2018 APS General Election Results

The results are in for this year’s APS General Election, which began on July 2 and closed on August 10. Sylvester James Gates, Jr. (Brown University) will join the APS president-elect line as Vice President in 2019, becoming President-Elect in 2020, and President in 2021. APS Treasurer James Hollenhorst (Peking University) will become International Counselor. Nora Berrah (University of Connecticut) was selected to become the Chair-Elect of the APS Nominating Committee. All will begin their new terms on January 1, 2019.

Sylvester James Gates, Jr. (Vice President) a theoretical physicist, is currently the Ford Foundation Physics Professor and Affiliate Mathematics Professor at Brown University. He received his Ph.D. degree in 1977 from the Massachusetts Institute of Technology. This year marks the forty-sixth consecutive year of his university-level teaching in institutions as diverse as Caltech, Howard University, Gustavus Adolphus College, MIT, and the University of Maryland. Gates received the 2011 U.S. National Medal of Science, with a citation reading, “For his contribution to the mathematics of supersymmetry in particle, field, and string theories and his extraordinary efforts to engage the public on the beauty and wonder of fundamental physics.” He is an APS ELECTION continued on page 3

2019 APS Medal for Exceptional Achievement in Research awarded to Bertrand I. Halperin

Harvard physicist Bertrand I. Halperin has been selected to receive the 2019 APS Medal for Exceptional Achievement in Research for his “seminal contributions to theoretical condensed matter physics.”

Halperin, ’76, is Hollis Professor of Mathematics and Natural Philosophy (Emeritus) at Harvard and an APS Fellow. He is winner of the 1982 APS Oliver E. Buckley Condensed Matter Physics Prize and the 2001 APS Lars Onsager Prize.

“Bertrand Halperin is a giant in the field of theoretical condensed matter physics,” said APS President-Elect David Gross, chair of the medal selection committee. “His many contributions to the understanding of the dynamics of phase transitions, of low-dimensional quantum phenomena, of the quantum Hall effect, and his pioneering work on the role of topology in both classical and quantum systems have shaped condensed matter theory over the last 40 years, bringing it to bear on the understanding of many experiments.”

Sylvester James Gates, Jr.

2019 APS Medal for Exceptional Achievement in Research awarded to Bertrand I. Halperin

Bertrand I. Halperin

The Medal for Exceptional Achievement in Research is the largest APS prize to recognize researchers from all fields of physics and is funded by a donation from entrepreneur Jay Jones. Previous recipients were Edward Witten (2016), Daniel Kleppner (2017), and Eugene Parker (2018).

“Bert is among our most distinguished APS Members,” said APS Chief Executive Officer Kate Kirby. “It’s hard to imagine someone more deserving of the APS Medal.”

PHYSICAL REVIEW A

covering atomic, molecular, and optical physics and quantum information

An Evolving and Leading-edge Journal with a Rich History

By Thomas Pattard and Gordon Drake

Throughout 2018, APS has been celebrating the 125th anniversary of The Physical Review. In comparison, Physical Review A—which was born under the heading “General Physics” when the original publication was split into four parts in 1970—is a young journal. Even so, we can already look back on an almost-50-year history. Since its founding, the journal has continuously grown in size and reach. While the first issue, in January 1970, had 33 articles, we now publish more than 200 articles each month. And although 28 of those first 33 articles had authors only from the US, we are now truly international: in 2017, 84% of the manuscripts submitted to us came from abroad.

Grounded in the tradition of The Physical Review, the mission of Physical Review A has always been to publish excellent physics within the scope of the journal, and our approach was captured in a formal statement adopted by the APS Council in 1995: “It is the policy of the American Physical Society that the Physical Review accept for publication those manuscripts that significantly advance physics and that have been found to be scientifically sound, important to the field, and in satisfactory form. The Society will implement this policy as fairly and efficiently as possible and without regard to national boundaries. This is a promise to our authors that they will be treated as fairly as possible and that we do not discriminate on the basis of nationality, gender, religion, political views, or other aspects that are not part of the scientific assessment of their work. And it is a promise to our readers that, in addition to being free from obvious errors, the papers they see published in Physical Review A have been judged by their peers to represent substantial advances. These guiding principles have not changed in decades and form the anchor for the journal.

Among the more than 77,000 papers Physical Review A has published, there are many jewels that would make any journal proud. The most highly cited, a paper on density-functional theory, has been updated about once per year. At the same time, sections of the journal that are aligned with units of the American Physical Society including computational physics, polymers, biological physics, plasma physics, and fluid dynamics have been stable over the years.

PHYSICAL REVIEW E

covering statistical, nonlinear, biological, and soft matter physics

Interdisciplinary Excellence

By the Editors of PRE

This year, Physical Review E (PRE) is celebrating 25 years of publishing, along with the entire Physical Review family of journals, which is marking its 125th anniversary. The PRE story began in January 1993, when the burgeoning Physical Review A (General Physics) was split into two: Physical Review A (Atomic, Molecular, and Optical Physics) and Physical Review E (Statistical Physics, Plasmas, Fluids, and Related Interdisciplinary Topics).

Since then, PRE has continued the editorial philosophy of the founding editor, Irwin Oppenheim, by publishing research from emerging areas, nontraditional fields, and authors who are new to the Physical Review journals. To acknowledge his work, APS has announced a new honor, the first of its kind: the Irwin Oppenheim Award for best paper in PRE by young investigators. The award will recognize outstanding contributions to physics by early career researchers who publish in PRE. Appropriately this new initiative recognizes a visionary and inspiring editor who embraced the interdisciplinary nature of the journal.

The birth of PRE was preceded by rapid growth in statistical physics and nonlinear dynamics. An entire generation of physicists studying topical areas such as renormalization group theory, critical phenomena, and chaos chose the journal to be their premier publication. PRE doubled in size in its first 10 years, with subsequent growth in soft matter and biological physics, and later complex systems and networks. Arguably, the emergence of entire fields of research including colloids, granular materials, and liquid crystals could not have been possible without PRE.

Since its inception, PRE has published over 50,000 articles and these articles have garnered over 1 million citations. PRE covers collective phenomena of many-body systems. The journal faithfully serves overlapping communities dealing with statistical and nonlinear physics, and soft matter. And as these communities have evolved, so has the journal. For example, two years ago PRE added a new section in solid mechanics as this classical subject is experiencing a revival of interest among nonlinear, statistical, and soft matter physicists. Researchers. Active matter, the study of self-propelled and self-organizing objects, is another example of the current addition to the table of contents. To better serve the community, the journal subtitle has changed twice, and to better organize its content, section titles have been updated about once per year.

PRE is unique in that it hosts the journal together is not a single specific subject area, but rather an approach that often involves a statistical component. Typically, a PRE author may publish in multiple sections and on multiple topics, and there is a clear community corresponding to the journal. The journal’s author and referee base is overwhelmingly international, and appropriately, about one half of the PRE editors are based outside the U.S., and the journal’s editorial board spans 15 countries and five continents.

With its broad coverage, PRE relies primarily on editors who are active researchers, typically scientific
This Month in Physics History

August 15, 1934: World-Record Dive in the Bathysphere by Beebe and Barton

In 1986, a deep-ocean submersible vessel dubbed Alvin made international headlines when it carried explorer Robert Ballard and two others to the site of the RMS Titanic, which sank in 1912. Its design was based on pioneering deep-sea divers in the 1930s by William Charles Beebe and Otis Barton in a spherical vessel known as the "bathysphere." Born in Brooklyn, New York, to a newspaper executive, Beebe had a strong interest in collecting animal specimens, even teaching himself the art of taxidermy as a high school student. An avid amateur ornithologist, he published his first article in Harper's Young People while still in high school, about a bird known as a "brown creeper."

He attended Columbia University, but left without earning a degree to work at the just-opened New York Zoological Park, where he cared for the birds and rose quickly to become a full curator. (Both Tufts and Colgate University later awarded him honorary doctorates.) Beebe also persuaded some of his professors to sponsor expeditions to Nova Scotia to photograph birds and other animals there and to collect specimens. He there picked up the practice of dredging, using nets to haul up organisms that the bathysphere crew wanted to study. In 1928, Beebe received permission from the British government to set up a research station in Bermuda to study the marine life in the region. He soon realized that for dredging and diving to observe deep-sea animals in their native habitat, a special underwater helmet would not be sufficient. Helmets were safe to only a few hundred feet down, and though submarines had descended to 383 feet, they had no windows to permit observation. Beebe wanted to build a deep-sea vessel with observation windows, capable of descending to even greater depths. His early designs for a cylindrical vessel appeared in The New York Times and caught the attention of an engineer named Otis Barton, who soon teamed up with Beebe to design and build a deep-sea diving vessel.

This team, led by Rebecca Moore, who helped to design the vessel, received a Project Development award from APS. "Large mega-projects offer one direction, but table-top physics may offer a window into the underlying physics in completely unexplored ways," Moore said. EDMUND MEYERS

An innovative collaboration between the APS and the American Physical Society to make America's deep-sea animals excited and engaged by Beebe and Barton's work, the bathysphere was quickly realized. Barton's initial letters to Beebe went unanswered, largely because the latter received so much correspondence from obvious cranks. But eventually a mutual friend introduced them, and Barton presented his own design in person: a spherical shape, the better to withstand the immense pressures, with openings in the "windows" made of fused quartz. They agreed that Barton would cover the cost of constructing the vessel and related equipment, while Beebe would help finance the charter of a ship and other expenses. The men conducted their first unmanned test of the vessel on May 30, 1930. They sent it down to a depth of 45 feet. A descent down deeper became the next goal, and that the crustal electrical and telephone cables, encased in a rubber hose, were badly twisted around the suspension cable. Once that issue was resolved, Beebe and Barton made their first dive, descending to 803 feet, and made several more successful dives that summer. They documented many deep-sea animals previously never observed in their native habitats, and Beebe noted how parts of the solar spectrum were filtered out during descent, until only the violet and blue hues remained. They also conducted shadower dives to map Bermuda's underwater geography, despite the risk of the vessel colliding with the submerged cliffs.

A combination of bad weather and the Great Depression foiled diving plans the next summer, and Beebe pledged to dive down a full half-mile in an attempt to raise funding for more dives. The resulting funding enabled them to resume their dives in 1932. The project was nearly scuttled during an unmanned test of the bathysphere, when it reemerged nearly full of water. As they loosened the heavy metal hatch bolts, one of them “shot across the deck like the shell from a gun,” Beebe later wrote in his memoir, Half Mile Down. Had the two men been inside the vessel under those circumstances, the water at such pressure “would have shot through flesh and bone like steel bullets,” before they even had time to drown. But they fixed the leak, and a dive was scheduled for September 22, 1932. Barton planned to film the creatures through the bathysphere’s window, and NBC broadcast verbal observations as they were relayed up the phone line. It was a rough descent, and the bathysphere’s swinging from side to side caused Barton to vomit from seasickness. But they kept going, eventually reaching 2,200 feet—still 440 feet short of their half-mile goal. By then, Barton and Beebe were badly bruised from the rough ride, and asked to be brought back up.

Once again, Beebe found himself in need of sponsorship to conduct more dives in the bathy-

BATHYSFHERE continued on page 5

William Beebe (left) and Otis Barton with their bathysphere.
News from the APS Office of Government Affairs

2018-19 APS Congressional Fellows Named

By Twannda W. Johnson

Jennifer Dailey and Abigail Regitsky have been selected as the 2018-19 APS Congressional Fellows, and they are both thrilled to begin their new positions on Capitol Hill.

“I was extraordinarily excited to find out that I had been named a Fellow,” said Dailey, who earned her Ph.D. in materials science and engineering from Johns Hopkins University.

She added, “Ever since I found out that this position existed a few years ago, I’ve been actively pursuing relevant training and outreach opportunities to gain as much experience as possible in the field. The news also made me a bit nostalgic; it was seven years ago that I first acknowledged, ‘I’m a scientist, not just a science student,’ while presenting research at my first scientific meeting: the 2011 APS March Meeting.”

Regitsky, who received a Ph.D. in materials science and engineering from the Massachusetts Institute of Technology, recalled a feeling of elation after receiving news of her fellowship.

“I was very excited and almost speechless when I found out I was going to be an APS Congressional Fellow. After hearing about the fellowship three years ago, I knew a fellowship would be the perfect opportunity to help introduce to policymakers growing up in science policy, science and policy issues, and identifying opportunities to get involved. Past issues are available at go.aps.org/2nr298D.

FYI: Science Policy News from AIP

U.S. Quantum R&D Strategy Taking Shape

By Mitch Ambrose

Efforts to prioritize quantum R&D have leapt forward this year in Washington, D.C., spurred by policymakers’ growing conviction of the strategic importance of nascent technologies that leverage some of the deepest phenomena of quantum mechanics. Advances in quantum information science (QIS) in particular promise to enable powerful new sensing, communication, and computing technologies.

Although federal agencies have supported QIS research for decades, the field is now widely viewed to be at an inflection point. Countries and private companies are committing substantial resources to secure a stake in the market for emerging quantum technologies and to master those that could prove especially disruptive.

Concerned the U.S. lacks a comprehensive strategy in the face of other governments’ investments, particularly those of China and the European Union, some policymakers are seeking to launch a national initiative to better focus federal quantum R&D efforts in partnership with academia and industry.

A primary driver behind the bill is a coalition of scientific societies, universities, and industry groups known as the National Photonics Initiative. A newly launched Quantum Industry Coalition has also endorsed the initiative, although it hopes to broaden the bill’s focus beyond basic research to explicitly encompass applied research.

The Senate Commerce Committee advanced similar legislation in August, although for jurisdictional reasons its version does not contain the DOE provisions.

Although supportive of the House bill’s underlying research principles, AIP has expressed concerns that the legislation could divert funding from other research programs if the agencies do not

ELECTION continued from page 1

Tawanda W. Johnson

In August/September 2018
A.D. Becke, has received more than 22,000 citations, making it the 5th-most-cited paper in the 124-year history of the Physical Review family. Other highlights include seminal papers by Loss and Dvornicenco on quantum computation with a single donor, by Hehn et al. on quantum error correction, and by Allen et al. on orbital angular momentum of light, to name just a few that have amassed over 2,000 citations each. And over the last twenty-five years, eleven Nobel prizes have been awarded in areas directly related to work published in Physical Review A, and all of the recipients have published some of their work in our journal.

While we are proud of this rich history, it does not mean that we should rest on our laurels; on the contrary, the editors are motivated to continue to work hard so that Physical Review A will remain the journal of choice in the areas of physics that we cover. In order to achieve this, the journal has always evolved, and continues to do so, to address and changing needs of the community.

For example, a significant change, rooted in the ever-increasing specialization of the field, was to begin highlighting a small number of papers that the editors feel deserve special attention due to their particular interest, significance, or clarity. Of course, we feel that all the papers published in Physical Review A deserve attention, but the sheer amount of available information has made it increasingly difficult for readers to follow developments that are somewhat outside their own main area of specialization. In order to help our readers navigate this information, we introduced Editors’ Suggestions in August 2013. Now, every year, we are about to publish our 500th Suggestion.

Here, more important are the changes to the content itself—the scope of the journal. When the journal first became too large and seemed to lack focus, Physical Review B was split off from Physical Review A in January 1993, and Physical Review A concentrated on atomic, molecular, and optical physics. Being one of the first journals to fully embrace quantum information as a new research field, we created a separate section entitled Quantum Information as early as January 1998. In the ensuing two decades, this section has grown to be the second-largest section of the journal, and now contains about twenty percent of the journal's pages. It continues to publish the latest advances in Physical Review A. In recognition of this, we have recently added "Quantum Information" to our for of claim, allowing us to highlight both recognized that quantum information has evolved into its own subfield of physics, and to make it clear that Physical Review A views itself as the home for high-quality papers that connect with the quantum information community. The journal has grown with its community, and has, in turn, facilitated and enabled the growth of the quantum information field. While we feel that we have much to be proud of, we will not be complacent. We will continue to listen to our readers, and to reflect on our mission and purpose within the framework of our mission, to our community.

Thomas Pattison is Managing Editor of Physical Review A and has been with the journal since 2006. Gordon Drake has been Lead Editor of Physical Review A and has been with the journal since 2006. He is a former Head of the Department of Physics at the University of Windsor, A Fellow of the Royal Society of Canada, and an APS Fellow.

Along similar lines, we have recently responded to the needs of another community by renaming one of the sections of the journal. While APS has a long history of Measurement and Fundamental Constants since 1987, the field has recently seen a surge, and more and more papers in this area are being published, many of them in Physical Review A. Thus in July 2014, we split off a topical section on "Atomic and Molecular Structure and Dynamics" to "Atomic and molecular structure and dynamics" section to "Atomic and molecular structure and dynamics," to signal that this community clearly has a home in our journal. For almost fifty years, Physical Review A has been an indispensable part of the AMO community, and (for a somewhat shorter time) the quantum information community. The journal has grown with its community, and has, in turn, facilitated and enabled the growth of the quantum information field. While we feel that we have much to be proud of, we will not be complacent. We will continue to listen to our readers, and to reflect on our mission and purpose within the framework of our mission, to our community.

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The intent is to keep the country safe. But a beefed-up defense system can also easily become an offensive weapon, with unintended consequences that policy makers gloss over, she says. Grego emphasizes one danger in particular: these missile defense systems have the capability to destroy satellites. "If you make a good missile defense system, you are also making a good antisatellite weapon," says Grego. "You can’t help it. They just do the same kind of thing."

Current missile defense systems—launch projectiles into the air to hit incoming offensive missiles. But some of these projectiles can reach altitudes higher than 2,000 kilometers—beyond low Earth orbit (LEO), where some 1,000 satellites reside.

Eighty percent of these LEO satellites belong to the U.S. So by developing a robust missile defense system, the U.S. is also creating a technology that disproportionately threatens its own satellites, Grego noted. It’s actually easier to knock a satellite down than a missile loaded with nukes: satellites travel in known orbits, so attacks can be planned in advance.

The U.S. government has already used missile defense technology to blow up a satellite, one of its own. In 2008, the Pentagon converted a defensive missile to shoot down a non-functioning military satellite in a mission known as Operation Burnt Frost. “It only took a few days of reprogramming to make that missile capable of hitting the satellite,” says Todd Harrison, an aerospace security expert at the Center for Strategic and International Studies, a bipartisan think tank.

However, Harrison says that other countries shouldn’t worry that the U.S. will turn missile defense systems on their satellites. For one thing, these collaboration methods create lots of debris that damage other spacecraft. According to Grego, destruction of a single 10-ton satellite could double the amount of large debris in LEO. “We have more to lose in space than anyone else,” says Harrison. “Why would we want to be polluting it with all kinds of debris?”

But conversely, Harrison says, the U.S. does need to keep an eye on other countries with antisatellite capability, such as Russia and China. Russia’s missile defense system can also shoot down LEO satellites. In 2007, China shot down one of its weather satellites as a demonstration. Debris from that test collided with a Russian space craft in 2013, altering its orbit.

Grego says that antisatellite weapon threats threaten more than just the satellites themselves: it also endangers international laws. The U.S. has always used space for peaceful purposes. But likely it will argue for expanding the technology for missile defense, technologies for missile defense, which the U.S. government has a shift in thinking,” says Grego, said space real estate becomes more crowded. In a March speech, President Trump referred to space as “a war-fighting domain just like the land, air, and sea,” and proposed a new branch of the military, the Space Force. The development of antisatellite weaponry furthers the possibility of the development of antisatellite weaponry.

Ballistic missile defense systems are deployed on land and sea. A move to space could lead to geopolitical tensions. In this photo, the guided-missile destroyer USS Fitzgerald launches a missile as part of a joint ballistic missile defense exercise in the Pacific Ocean on Oct. 25, 2012.
Education and Diversity Update

APS Conferences for Undergraduate Women in Physics (CUWiP): Student Applications Open September 3

APS CUWiPs are three-day regional conferences at multiple sites across the U.S. and Canada, and are designed to increase the recruitment and retention of undergraduate women in physics. The 2019 APS CUWiPs will be held at twelve universities during the week of February 18-20. The conferences will provide great opportunities for women in physics, as well as support from scientific presentations, panel discussions, graduate school topics, and career exploration. Applications are open September 3 - October 12 at aps.org/cuwp.

Interested in hosting an APS CUWiP at your university in 2020?

If you are interested in applying to be a host site for our 2020 conferences, please visit go.aps.org/cuwiphost and submit an application form by November 1. Email women@aps.org for more information.

Professional Skills Development Workshop for Women Physicists

With support from the National Science Foundation and the APS Division of Fluid Dynamics (DFD), APS will offer a Professional Skills Development Workshop in conjunction with the 2018 Annual DFD Meeting in Atlanta, GA. The workshop is open to women postdocs and early career women physicists and is designed to provide professional training in effective negotiation and communication skills, as well as a special opportunity for networking. For more information and to register, please visit apsdf2018.org/register.

Save the Date: 2019 PhysTEC Conference

Join the nation’s largest meeting dedicated to the education of future physics teachers. The 2019 PhysTEC Conference will be held at the Westin Boston Waterfront Hotel in Boston, MA, March 2nd and 3rd. It will feature a special workshop entitled ‘Get the Facts Out’, a toolkit for recruiting physics teachers, and much more! Find out more at phystec.org.

BATHYSphere continued from page 2

sphere. This time their benefactor was Gilbert Hewey Grovemore, editor of National Geographic, who pledged $10,000 if Beebe and Barton succeeded in reaching a depth of half a mile and Beebe subsequently wrote an article for the magazine. By this time the bathysphere was complete, they succeeded in reaching 2,510 feet on August 11, 1934, just 140 feet shy of their goal. A few days later, on August 15, Beebe and Barton successfully took the bathysphere down to the promised 3,028, setting a new world record in the process. That record would stand until Barton broke it in 1949, on a dive in a new vehicle he dubbed the Benthoscope. Beebe lost interest in the bathysphere, deeming it too expensive for what little knowledge remained to be gained from such dives, but he continued to be an avid researcher. Active well into old age, even at 80 he could still scrabble up tree trunks to examine bird nests. As his strength flagged, he still managed to do work in the laboratory, such as examining the structure of bird nests. He died of pneumonia in 1962. As for the bathysphere, it was exhibited at the 1939 New York World’s Fair and was used to observe underwater explosions during World War II, before finding a permanent home at the Coney Island aquarium in 1957.

Further Reading:


American Institute of Physics CEO Michael H. Moloney

By Leah Poffenberger

The American Institute of Physics (AIP) started 2018 with big news: In January, AIP announced the hiring of its ninth CEO. In March, physicist Michael H. Moloney assumed his role at the helm of the organization.

AIP is a federation of scientific societies, including APS, dedicated to advancing and promoting the physical sciences. All told, the member societies cover over 120,000 scientists, engineers, and students. "AIP has been through a lot of change in the last decade," says Moloney. "My job, 87 years after AIP was established, is to help prepare AIP to be a robust, sustainable organization into its second century of existence."

AIP offers support and programs to its member societies to assist in communication, education, and promotion of the physical sciences, and publishes Physics Today magazine. AIP has an obvious benefit: AIP offers members to be Physics Today—Every member of our member societies receives it," says Moloney. "I remember getting it when I joined APS in 2001—it's certainly a powerful brand." AIP is a key resource in other ways: its subsidiary AIP Publishing offers a range of journals; AIP's newsletter FYI provides policy news and analysis; the Inside Science news site and podcasts provide a range of wide-spectrum science reporting; the Institute hosts the Niels Bohr Library and the Center for the History of Physics; and the Statistical Research Center produces original research on physics education and workforce issues.

Moloney is no stranger to science organizations: He's been a member of both the American Astronomical Society and AIP for most of the last 16 years, during which time he was on the staff at the U.S. National Academies of Sciences. He's also an experimental physicist in his own right, holding a doctorate from the University of Virginia, and 30 years of work spread somewhat between [atomic, molecular, and optical] physics and condensed matter physics," says Moloney. "It's like the time until I arrived in the U.S. that I knew I had to be a type of physicist—back then I was just a physicist."

Moloney's physics background, coupled with a seven-year career in diplomacy as a member of the Irish Foreign Service, uniquely qualified him for a position at the U.S. National Academies of Sciences. At the National Academies, Moloney oversaw the Aeronautics and Space Engineering Board and the Space Studies Board, both of which are

U.S. Physics Team Returns from Lisbon

By Leah Poffenberger

For the eleventh year in a row, every member of the United States Physics Team has medaled at the International Physics Olympiad (IPhO). This year, five high school students representing the United States traveled to Lisbon, Portugal, from July 19 to 29 to compete, taking home three gold and two silver medals, finishing seventh out of 60 countries.

This year’s traveling team included Daniel Zhu (Montgomery Blair High School), Michelle Song (McGill High School), Gopal Grod (Krishna Homeschool), YuQing Xie (Charter School of Wilmington), and Anthony Ou (Carmel High School). Zhu, Grod, and Xie scored gold medals, and Song and Ou both brought home silvers.

Every year, 20 of the nation's best and brightest high school physics students make the trip to the IPhO to compete for a gold medal— and rewarding—physics boot camp. These exceptional students make up the U.S. Physics Team, and five of them were selected based on performance examinations at the end of the training camp and their compatibility as a cohesive group to compete in the 49th IPhO.

On May 27, this year’s twenty students arrived at the University of Maryland, which became their headquarters for physics instruction, discussion, and experimentation for the next ten days. Despite coming from different states and schools, and ranging from freshmen to seniors, the team quickly bonded around their love of physics.

Michelle Song shared her experience from last year’s camp in her biography this year: “I had always thought I’d be too tired after a day of lectures and exams to continue talking about physics over the dinner table, but Physics Camp last year proved me wrong.” wrote Song. “I never knew a bunch of nerds could be this down-to-earth and cohesive.” Song competed at
PhysTEC Announces the 2018 National Teacher of the Year

By Leah Poffenberger

Each year, the Physics Teacher Education Coalition (PhysTEC) selects a group of outstanding recent graduates from physics teaching preparedness programs around the U.S. PhysTEC recognizes up to one local Teacher of the Year per PhysTEC institution and a single national Teacher of the Year. This year’s national winner is Tiffany Taylor from Rogers Heritage High School in Rogers, Arkansas.

The Teacher of the Year award recognizes the contributions of physics educators to their school and the physics community at large. Award recipients receive a certificate of recognition from PhysTEC, funding to attend two professional physics conferences focused on teaching and teaching preparedness, and a grant of $1000 for classroom materials.

Taylor was especially noted for her recruitment efforts and the increase in enrollment of students in AP Physics I and 2, from only 26 students in her first year of teaching, to over 80 students in recent years. More than 40% of her students are typically from underrepresented groups in physics (including women and Hispanic populations).

“Student retention and motivation are the keys to their success. She pays close attention to ensuring that all students feel welcome in her class,” says the announcement on the PhysTEC website. “As part of her award, she receives funds to attend the 2018 American Association of Physics Teachers (AAPT) Summer Meeting in Washington, DC, and the 2019 PhysTEC Conference in Boston, MA, where she will receive public recognition for her achievements.”

PhysTEC is jointly led by AAPT and aims to improve the education and preparedness of future physics teachers by transforming physics departments, creating successful models for physics teacher education programs, and disseminating best practices. For more details, visit www.physTEC.org.

COMIC CON continued from page 2

During the convention, visitors had their chance to snag free copies of several Spectra issues, chat with Thompson, and get quick physics lessons on light emitting diodes and magnetism. Stopping by the Spectra booth is a yearly highlight for Spectra. Such outdoor shows often include limited quantities of comics, which is why Thompson is always at the booth. Of course, people are also looking for the new comic, which is always available online.

“Comic Con is full of people who are always looking for new ways to get their hands on physics. I always have a good time at the booth, and I think that people enjoy the comics. I’m always happy to meet new people and talk about physics. I hope that people take away a new appreciation for physics from the booth.”

For more information about Spectra and the activities of the APS Outreach team, visit www.aps.org/outreach.

The U.S. Physics Team that went to Portugal for the 2018 International Physics Olympiad. L-R: YuQing Xie, Gopal Goel, Michelle Song, Daniel Zhu, and Anthony Ou.
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of the APS flagship honor, the 2018 APS Medal for Exceptional Achievement in Research.”

Halperin received his A.B. degree from Harvard in 1961, and his Ph.D. from the University of California, Berkeley, in 1965. Following a postdoctoral year in Paris, he spent ten years at Bell Laboratories and then joined the Harvard physics faculty in 1976.

While Halperin’s early work centered on the behavior of classical critical systems and properties of systems with frozen disorder, his recent work has focused more on quantum properties of electrons in confined geometries, especially two-dimensional electron systems in a strong magnetic field.

Topological aspects of his work include the roles of dislocations and disclinations in two-dimen- sional melting, of vortices in the superfluid transition, and of edge states, fractional statistics, and emergent gauge fields in quantum Hall systems.

Among his many honors, Halperin is a member of the National Academy of Sciences and the American Philosophical Society, and a fellow of the American Academy of Arts and Sciences. In addition to his APS awards, he received the Dannie Heineman Prize of the Göttingen Akademie der Wissenschaften, the Lars Onsager Lecture and Medal of the Norwegian University of Science and Technology, an honorary doctorate from the Weizmann Institute of Science, the Lise Meitner Lecture and Medal, and the Wolf Prize in Physics.

The formal award will be made at a ceremony in Washington, DC, on January 31, 2019. In addition, Halperin is invited to give a presentation on his work at the 2019 APS March Meeting in Boston (March 4-8). The Medal is accompanied by a prize of $50,000.

For more on the award visit aps.org/prizes/medals.cfm.

Distinguished Lecturer in Plasma Physics (DLPP) Program

The Division of Plasma Physics (DPP) of APS invites academic institutions to host a DLPP speaker in academic year 2018-2019 for one or two days. Lecturers will give a departmental colloquium open to the entire academic community and will meet with student and faculty. They may also give a guest lecture in a class related to plasma physics. The dual purpose of the program is to strengthen plasma physics in the established lexicon of basic and applied physics by increasing awareness of plasma physics to students and faculty in college departments that do not have a significant plasma research component and to steer new graduate students towards a Ph.D. in plasma physics.

DPP covers travel expenses of the lecturer whereas the host institution is responsible only for arranging and advertising the lecture schedule. Requests should be sent directly to the DLPP speaker or to Mark Koepke (mkoepke@wvu.edu). There is no deadline. For these instructions, details, and others, see apsdpp.org/outreach/lecturers.php

Lecturers for 2018-2019:

- Extreme environments at the world’s most powerful pulsed x-ray sources
  - Chonglin Su, Lawrence Berkeley National Laboratory

- Fast Magnetic-Reconnection in Laboratory and Space Plasmas
  - Armitava Bhattacharjee, Princeton Plasma Physics Laboratory, Princeton University

- Lasers, plasmas, and the big things we could do if we had small accelerators
  - Wm. Leemans, Director, Accelerator Technology and Applied Physics Division and Berkeley Lab Laser Accelerator Center

- From sandpiles to burning plasmas: How turbulence self-organizes to facilitate fusion energy
  - George R. Tynan, University of California - San Diego

- Stormy (space) weather: An EMFISIS on the Radiation Belt Storm Probes
  - Craig Kletzing, The University of Texas at Austin

- Solar wind interactions with magnetized lighter plasma cavities and unmagnetized heavier plasma clouds in the heliosphere
  - Peter Delamere, Geophysical Institute, University of Alaska

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Regtisky is the type of person who takes initiative, according to Jen [Dailey] epitomizes the traits that your Society holds important – she is committed every day, an excellent scientist, and an excellent citizen of the world,” said Jonah Erlebacher, professor and chair of the Johns Hopkins Department of Materials Science and Engineering.

Erlebacher added that Dailey has been a superb student. “I have had the pleasure of Jen in my classes and participated as a panel member in her thesis proposal defense, which she easily passed. Her idea for this presentation at this milestone was notable—not only did she present an effective argu- ment for why her work develop- ing sensors ultimately for detecting pathogens such as MRSA [methicillin-resistant staphylococcus aureus] was feasible and innova- tive, but her presentation style was exceptionally good.”

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candidate for the fellowship from our department. I believe that Jen [Dailey] epitomizes the traits that your Society holds important – she is committed every day, an excellent scientist, and an excellent citizen of the world.” Senator Ted Cruz (R-TX), have been vocal critics of the Pentagon’s space-based missile defense policy.

“Abigail is an extremely tal- ented materials scientist with a deep dedication to applying her skills in efforts that ultimately will support a more sustainable life on this planet. Already during my first meeting with Abigail as part of our departmental recruitment, I was immediately impressed with her strong desire to pursue her own research and her early presentation at this milestone was notable—not only did she present an effective argu- ment for why her work develop- ing sensors ultimately for detecting pathogens such as MRSA [methicillin-resistant staphylococcus aureus] was feasible and innova- tive, but her presentation style was exceptionally good.”

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receive corresponding budget increases. APS supports the Senate version of S. 4154, which has strin- gent funding directives.

Separate quantum-focused legis- lative measures, however, already made it into law this year. The annual defense policy bill Congress passed in August directs the Department of Defense to create a program to coordinate QIS R&D across the department and interface with civil- ian agencies where appropriate.

At the other end of Pennsylvania Avenue, the White House Office of Science and Technology Policy has tapped NIST physicist Jake Taylor to be the office’s first-ever point person for QIS and co-lead a new interagency coordinating commit- tee dedicated to the subject (see APS News, February 2018). Across the Potomac, the Pentagon has cre- ated a new position dedicated to overseeing quantum research as part of a broader restructuring of its R&D apparatus.

Although the current spate of congressional action is driven by interest in the potential techno- logical applications of QIS, Taylor stresses that there is much fundamental science still to be done. “If you just think of this as a technological field that’s ripe for that type of development, I think that at the present time we see that as a bit early,” Taylor says. “There is technology to be done, for sure, but it’s a little bit like trying to predict the di- rect nexus of the Global Positioning System right after you invented the atomic clock.”

The author is a science policy analyst with FYI at the American Institute of Physics.

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of space-based conflict. “If we’re not careful, we may lose options for keeping space secure for the benefit of all people,” said Grego at the press conference.

In addition to its threat to outer space, the current U.S. missile defense system isn’t entirely effec- tive at stopping missiles, either. It has tested tests only half of the time, under idealized conditions, says Grego.

Some lawmakers, such as Senator Ted Cruz (R-TX), have expressed support for building a missile defense system in space, a recurring idea since the Reagan administration proposed “Star Wars”—the Strategic Defense Initiative—in the 1980s.

In theory, these systems could target missiles as they are launch- ing, as opposed to when they are cruising. Missiles in boost phase would be easier to hit, as they would be moving more slowly. They are also less likely to have countermeasures such as decoys to fool interceptors. However, for a space- based missile defense system to be effective, the system would need to cover vast swaths of the planet at once, which would be too expen- sive, says Harrison. For example, to defend against North Korean missiles, the system would need the ability to launch an interceptor at the country within minutes at all times of day.

“The biggest misconception is that space-based interceptors are a viable option for protection,” says Harrison. “They’re just not. The physics doesn’t work, and it doesn’t scale.” Yet last year, Congress authorized the Pentagon to develop a space-based missile defense system.

Ultimately, the only foolproof method of blocking a missile attack is to avoid conflict in the first place, says Grego. To her, the policy mak- ers’ overall strategy for missile defense—building new technol- ogy—points to a bias against diplo- matic solutions. “There’s a real impulse to solve things unilaterally with technology,” she says. The author is a freelance writer in Tucson, Arizona.
With the release of the U.S. National Academies (NA) report Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine [1] and the increasing visibility of the #MeToo movement [2], this is a good time to consider the experience of women in our APS community. There is growing awareness of the damage that is done to individual careers as well as to our physics community when women are not treated with equity and respect. Here we want to discuss steps that have been taken as well as the work our community still needs to do. Gender norms, for better or worse, are part of human culture; managing the negative impact they can have is something that will take perpetual and continuing effort. While the APS members embrace this concept and make a commitment to help create an APS culture where personal integrity and physics excellence are celebrated, where those who unintentionally harass are mentored, and those who continue to harass are marginalized.

The NA report emphasizes that typically when the phrase “sexual harassment” is used, we think of explicit and unambiguous assault or coercion. But included in the range of behaviors the NA identifies as sexual harassment is “gender harassment”—actions and comments that demean or belittle women and/or call attention to them as sexual objects. The NA report states that “the trauma experienced from gender harassment on women, as reflected in their physical and mental health and their likelihood of leaving the field, equals that of physical assault. This is the landscape we are in APS, and as members of our physics community at our universities and laboratories, need to address. To take a recent example, the theme of the 2018 APS Applied Physics meeting was Sexual Harassment. A tremendous amount has been written about Feynman, his famous physics achievements, and his famous personality, including many essays on the long-running tension between our awe of his discoveries and our acknowledgment of the gender harassment he perpetrated [3].

Unfortunately, even today people in our community think that if Feynman did it, it must be okay. It is not, and we hope in what follows to present some ways that the APS community can move forward.

Within our own subfields of physics, there is still much that needs to be done. When we asked Division of Nuclear Physics (DNP) members to tell us about experiences at APS meetings that made them uncomfortable, we received two types of responses. The first type related interactions that made the responder feel diminished, demeaned, or unwelcome. The second type indicated that the responder had never witnessed any inappropriate behavior at APS meetings. We think both viewpoints are sincere, and that this mismatch between experiences is one reason it is so difficult to create a welcoming environment for all women at APS meetings. Within the subgroup of a community has felt felt unwelcome it is hard for people in that portion to believe that there is a problem. The NA report cites that “58 percent of women experience sexually harassing behaviors at work” [4]. This varies by field from 43 to 69 percent. A more recent survey found that 81 percent of women and 43 percent of men are sexually harassed during their lifetime, with 38 percent of women reporting being harassed in the workplace [5].

This happens in academia and it happens in Silicon Valley; to assume that it is not a problem at APS meetings would be naïve and unreasonable. Since all APS divisions except for our largest—more than 20 percent women in a small population means that the number of people being harassed is small, but the NA report finds that the climate in which women are a small percentage of a community actually increases the likelihood of any one woman being harassed [1]. These numbers may explain why we have APS members who never witness inappropriate behavior as well as members whose careers are completely derailed by harassment. It is also possible that some of our members do not recognize harassment when they see it. Even fewer in our community are minorities in race or sexual orientation, and yet harassment in these communities is higher than in the parallel “majority” category [7]. This situation is in complete conflict with our desire to make our APS community more inclusive.

Fortunately, the NA report identifies several remedies and explicitly advises that “Professional societies should accelerate their efforts to be viewed as organizations that are helping to create culture changes that reduce or prevent the occurrence of sexual harassment.” Steps that the APS community has already taken to address this problem include establishing a Code of Conduct (CoC) [8]. This CoC is currently operational for the March and April meetings. Critically, before anyone can take part in the meetings they must agree to abide by the CoC. The annual DNP meeting has also implemented the CoC and registration agreement.

The DNP established an Allies program at its Fall 2017 meeting in Pittsburgh [9] after receiving reports of harassment of participants in the Conference Experience for Undergraduates. The Allies program visibly raises awareness of harassment at meetings and provides trained bystanders who serve as a resource to targets of harassment. In addition to this, the DNP Ad-Hoc Education Committee has sponsored workshops at the fall meetings on issues related to diversity and sexual harassment, addressing stereotype threat, implicit bias, and diversity in the workplace. At the Fall 2018 DNP meeting in Hawaii we will continue our Allies program. In addition, we are planning a workshop there on how senior DNP members can help improve the climate at our meetings.

The NA report emphasized the influence professional meetings and organizations have and that “... they have a responsibility to join academic institutions in addressing sexual harassment ... Sexual harassment in academic science ... cannot be addressed in higher education if the standards of behavior are not also upheld in these off-campus environments.” Of the NA suggestions the APS has yet to implement we advocate:

1. Broadening the Allies program to encompass all APS meetings.

2. Offering bystander training at APS meetings.


5. Requiring a pledge to abide by the APS CoC not only at every APS conference registration, but for membership renewal.


7. Administering regular surveys to APS members to measure our progress.

By Warren Rogers, Roxanne Springer, and Sherry Yennello

References

1. The NA report is available at go.aps.org/2BxeinG.


3. See, for example, go.aps.org/2NhkzAE. For a nicely balanced way to think about our flawed scientific role models, see “Re-examining our Physics Heroes,” Nat. Phys. 14, 769 (2018); nature.com/articles/d41576-018-0263-0.


5. See the NPR story at go.aps.org/2i16xf4 (Note: these numbers are for sexual harassment so those for total harassment will be higher).

6. Credits are available at go.aps.org/2MN4H.

7. RAIN (rain.org/stats/victims-sexual-violence).


9. The Astronomy Allies program created by the American Astronomical Society was highlighted in the NA report. See also APS News; December 2015: go.aps.org/2oCoIDm. The DNP Allies program was created by the DNP ad-hoc Committee on Harassment Prevention, chaired by Prof. Filomena Nunes of Michigan State University.

10. The American Geophysical Union does this. For more, see the website at go.aps.org/2Ng97G.

11. Callisto is a non-profit organization that develops technology to combat sexual assault and harassment. See their website at projectcallisto.org.

12. APS Guidelines for Professional Conduct are available at go.aps.org/2Ngq2Z.

Some of us don’t recognize harassment even as it is happening. If your home institution offers training, please sign up for it. Bystander training is an effective way to respond to incidents of harassment [1]. This training will allow more of us to be equipped to positively influence potentially harmful situations as we witness them. The next time you see or hear something that looks like harassment, please do something. If you are at an APS meeting you can say something yourself or you can contact an APS representative at your meeting. Please be part of creating the inclusive and respectful culture we all want in our community.

“The influential role APS leaders play in shaping this climate cannot be overstated, but every APS member also has a responsibility.”