student visas to America’s universities.

Many attendees were surprised to learn that lawmakers and congressional staff had scientific experience themselves. Rep. Eric Sorensen of Illinois talked about his background as a meteorologist. Staff from offices in both chambers included biologists, engineers, and physicists. Even Hill employees without scientific degrees had deep interests in STEM.

“There was a staffer that started asking difficult questions about teachers’ unions,” said Fathima Farheen, a Ph.D. student at Michigan Technological University and an executive committee member of APS’ Forum on Graduate Student Affairs. “We worked together to help get the conversation back on track, and it was great to be able to rely on one another.”

The day was also punctuated by unexpected moments of joy. Teams that walked by Nevada offices were greeted by a giant cardboard cutout of Elvis. One group met actor Joseph Gordon-Levitt as they were checking in for a meeting. Rep. John Garamendi of California was so engrossed in a conversation with attendees that his staff members had to drag him out of the meeting.

“On both sides of the aisle, we had some really interesting, amicable conversations,” said Eric Burkholder, a physicist at Auburn University and an executive committee member of APS’ Topical Group on Physics Education Research. “It helped restore some of my faith in politics.”

Corey Feuer is the member advocacy specialist at APS.

CVD 2026 continued from page 4

gists consider whether the models make sense scientifically, and they cross-reference the predictions with the National Weather Service.

Sometimes their forecasts disagree with the NWS, he says. For example, recently the NWS determined their local area in Arkansas was at risk for severe weather. “We didn’t agree that our area should have been included in it, because there was so much rainfall during the day that there was no energy left for any storms to gain strength and pop off for our area,” he says.

Their weather broadcasts are never scripted, as forecasts need to be as up-to-date as possible. Sometimes Huggins finalizes a forecast just five minutes before broadcast. “Meteorologists get on air, and we just talk,” he says. “Everything is freestyle.” He embraces corny weather jokes. After local temperatures rocketed from the 20s to the 70s in a matter of days, “I was like, ‘You know, Mother Nature’s playing Powerball,’” he says.

But he loves the fast pace. “Weather never stops, and it’s never the same,” he says. “The constant motion keeps it interesting, and keeps me coming back.”

Recently, a family at his new church in Arkansas recognized him from TV. “The meteorologist is part of the community,” he says. “I love being part of the community I serve.”

Sophia Chen is a writer based in Columbus, Ohio.

found math difficult,” said Anna Kinderman, a Ph.D. student at the University of California, Santa Cruz, and an executive committee member of APS’ Far West Section. “That single anecdote served as the perfect jumping off point for discussing the importance of STEM education programs.”

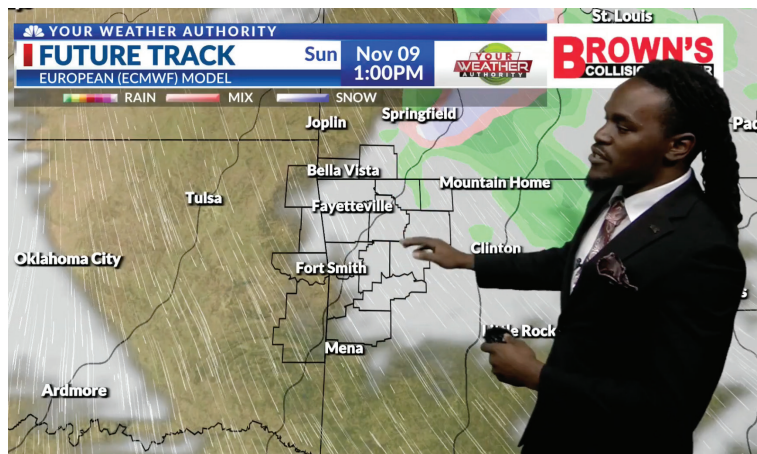
Not every office was enthusiastic about science policy. When conversations became challenging, APS teams relied on their diverse backgrounds and perspectives to answer questions. Each CVD group consisted of members from a wide range of personal, community, and professional backgrounds, which allowed team members to support each other in discussions.

“There was a staffer that started asking difficult questions about teachers’ unions,” said Fathima Farheen, a Ph.D. student at Michigan Technological University and an executive committee member of APS’ Forum on Graduate Student Affairs. “We worked together to help get the conversation back on track, and it was great to be able to rely on one another.”

The day was also punctuated by unexpected moments of joy. Teams that walked by Nevada offices were greeted by a giant cardboard cutout of Elvis. One group met actor Joseph Gordon-Levitt as they were checking in for a meeting. Rep. John Garamendi of California was so engrossed in a conversation with attendees that his staff members had to drag him out of the meeting.

“On both sides of the aisle, we had some really interesting, amicable conversations,” said Eric Burkholder, a physicist at Auburn University and an executive committee member of APS’ Topical Group on Physics Education Research. “It helped restore some of my faith in politics.”

Corey Feuer is the member advocacy specialist at APS.



On Nov. 6, Huggins delivered his first on-air weather report for KNWA/Fox 24 in Arkansas. Credit: Davion Huggins/YouTube

He built a home studio with microphones, a camera, and a green screen, and he used weather models to make forecasts, which he posted on social media.

When the meteorologist job in Arkansas opened, Huggins was

Alexa. He’s working on a podcast on weather history, too.

To create a forecast, they look outside, he says, and then look up nearby weather and consult several weather models. The meteorolo-

Federal workforce continued from page 4

These science agencies saw the greatest losses in administration and program management and analysis. They also collectively lost thousands of employees across engineering, health science, and physical science.

Changes to scientific staff at the Department of Defense are less clear, but DOD as a whole shed about 75,000 positions over the past year, including in research offices. The Office of Naval Research, for example, shrank by more than 400 people, about 14%.

Deferred resignations

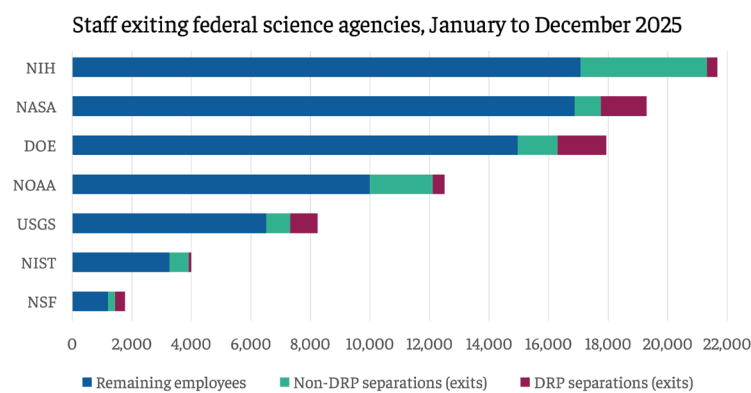
Over 15,000 employees at science agencies left the federal workforce last year. Around 5,000 of those staff accepted offers from the deferred resignation program (DRP), in which the administration offered to continue paying full salaries to employees who resigned until Sept. 30, or until Dec. 31 if retirement-eligible.

The DRP affected science agencies unevenly. At NASA, 63% of the agency’s total departures last year were through the program. For DOE, NSF, and USGS, the DRP also accounted for more than 50% of separations last year. In comparison, the federal workforce overall dropped 10% in 2025, about half of which was through the DRP.

At NOAA, NIST, and NIH, the DRP accounted for less than 20% of separations last year. For instance, only about 80 of the more than 700 people who left NIST used the

program. NOAA saw many non-DRP voluntary retirements, while many separations at NIH were due to non-DRP departures or reductions-in-force.

Some agencies offered multiple rounds of deferred resignations, and the current OPM data may not yet account for all employees who accepted the deferred resignation offer last year.



At federal science agencies, job losses in 2025 ranged from around 12% to 30%. Credit: AIP

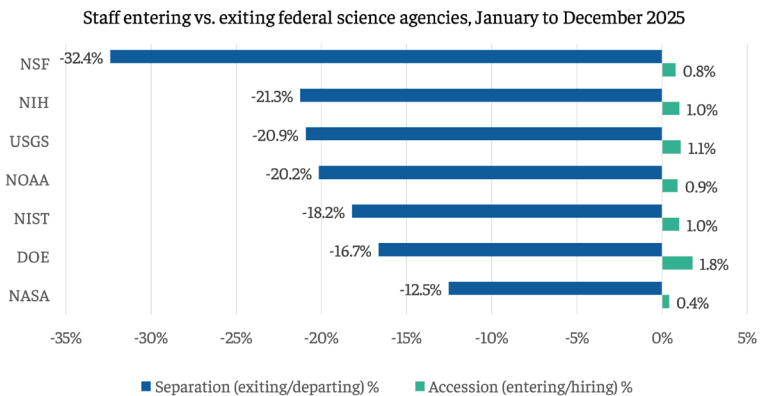
Probationary firings

Early last year, the administration carried out mass firings of employees who had not completed their probation period — typically of one year — and were easier to fire than longer-term employees. A court eventually ruled that the firings were illegal but did not mandate reinstatement for many of the fired individuals. Some employees went through multiple rounds of be-

ing fired and reinstated. Others were put on leave following reinstatement and did not return to work until months later, some as recently as December.

The number of probationary federal employees in the physical sciences in 2025 remains unclear due to redactions in the OPM data. Based on the unredacted data, the number of probationary federal

employees in the physical sciences appears to fall sharply from 2024 to 2025. For instance, the Department of Energy had 116 physical sciences employees with less than one year of service in 2024, compared to just 12 such employees in 2025. However, the length of service of more than 200 DOE employees in 2025 is redacted, so the number with less than one year of service could be much higher than 12.



Federal science agencies saw much higher rates of employees exiting the workforce than entering in 2025. Credit: AIP

Reductions-in-force

OPM’s data reveals no completed reductions-in-force at most agencies overseeing science. NIH was a notable exception with 807 employees lost due to RIFs, including 340 across contracting and program management, 71 in general health science, 62 in writing and editing positions, and 50 in public affairs. NASA lost 13 employees as part of RIFs across program management, engineering, and physical science. NSF lost four employees as part of RIFs across program management and other administrative functions. The OPM data shows no separations due to RIFs at DOE, NOAA, NIST, or USGS.

Last year, the administration directed agencies to produce plans for “large-scale” RIFs by March, then again asked for similar plans in advance of the government shutdown in October. The Energy, Commerce,

and Health and Human Services departments collectively issued around 1,300 RIF notices during the shutdown, which were temporarily blocked in court and later by the stopgap funding law until Feb. 13.

Workforce additions

Both the high number of separations and the low number of new hires contributed to the federal workforce drop in 2025. The employees added at agencies overseeing science constituted no more than 2% of the total workforce of those agencies, while separation rates ranged from 7% to 30% at those same agencies. The administration froze federal hiring beginning in January last year, and the freeze is now ongoing indefinitely.

Clare Zhang is a science policy reporter at FYI, published by the American Institute of Physics.

THE BACK PAGE

Leaving MIT

How I built a career in fluid dynamics that was, finally, my own.

BY KELLI HENDRICKSON

To: <name>

Subject: My role going forward

Effective immediately, I will be resigning from my position at MIT.

Kindly,

Kelli

I stared at the cursor on my phone. *What if I hit Send?*

Cocooned in my hotel room, I could imagine it. The first time I drafted a resignation letter, a few weeks back, I panicked and deleted it. The next time, I got closer to finishing, even debating how to sign it. “Warmest Regards” or “Best”? Each time I wrote these emails, I felt some relief from the pain in my chest, a pain that had intensified since the recent and sudden death of a dear friend.

My phone’s alarm went off. *I should be heading down to the conference. I should be looking forward to seeing my fluid dynamics colleagues.* But the last thing I wanted was to step into my role as a research engineer at MIT.

I deleted the draft. When I looked up at the hotel room mirror, my reflection stared back in disgust. *Chicken.*

This was November 2018.

When I look back, I understand that grief was driving my experience. By trying to “move on” after my friend’s death, I was trying to return to the status quo — to a job I no longer wanted.

From the outside looking in, my career seemed strategic and planned. I had defended my Ph.D. thesis 36 hours before giving birth to my second child. I’d had my first child two years earlier, before MIT had maternity leave for graduate students.

When I tell people this, they’re usually impressed. They admire that I didn’t put my family planning on hold while finishing my thesis, and that I defended my thesis so close to childbirth.

After my second unofficial maternity leave, I finished my thesis edits and turned my attention to my new role of research engineer at MIT as a mom to a 4-month-old and 2-year-old. In the following years, I mommed. I wifed. I worked. I gave my time and energy to a non-tenure-track research role, helping students in our lab develop into researchers and supporting the PI.

Work in academia is like a gas. It will fill whatever space you give it, and I gave a vast amount of space to my job.

Fast-forward to that morning in the conference hotel. Wandering through the convention center, it dawned on me that 14 years had passed and I was still in the same job, doing the same things with the same people. While I poured energy into my job and family, my career had stagnated.

As we grew up, Gen-X women were told that we could have it all — career and family — and that we should do it with poise and perfection. The advertising tagline “Never let them see you sweat” epitomized this pressure. For 14 years, I had put on emotional armor at work and spent the commute home trying to take it off. For 14 years, I focused on the immediate work because it was all I could manage. And for 14 years,



the professional aspirations I had when I started the job had gotten lost while I tried to stay afloat.

Over those years, I ignored comments about how challenging it was that I was unavailable after 4 p.m. so I could pick up my children. I deflected suggestions to apply for tenure-track jobs. I internalized the feedback that I wouldn’t be successful in academia, especially as a tenure-track faculty member, because I wouldn’t sacrifice time with family.

For weeks after that conference, I felt shame and anger. *Why can’t I both raise a family and build a career?* It felt as if I had failed the women before me who made it possible for Gen-X women to have it all. Then the guilt turned inward. *Why aren’t I satisfied with what I have accomplished? Isn’t my family worth any sacrifice?*

Finally, my counselor asked a pointed question. “How do you move forward?”

Conventional wisdom says there’s a well-worn path to success — B.S., M.S., Ph.D., postdoc. ... Despite our creativity, we struggle to understand those who deviate.

“From this grief pit?”

“If that’s where you want to start, sure.”

Something inside me cracked open. Sure, I could choose to move forward from my grief. Sure, I could choose to move forward in my career. It was, simply put, my choice to make.

After that, I found it easier to focus on a new question. What do I want to do now? As an academic by training, I naturally turned this into a research project. I formulated a hypothesis. There must be a career path that I would find fulfilling. My task became to gather data, test possibilities, and analyze results. I delved into resources like the book *Designing Your Life*, by Bill Burnett and Dave Evans, and career coaching programs like *Beyond the Professoriate*.

If I were to write a report on my self-research project, I would mention two pivotal moments. The first was creating a two-column list about my role as a research engineer at MIT. This wasn’t a list of pros and cons about staying or leaving; I

had already decided to go. Rather, I had to determine what I wanted to take with me. In one column, I listed what energized me; in the other, what sapped my energy:

- Love: mentoring and advising students, engaging with people about research, helping people create their careers, collaborating with colleagues
- Hate: lacking autonomy, receiving little recognition for accomplishments, dealing with academic bureaucracy

The second pivotal moment came when I tried to envision leaving academic-level research — and couldn’t do it. In my two-column list, I had overlooked how exhilarating it was to plot data, watch it align, and confirm hypotheses. It wasn’t until I had forced myself to picture life without research that I realized I still had a passion for it.

My self-research project unearthed the raw elements of a career that would let me move forward. Element 1: I needed to leave MIT, but I didn’t need to leave research. Element 2: I needed to help people build successful, fulfilling careers.

When I shared these results with colleagues, I received supportive responses. On the surface, these elements sounded like a tenure-track position. What I wanted was different, and as I put my plan into action by pursuing a coaching certification and looking for academic jobs outside MIT, that support turned into warnings:

“You won’t have time to breathe if you try to do both.”

“Don’t tell anyone you’re coaching. You don’t want them to think you’re not serious about research.”

“Why would you leave MIT?”

Their reactions left me feeling bruised. Our community thrives on outside-the-box thinking to solve hard problems, but not when it comes to our own careers.

Conventional wisdom says there’s a well-worn path to success

— B.S., M.S., Ph.D., postdoc. Then the path forks. Choose industry, and you’re seen as less focused on research, and destined never to return to academia. Choose academia, and you’re locked into climbing the rickety tenure-track ladder to full professor, and maybe to university administration. Despite our creativity, we struggle to understand those who deviate from these paths.

My outside-the-box solution to my dilemma was to create a portfolio career, balancing multiple roles that aligned with my passions. Despite the well-intentioned advice to keep my coaching quiet, I openly embraced it, launching a graduate student coaching program at MIT. I also started a private coaching practice focused on helping women in STEM create fulfilling careers.

I left MIT in 2024. The University of North Carolina helped me create a part-time research associate professor position that gives me the autonomy and space to pursue research and coaching. What I needed wasn’t to quit, but to create a career that reflected who I am.

With that understanding, here’s what I would have told myself at various points in my career:

At the start of my job as a mom of young children: Do what you need to do to survive, without shame.

Sometimes, the path of least resistance is the right path. I chose safety and flexibility over autonomy and risk, prioritizing being present for my family given my fixed capacity.

I stayed in a job that allowed me to be “the parent with the flexible schedule” so I could stay home with sick kids and manage after-school activities. It also afforded me the opportunity to work at a top-tier research institution in a field I love and mentor amazing people. Don’t let the perceived or actual judgment of others deter you.

But don’t forget to periodically ask yourself, “Is this still the direction I want?” We’re scientists. Our careers should be iterative.

When I had internalized that I couldn’t become a tenure-track faculty member because of my choices for my family: Set your own metrics for success.

We are the only subject-matter experts on our lives, so we should decide what success means. In the absence of metrics we define for ourselves, external metrics — peer review, promotions, grant submissions — can become the driving force in our careers.

Just as you shouldn’t let others’ judgments deter you, don’t let them define your metrics of success. We can’t control whether we live up to others’ expectations, but we can control whether we live up to our own.

When I felt a need to shift my career: Don’t be afraid to make a change.

Well before my career crisis in 2018, I wanted more than my role as a research engineer. In 2009, I asked to continue my role outside Massachusetts to enable my husband to pursue a job opportunity. In the years after, I flirted with the idea of finding a new job, in or beyond academia. But I never committed to it because I was afraid — of failing, yes, but even more, of disrupting my family’s stability. Unfortunately, it took the death of a friend to make me face this fear.

If we see our careers as an ongoing process, then change is something not to fear, but to embrace.

I’m uncertain how the next iterations of my career will unfold. Will I continue to pursue research at my current pace? Will I decide to develop my coaching practice? I don’t know, but I’ll follow the path that feels right. Through self-evaluation and action, I’ve developed the perspective and skills to create a fulfilling and successful career — by my own definition.

Kelli Hendrickson is a research associate professor in the mathematics department at the University of North Carolina at Chapel Hill, a certified leadership and career coach, and the founder of the Stories of Women in Fluids Initiative, committed to amplifying the voices of women in STEM.

This essay is adapted from a chapter of Persevere, Survive, & Thrive: Hard-won Wisdom from Women in Science, published in November 2025.