On the evening of March 10, at the University of Illinois, Urbana-Champaign/UIUC campus, two physicists stayed late to chat about the upcoming spring break. The conversation, however, did not center on sunny beaches or forest hikes. Nigel Goldenfeld and Sergei Maslov were worried.

Four days, a significant fraction of the school’s 48,000 students and 15,000 faculty and staff would be trudging through crowded airports, sharing hugs and kisses with loved ones, celebrating in restaurants and bars—and then, after eight days, returning to campus.

At the time, the impact of COVID-19 had not fully descended on Illinois, with only 19 confirmed cases. But Goldenfeld and Maslov had followed the news in China and in Italy. “We were both very concerned,” says Goldenfeld. “We thought it was purely amazing: that the virus could replicate and spread through four days, a significant fraction of the population, and in Italy. “We were both very worried. In the forest hikes. Nigel Goldenfeld and Sergei Maslov were worried. In the COVID-19 pandemic hit the United States, causing the March event to be cancelled and April to initially be limbo.

But thanks to tireless work from several APS departments, decisive input from the meeting’s program committee, and support from the physics community, the April Meeting took place on April 18 to 21 as scheduled. Despite the virtual format, almost five times the expected number for a typical, in-person April Meeting.

“I think it was purely amazing: that we did the meeting as a whole, the number of people who attended and the number of sessions that went on—and they went off mainly without a hitch, aside from a little glitch here and there,” says Hunter Chumbley, Director of Meetings at APS. “What I loved was seeing comments like ‘I’ve always wanted to go to this meeting and I haven’t been able to attend. It was great to be able to participate.’”

Meeting Virtually

For anyone who has attended an April Meeting, this year’s line-up changes will have been particularly noticed. Meeting changes from hotel meeting rooms to kitchen tables, kitchen tables, and living rooms. As usual, at the meeting the day of lectures.

PHYSICISTS RISE TO THE CHALLENGE

The response to the COVID-19 pandemic has meant radical changes for scientists as they adjust to laboratory shutdowns, online teaching, and travel restrictions. APS News and Physics and Physics want to hear about your experiences at letters@aps.org. More letters are available at the Physics website (physics.org). Keeping Research Going, and Contributing in Other Ways

Fortunately, my research is theoretical and computational, so it has been difficult for my group to continue working and to stay in touch as we all hunker down at home. But graduate students in campus housing have been particularly affected. Many of them have had to vacate their housing and find new lodging on extremely short notice. [My group] also volunteered for the Rapid Assistance in Modeling Pandemic (RAMP) initiative in the UK, which brings together researchers with many kinds of computational skills. We hope that our expertise will be valuable there. – Andrea Liu is a physicist at the University of Buenos Aires.

A Silver Lining

I enjoyed writing short stories in my high school and college years. But after getting my doctorate in physics and then teaching large undergraduate classes, I had no time to indulge in this pastime. The coronavirus outbreak forced me to join the ranks of college faculty around the world who communicate with their students online. How could I continue to make physics exciting to my students when I couldn’t be with them in person? Could I talk to those who are lucky few whose life has not been completely scrambled. – Alexander Yosifov is a PhD student at the Space Research and Technology Institute, Bulgarian Academy of Sciences.

Donating Supplies

On the morning of March 20th, we were closing our labs at the School of Physics and Astronomy when a call came, asking whether we had personal protection equipment (PPE) that could be donated to the UK’s National Health Service (NHS). We have a lot of this equipment because we are active in biophysics, nanotechnology, and device fabrication. Within an hour, three colleagues and I had packed up all of the PPE we could find, and it was on a truck to the NHS, along with supplies from the Electrical Engineering Department’s clean room. I heard later that some institutions around the world were hitting administrative barriers when trying to do the same thing. But our dean was very happy to hear what we’d done.

Letters continued on page 6

LETTERS CONTINUED ON PAGE 6
May 1664: Hooke vs. Cassini: Who Discovered the Great Red Spot?

One of the most easily identifiable features of the planet Jupiter is its Great Red Spot, a gigantic storm in the planetary atmosphere, about 22 degrees south of the equator, that rotates counter- clockwise, akin to an anti-cyclone. Astronomers think the current red spot may have been present for at least several hundred years. This persistent feature, known as the "Great Red Spot," is the largest known storm in the solar system.

The controversy over who discovered the Great Red Spot began in the 1660s, with Robert Hooke and Giovanni Domenico Cassini, two prominent astronomers of the time.

On May 9, 1664, Robert Hooke observed a small spot "in the middle of the Circumambient Ring," noting its red color and the fact that it was moving across the planet's surface. Hooke continued to observe the spot over the course of several weeks, noting its changing size and position.

In contrast, Giovanni Domenico Cassini, the director of the Paris Observatory, observed a large spot on the same hemisphere of Jupiter on May 12, 1664, which he named the "Great Red Spot." Cassini was able to track the spot's movement over several weeks, observing it to be a permanent feature of the planet.

The debate over who discovered the Great Red Spot continued for several years, with both Hooke and Cassini claiming credit for the discovery. It was not until later in the 18th century that it became clear that both astronomers had observed the same feature.

The controversy over the discovery of the Great Red Spot highlights the importance of careful observation and record-keeping in the field of astronomy. It also serves as a reminder of the ongoing debates and discussions that have taken place throughout the history of science, as researchers strive to understand and describe the natural world.

In the end, it is difficult to say definitively who discovered the Great Red Spot. Both Hooke and Cassini played important roles in the study of this fascinating feature of Jupiter, and their observations contributed to our understanding of the planet and its atmospheric phenomena.

The Topical Group on Precision Measurements and Fundamental Constants

ABIGAIL DOVE

Atomic clocks are among the tools used for precision measurement. One such clock at NIST uses two magnetic coils (red rings) and an optical lattice (red laser beam), as well as intersecting violet lasers to cool ytterbium atoms, slowing their motion. Image: NIST

TODAY IN PHYSICS HISTORY

HOOKE VS. CASSINI: WHO DISCOVERED THE GREAT RED SPOT?

May 9, 1664: Hooke observed a small spot "in the middle of the Circumambient Ring," noting its red color and the fact that it was moving across the planet's surface. Hooke continued to observe the spot over the course of several weeks, noting its changing size and position.

May 12, 1664: Cassini observed a large spot on the same hemisphere of Jupiter, which he named the "Great Red Spot." Cassini was able to track the spot's movement over several weeks, observing it to be a permanent feature of the planet.
“It is out of the question that he would have been able to distinguish it because of the low light-grasp of telescopes of that time.”

There is little doubt among science historians that Cassini witnessed, repeatedly, a spot on Jupiter that bears a remarkable similarity to the Great Red Spot we know and love today. There is still some uncertainty as to whether it is exactly the same spot, centuries later, because of imperfect historical records. There were no reported observations of the red spot after 1713 for more than a century, until it was spotted again in 1831 in a drawing of Jupiter by Samuel Schwabe. American astronomer C. W. Pritchett “rediscovered” the Great Red Spot in 1818, and astronomers have been monitoring it closely ever since.

That said, “Even if the identity of the old Permanent Spot with the modern Red Spot is still in doubt,” Fosdiki concluded, “there can be no doubt over the identical nature of the phenomenon, and the discovery must be attributed to Cassini.”

Since 2010, astronomers have worried that the red spot might be shrinking, and that the process was occurring more rapidly since 2012. In 2019, several amateur astronomers reported a strange flaking off of bits of the red spot, fueling fears that Jupiter’s most famous feature might be disappearing at long last.

University of California, Berkeley, physicist Philip Marcus, however, has found no reason for alarm. At the 2019 APS Division of Fluid Dynamics meeting, he offered an intriguing counter-explanation for the flaking, based on his own computer models (see APS News, January 2020). He concluded that the flaking is a perfectly natural weather phenomenon on Jupiter, the result of the complicated fluid dynamics of the planet’s atmosphere. If Marcus is correct, the Great Red Spot should endure for several more centuries, barring any cataclysmic event.
OUTREACH

Wikipedia Editing Course Gives a Voice to Women and Minorities in Physics
BY LEAH POFFENBERGER

Despite millions of pageviews and millions of articles, Wikipedia, the world’s largest encyclopedia, has a problem: women and underrepresented minorities are often missing from its pages. When she became the third woman to ever win the Nobel Prize in Physics, Donna Strickland didn’t have a Wikipedia page, and many other deserving women don’t, either, with only 18 percent of biographies on Wikipedia belonging to women (see “Fixing Wikipedia’s Diversity Problem,” APS News, April 2019).

To help bridge this gap and recognize women and minorities in physics for their achievements, APS partnered with Wiki Education to train APS members on how to contribute articles and edits to Wikipedia. Over a 12-week course that started on February 10, a group of 14 APS members edited 43 pages, adding 127 references to articles that cracked-up 148,000 pageviews.

“The Wiki Education course taught the ins and outs of being wiki-editors, how to create and maintain biographies that satisfy Wikipedia’s notability requirements,” says James Roche, Public Engagement Programs Manager. “Wikipedia has come a long way and instituted a lot of policies to discourage poor editing practices—there’s a lot that goes into these articles.”

Wiki Education, a non-profit spun off from the Wikipedia Foundation that runs Wikipedia, worked with APS to design and run the course. “The course specifically focused on adding more biographies on women and minorities in physics because, for a variety of reasons, Wikipedia has some catching up to do in these areas,” says Roche.

“This course was a pilot program, but we’re hoping to do more in these areas,” says Roche. “For more information about Wiki Education visit wikiedu.org.”

OUTREACH

Sparking the Joy of Physics at Home
BY LEAH POFFENBERGER

As millions of people are being asked to stay at home to stop the spread of COVID-19, parents are facing the task of keeping energy-filled kids occupied while stuck in the house. Fortunately, using household items or an internet connection, it’s possible to turn the house into a DIY-lab and spark excitement about physics.

For more than a decade, APS’s PhysicsCentral has been a mission to communicate the importance and excitement of physics with a variety of educational resources, from blog posts tackling physics news to classroom experiment kits. Each year, the PhysicsQuest program sends boxes of materials and experiment guides to middle- and high-school classrooms all over the country, but at-home scientists can easily jump in to experimenting, too. All PhysicsQuest guides are available online, and most of the experiments are designed to use normal household items. PhysicsQuest 2019 educational guides can be found at go.aps.org/2nr298D. Join Our Mailing List: visit the sign-up page at go.aps.org/2nqGtJP. FYI: SCIENCE POLICY NEWS FROM AIP

National Labs Pivot to Pandemic Research
BY MITCH AMBROSE

At the outset of April, all but two of the 17 Department of Energy (DOE) national laboratories were in states whose governors had issued stay-at-home orders to blunt the spread of the coronavirus pandemic. Though most lab employees were now teleworking or in Mass, some on-site work has been deemed essential and continues, particularly research related to the pandemic.

DOE has mobilized its suite of user facilities and other infrastructure to complement research efforts underway at public health agencies, casting a wide net for ideas on how to support the national response.

“Not every lab has the capability, but they are all participating in a working group that we’ve put together to ask questions,” said DOE Office of Science Director Thomas Drell in a March interview. As one major thrust of its efforts, DOE has enlisted light and neutron sources across the lab complex to study the structure of SARS-CoV-2, the virus that causes the respiratory disease COVID-19. For instance, the National Synchrotron Light Source II at Brookhaven National Lab in New York has run experiments with protein crystallography beamlines to characterize viral components that could be targeted by drugs. The Advanced Light Source at Lawrence Berkeley National Lab in California has likewise made its beams available for structural biology studies, as have light sources at other DOE labs.

The Advanced Light Source was initially put on “warm standby” after several counties in the San Francisco Bay Area issued stay-at-home orders in mid-March, the first such directives in the country, but the facility resumed limited operations in April to support coronavirus research. Berkeley Lab’s Joint Genome Institute also has offered expertise in high-throughput automation to aid a robotic coronavirus testing initiative at the University of California, Berkeley, and staff from its Molecular Foundry Facility are working with Stanford University to synthesize peptides that could be used to develop antiviral agents.

DOE’s two neutron sources at Oak Ridge National Lab in Tennessee were on scheduled shutdowns when the pandemic first escalated in the US, but they began accepting rapid access proposals for coronavirus research in April. Meanwhile, the lab has shuttered the country’s other major neutron source user facility. The National Institute of Standards and Technology’s Center for Neutron Research was shut down in mid-March due to a potential case of COVID-19 among its staff.
the consequences of delaying. They then asked, what would be the factor. Assuming that the state available to them, they decided to meet with a group of officials, work to the Illinois governor’s office, which then invited them results to the governor’s office,3 says Goldenfeld. The lockdown began. They found calculations on models that have lots of limitations and deficiencies,” says Goldenfeld. The two continue to work with the state government on more epidemiological models. Without their usual safeguards such as peer review, they check their calculations against the results of two other modeling teams. “We’re doing quick and dirty engineering-type calculations on models that have lots of limitations and deficiencies,” says Goldenfeld. Their contribution to the state reads like a success story, of physicists demonstrating the real-world applicability of their skills. But the two of them see it as a failure of government. “I wish that the country was better prepared, and that it wasn’t up to a ragtag group of physicists who decided they needed to do something,” says Goldenfeld. Maslov and Goldenfeld have set aside their own research for the foreseeable future, to continue helping the state government. This work “is much more important,” says Maslov. But their pivot does come with a nostalgia for their former lives, just months ago. “We learned to like epidemiology,” but I cannot imagine spending another five years doing it,” says Maslov. For him and Goldenfeld, epidemiological modeling just doesn’t provide the same intellectual thrill that the statistically complex ecological models do. It’s a small loss compared to lives and livelihoods—but intellectual curiosity, too, has been a sacrifice of this pandemic.

The author is a freelance writer based in Tucson, Arizona.

MEETING CONTINUED FROM PAGE 1

“I made it clear: I would be the last one to accept this cancellation. I would be hugely disappointed… I was obviously emotional,” says Han. “We worked so hard for a great program and physics does not stop. Science does not stop. We had to move on in some way.”

Fortunately, Doyle and Clemens had already identified Freeman’s meets platforms as a potential place to hold a virtual meeting. On April 3, exactly two weeks out from the meeting, Freeman officially started working on the April Meeting and the APS IT, Meetings, and Communications departments undertook a heroic effort to bring the meeting to fruition. “At first, I said don’t we only do the plenary sessions and the public lecture — those are high profile talks — and leave the rest to our divisions,” says Han. “[Doyle] said, ‘Okay, let’s see how far we can go…’ It’s just amazing for them to have put everything online and I’m really extremely grateful.”

Learning—and Looking Ahead

Launching an all-virtual meeting was a monumental task, but the developed tools and lessons learned can likely be used for future meetings, especially in a post-COVID world. The plan is going to be a new normal next year. I don’t know what it is yet in terms of live meetings. I’m hoping it doesn’t affect them too much, but I have a feeling it will,” says Clemens. “I do think we should, going forward, have much more of a hybrid meeting. And when I say hybrid, I mean a virtual component of the live meeting so that we can reach that audience that doesn’t go [to meetings] and hopefully grow the audience.”

While other societies are launching online meetings, the APS April Meeting currently stands as one of the largest ever online meeting platforms, drawing support from the physics community. “I want to show appreciation for all the support and backing from the physics world. Our APS leadership, our program committee, and our APS staff members, they’re the real heroes,” says Han. “I also want to thank our community: our Society. For 7,000 people to sign up at such a short notice—That’s strong support.”
symmetry, for instance, predict much larger ones. With increasingly precise measurement tools, it may be possible to verify such a prediction in the future, after a result, finally bringing positive experimental evidence to bear on the question of supersymmetry. Another major emphasis at GPMFC is the development of increasingly accurate sensors of various physical properties. This technological development spans atomic clocks to measure time and frequency, super-sensitive detectors to measure magnetometers to measure magnetic fields to ever-greater sensitivity, and atom interferometers to measure energies and forces between atoms.

Perhaps the most high-profile event in the world of the Laser Measurement occurred last year, with the redefinition of four of the seven SI base units—the ampere, kelvin, mole, and most famously, the kilogram—in terms of fundamental constants (see APS News May 2019). Importantly, this marked the transformation of the SI system from being partially artifact-based to being constructed in terms of physical objects (like standard weights) to being based entirely on fundamental physical constants and interlinked fundamental constants. According to Hanneke, scientists are now working with the international committee that noted on this redefining of the SI system, and many more directly worked on measurements that led to the updated definitions of all of these units.

Historically GPMFC has had a strong presence at both the APS April Meeting and the annual DAMOP meeting in May/June, hosting invited talks, a poster competition, and, most notably, an annual one-day workshop on precision measurement topics (alternating between the April Meeting and DAMOP). This year’s workshop will be held at DAMOP, possibly in a virtual format, and will highlight “precision measurement searches for new physics.”

Looking forward, the GPMFC executive committee hopes for continued membership growth, particularly outside of its traditional AIP physics base. “We hope that showing this will get people in different subfields to appreciate each other more,” noted Gardner.

Increasing the diversity of GPMFC’s membership (currently more than 80% male) is another key priority. “There is so much work to do on broadening our community,” said Hanneke.

Overall, GPMFC stands out as an innovative and collaborative group of physicists, promoting research and exchange of ideas at the frontier of fundamental physics. “It’s a great time to be in precision measurements,” Hanneke emphasized. “No matter what field you’re in—solid state physics, particle physics, astrophysics—there are all sorts of new tools for new measurements, and many cross-disciplinary avenues beyond the Standard Model. It’s an enormous opportunity for new discoveries and new ideas.”

More information on this unit can be found at aps.org/units/gpmfc.

**Climate changed from Page 3**

**JOY OF PHYSICS CONTINUED FROM PAGE 4**

features Chien-Shing Wu, the “natural lawyer,” who has a list of book lovers, or anyone looking for their next read, a brand-new science fiction novel titled The Universe and More, created by a blended group of theorists and experimentalists, and my hope is that showcasing this will get people in different subfields to appreciate each other more,” noted Gardner.

Overall, GPMFC stands out as an innovative and collaborative group of physicists, promoting research and exchange of ideas at the frontier of fundamental physics. “It’s a great time to be in precision measurements,” Hanneke emphasized. “No matter what field you’re in—solid state physics, particle physics, astrophysics—there are all sorts of new tools for new measurements, and many cross-disciplinary avenues beyond the Standard Model. It’s an enormous opportunity for new discoveries and new ideas.”

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We’ve since been able to offer other equipment from our biophysics lab, and colleagues are contributing by modeling and developing sensitive and specific serological tests to detect and screen. This course of goes alongside the huge effort of working with UConn’s College of Medicine shifting to online teaching. It’s a terribly difficult time for everyone. But we had hoped, when we were at Leeds. – Helen Glosan hosts the School of Physics and Astronomy at the University of Leeds.

An Unexpected Collaboration

I am a second-year graduate student, mainly working on computational and theoretical aspects of complex nonlinear and quantum dynamics. My university closed and the state where I live, Maryland, is in lockdown. However, I am exceptionally lucky to have colleagues and an alumnus from my department as my housemates, and I thought it would be a good idea to start collaborations with them. Starting on Monday, continuing from my previous work, I have started two new projects with my housemates. These projects are now possible to work on because we have been able to uncover connections between concepts in vastly different fields. “In the past, when we are not busy collaborating, we share in the housekeeping and eat free food—homemade cookies and free pizza. It also helps to have a Netflix subscription, a stock of red wine, and someone who can share the household tasks,” said Banerjee. She is a graduate student in the Department of Physics and the Institute for Theoretical Physics, University of Maryland at College Park.

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ANDERSON CONTINUED FROM PAGE 1
damental level, and then nuclear, atomic, and so on, and beyond is biology and psychology, and so forth, and so on. It was that before new level could not be understood or predicted solely using concepts borrowed from the previous level. It was an antireductionist argument. Conceptually, each level is just as fundamental. Although other scholars were addressing this idea, “Phil was the first one to put this all together and to turn it in a forceful and coherent manner,” he adds.

As a condensed matter physicist, Anderson’s research centered on spin glasses—disordered networks of magnetic moments—viewing them as a bridge to other areas, including economics, biology, and computer science. His application for spin glasses demonstrated his ability to “extract the quinesence of experiment,” says Premala Chandrasekhar, Professor of Physics at Brown University and Anderson’s former colleague. “Phil was very good at the result of a measurement, sense what it was important, and then adapt that to make it so that you would launch a number of sub-fields.” With spin glasses, he developed a whole new set of methods to approach these problems, which are presently applied in combinatorial optimization, neural networks, and machine learning.

Anderson’s 1977 Nobel Prize in Physics was for his collaborative work on fundamental theoretical investigations of the electronic structure of magnetic and disordered systems. As Anderson’s interests grew, he became increasingly vocal about issues of public concern, especially those touching the scientific community. He was vocal in his disapproval of the Superconducting Super Collider (SSC), skeptical of the potential spin-offs, he felt that “those arguing for the USD was more there. I asked if he was for other nations, he had gotten to nuclear weapons, but of those throughout the world,” said Francis Slakey, APS Chief and the agency had not announced any plans to resume the center’s operations as of mid-April. Researchers at the Center and the NASA’s Goddard Space Flight Center have been developing sophisticated models to simulate the impact of the virus and thousands of drug compounds.

Center is running detailed simulations of the virus’s surface to identify potential vulnerabilities, and Oak Ridge National Laboratory is developing highly realistic models to simulate the impact of the virus and thousands of drug compounds.

In support of such efforts, Congress included supplemental appropriations for research in the phase III contract. The Department of Defense issued a request for proposals, and the National Science Foundation, and several private companies. Among those who have funded Frontier supercomputer at the Texas Advanced Computer Center (TACC) are researchers from the University of Texas at Austin, the University of California, Santa Barbara, and the Lawrence Livermore National Laboratory.

PANDEMIC CONTINUED FROM PAGE 4

Although other scholars were addressing this idea, “Phil was the first one to put this all together and to turn it in a forceful and coherent manner,” he adds. “Phil had no, so it didn’t bring true to me, and I pushed him a bit. He said ‘I play a bit of Go,’ and to me that sounded more than just a bit of Go—I had gotten to know Phil and suspected there were more than just a bit of Go in his agenda, and he said ‘Yeah.’ It was like peeling layers. I said ‘how good?’ and he said ‘Oh there are less people in Japan who can play me,’ and then there’s dead silence and all the mouths were open and we’re starting at Phil and then he says ‘but they meditate.’”

As late as this winter, Anderson was still engaged with friends. Chandrasekhar and her husband, Rutgers physics professor Piers Coleman, met Anderson for dinner. “He was in good spirits,” says Chandrasekhar. “We brought along the obligatory bottle of red wine, hidden in his walker compartment. Once the bottle was down, he asked Piers to uncork it and then insisted on serving us all. We had to push him more than we intended just to make sure he didn’t consume too much. Phil was full of gusto and the conversation topics were wide-ranging. I am grateful for these poignant recent images of him, spirited and animated as ever.”

Adda Chandrasekhar: “Phil is a hero to all of us for his intellectual breadth and depth, his wonderful curiosity about almost anything, and his active support of young researchers. He will be sorely missed but never forgotten.”

ADVOCATE CONTINUED FROM PAGE 4

some special position to make a difference in the reduction of nuclear weapons, given their historic role in nuclear arms control. “Physicists, acting as informed citizens, can be a powerful voice to educate and to propose steps to reduce the nuclear threat. Their voice was exercised during the 1970s when physicists at the very beginning of the nuclear era argued for nuclear arms control, during the 1960s when their message of the ineffectiveness of ballistic missile defense laid the basis for the 1972 Anti-Ballistic Missile (ABM) Treaty, and during the 1980s, when the citizen movement calling for a freeze to the arms race, helped achieve the START.”

This hard-won treaty-based structure of nuclear restraint and progress toward disarmament is being undone, however, said Prager. “With the US withdrawal from the ABM Treaty (2002) and the Intermediate Nuclear Force Treaty (2019), the only remaining treaty providing a constraint on Russian and US nuclear arsenals is the New START Treaty which, if not renewed, will expire in February 2021. The world is slipping toward a new and complex nuclear arms race, as well as the US and Russia, he said.”

Given the complex issues surrounding the reduction of nuclear threats, a multi-pronged approach is needed to effectively address the matter. “There are many such steps—extension of the New START Treaty, abandonment of a launch-on-warning policy, and implementation of a no-first-use policy, to name a few,” said Prager.

Francis Slakey, APS Chief Government Affairs Officer, said the coalition is doing important work that could make a lasting impact on the legacy of nuclear arms control. “We have an opportunity for APS OGA to support our members in advocating for an issue that not only affects the lives of Americans, but also those throughout the world,” he said.

The author is the APS Senior Press Secretary.
Scientists Must Intensify Their Commitment to Research Integrity

BY THE APS PRESIDENTIAL LINE: PHILIP H. BUCKSBAUM (PRESIDENT), S. JAMES GATES JR. (PRESIDENT-ELECT), FRANCES HELLMAN (VICE PRESIDENT), and DAVID J. GROSS (PAST PRESIDENT)

A few months ago, a prominent APS Fellow was led out of his office in handcuffs and charged with fraud for lucrative research contracts with China that he allegedly failed to report to the National Institutes of Health. This was the first time the US government is increasingly concerned about foreign influence, particularly from China, the lesson of those由此 leading a US scientist at one of our flagship universities couldn’t be clearer: scientists must recommit to the core principles of research conduct. 

Recent Reports and Reaction by Congress and the Executive Branch

This incident is just one recent example of the US government’s response to growing concerns about foreign influence, espionage, and IP theft. A recent US Senate report (1) largely critical of the scientific community states that some countries “seek to exploit America’s openness to advance their own national interests.”

Furthermore, that Senate report, titled “Threats to the US Research Enterprise: China’s Talent Recruitment Plan,” notes: “This report exposes how American taxpayer-funded research has contributed to China’s global rise over the last 20 years.” It states that members of China’s Talent Recruitment Program—scientists engaged in research in the US—receive substantial research funding in return for high salaries, lab space and other incentives—have downloaded sensitive electronic research files, submitted false information when applying for grant money, and willfully failed to disclose the receipt of money from China on their US grant applications.

That report was just one of many recent examinations of the extent and impact of foreign influence, marking a significant shift in thinking, in particular, on the US scientific enterprise. Other reports that have also circulated widely among policymakers in DC offer other views on this issue.

China’s tactics also came under fire in a report (2) last fall by Strider, a Maryland-based intelligence company, that alleges that China has gone from a “haggard in quantum science and technology to a global leader” by taking advantage of the scientific openness of the United States and European nations, as well as their funding mechanisms. The report goes into considerable detail describing a network including four continents, operated by a scientist in China. “For over a decade” according to the report this leading scientist at one of China’s premier research universities, “in collaboration with PRC (People’s Republic of China) government stakeholders, has executed an intentional strategy to exploit Western government funding to train Chinese quantum scientists at Western research institutes and relied on both ‘unwritten agreements’ and monetary incentives through PRC government talent programs to bring those Western-trained scientists back to China.”

Together, these two reports tell a chilling story that calls into question our principles of open science, and also the integrity of the scientists themselves, who are characterized as at best naive, and at worst, greedy and complicit in unethical contracts and deep conflicts of commitment.

These report conclusions, however, discount the very values that are intrinsic to progress in fundamental science, and even encourage new policies that could override those values, hamper the US role in worldwide scientific research, and thus diminish our nation’s scientific enterprise. This real danger was displayed by a recent APS study, where 32 percent of international physics students who chose not to study in the US say the country is “unwelcoming to foreigners.” The National Science Foundation (NSF) is rightly concerned about this issue, so the agency commissioned a report (3) on fundamental research security that was carried out last fall by JASON, the highly acclaimed group of distinguished US scientists with a long history of consultation for the government on security and science questions. According to NSF, four main themes emerge from the JASON document:

- The value of, and need for, foreign scientific talent in the United States.
- The significant negative impacts of placing new restrictions on access to fundamental research.
- The need to extend our notion of research integrity to include disclosures of commitments and potential conflicts of interest.
- The need for a common understanding between academia and US government agencies about how to best protect

Philip H. Bucksbaum

S. James Gates Jr.

Frances Hellman

David J. Gross

US interests in fundamental research while maintaining openness and successfully competing in the global marketplace for STEM talent.

The Director of the White House Office of Science and Technology Policy and current Acting Director of the National Science Foundation, Kelvin Droegemeier, is quoted in remarks last fall that went viral, signaling in particular, on the US scientific enterprise. Other reports that have also circulated widely among policymakers in DC offer other views on this issue.

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The Value of Collaboration to the US Scientific Enterprise and Global Science

Fundamental research transcends national boundaries, and in the APS Board’s view, the US must continue to adhere to research principles in order to receive or retain an honor, award, or fellowship. Adherence by scientists to these principles should, in turn, contribute to the health of the fundamental research enterprise and the needs of national security can both be satisfied by adherence by scientists to the principles of openness coupled with responsible stewardship. With that understanding, we can ensure that science will continue to advance, and that the open scientific enterprise can be held in the highest regard.

References

5. APS Board on Open Science and a Recommitment to Research Principles: go.aps.org/2VsPAzL.

APS Presidential Line:

Philip H. Bucksbaum is the President of the American Physical Society and holds the Marquise Blake Wilbur Chair in Natural Sciences at Stanford University, with appointments in physics, applied physics, and in photon science at SLAC.

S. James Gates Jr., is President-Elect and the Ford Foundation Professor and Affiliate Mathematics Professor at Brown University.

Frances Hellman is APS Vice President, Dean of the Mathematical and Physical Sciences, Professor of Physics, and Professor of Materials Science and Engineering, University of California at Berkeley.

David Gross is APS Past President and Chancellor’s Chair Professor of Theoretical Physics and former Director of the Kavli Institute for Theoretical Physics at UCSB.

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

APS News welcomes and encourages letters and submissions from APS members responding to these and other issues. Responses may be sent to: letters@aps.org