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PHYSICAL REVIEW JOURNALS 125 YEARS

The Physical Review Celebrates its 125th Anniversary

In 1893, the newly founded journal *The Physical Review* published its first research paper, one of five in the inaugural issue. Since then, the Physical Review family of journals has grown to encompass 14 high-quality publications.

This year, APS celebrates 125 years of excellence in physics publishing in the Physical Review journals. Throughout 2018, *APS News* will publish editorials, articles about the history of the Physical Review collection, and profiles of each of the Physical Review journals.

To kick off the anniversary, we start with a Back Page article by APS Publisher Matthew Salter and APS Editor in Chief Michael Thoennessen.

APS Advocacy in 2017: Working Together to be a Voice for Physics

By Tawanda W. Johnson and Gregory Mack

In 2017, the APS Office of Government Affairs (APS OGA, formerly the APS Office of Public Affairs) assisted Society members with nearly 15,000 contacts—phone calls, emails, and meetings—to their congressional representatives on crucial science policy issues. These endeavors included targeted approaches in specific states and districts, online campaigns for individual APS membership units, and activities at APS meetings. And in some cases, the House and Senate took action based on the overwhelming response from APS members.

At the APS Leadership Convocation, APS OGA met with unit representatives during the event to develop a common strategy to address the anticipated Trump Administration proposals to cut the fiscal year 2018 federal budget.

"We discussed a strategy for direct lobbying and grassroots advocacy on the federal science budget, as well as the need to build more champions for science in Congress," said Francis Slakey, APS Director of Government Affairs. Many of the units also agreed to partner with OGA on unit-specific, strategically timed grassroots advocacy campaigns throughout the year. This holistic approach to advocacy focuses on local impact and voices, supplemented by DC-based lobbying.

Integrated Advocacy & State-Based Campaigns

The discussion with unit leaders kicked off OGA's new Integrated Advocacy Strategy, which has four steps:

- Identify a senator or representative and match that member with a specific advocacy goal.
- Find a constituent volunteer in the congressperson's state or district, and the APS Press Secretary will work with that volunteer to write an op-ed for the local newspaper or national publication.
- After the op-ed is published, the APS Government Relations Specialist sends an alert to APS members in the state or district urging contact with the selected member of Congress, to amplify the op-ed's message.
- Set up in-state meetings for the op-ed author with the local office of the senator or representative, with OGA staff amplifying the message through meetings with the DC staff of the congressional office.

State and district-targeted op-ed articles were authored this year by: Jessica Winter (OH); Mina Hanna (TX); Karen King (MO); Dominic Calabrese (CA); Olle Heinonen (MN); Timothy Gay (NE); Maury Tigner (NY); Patrick LeClair

OGA continued on page 6

Announcing Inaugural PhysTEC Fellows

By Thomas Hone, PhysTEC Project Coordinator

The Physics Teacher Education Coalition (PhysTEC) announces its inaugural cohort of PhysTEC Fellows: teams from five different institutions were selected from among many applicants to receive recognition and support to build and enhance physics teacher education programs. These Fellows come from Indiana University-Purdue University Fort Wayne (IPFW), Texas A&M University-Commerce (A&M-Commerce), University of Houston, Wright University, and Worcester Polytechnic Institute. Each of these institutions not only showcased a strong desire to grow and improve their physics education program, but also provided compelling plans to do so. Since 2001, the PhysTEC project, led by APS and AAPT, has worked to address the severe national shortage of qualified high school physics teachers. In July 2017, the project received $3.375M from the National Science Foundation to build on previous achievements and explore new directions, including the Fellows program.

IPFW is currently the eighth-largest producer of teachers in Indiana and has seen significant growth in its physics department over the past 10 years. In 2015 they won the APS Improving Undergraduate Education Award. Fellows Mark Masters and Matthew Perkins are working to bridge the gap in demand and supply for physics teachers in Indiana. They seek to accomplish this by expanding their outreach and integrating Learning Assistants, experienced undergraduate instructors who assist in large classes, into several physics courses in the program.

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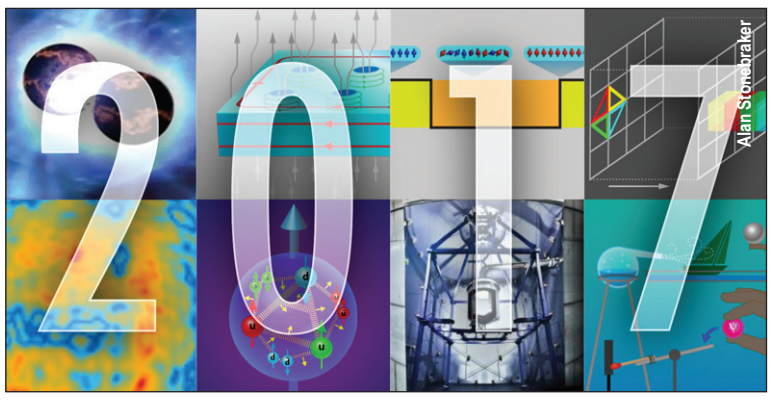
Physics: Highlights from 2017

The editors of Physics *select their favorite articles from the past year (reprinted from physics.aps.org).*



Multimessenger Astronomy Makes an Explosive Entrance

2017 was another sensational year for gravitational-wave detection. Days after the Nobel Prize in Physics was awarded to three leaders of the decades-long search for these spacetime ripples, the LIGO and Virgo collaborations announced the detection of a gravitational-wave signal emanating from the merger of two neutron stars (see the Viewpoint **Neutron Star Merger Seen and Heard** at physics.aps.org/articles/v10/114). If this achievement wasn't enough, multiple telescopes around the world also captured the myriad electromagnetic fireworks accompanying this merger. For the first time, electromagnetic signals and gravitational waves were detected from the same source, heralding a new era of astronomy in which scientists can both watch and "listen" to objects in the cosmos. Virgo coming online and adding one detector to LIGO's two was essen-

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Physics Next Workshops Topic Suggestions for August 2018

APS is currently soliciting ideas for a *Physics Next* workshop to be held in August 2018. This workshop series was launched in 2017 and is aimed at fostering new and emerging areas of physics research, focusing on topics that straddle traditional subject boundaries and are starting to "emerge from the noise." Two workshops have been organized so far: "Material discovery and design" in May 2017 and "Quantum fields and condensed matter" in August 2017. A third one "Physics of living matter" will take place April 24-27, 2018.

If you want to suggest a topic for a *Physics Next* workshop, please send a short description of the workshop, including a proposed title, scope, and a preliminary list of top experts that might be interested in participating to physics-next@aps.org. The deadline to submit your idea is January 31, 2018. A committee of APS editors will review the suggestions and reach a decision by the end of February.

The goal of the *Physics Next* workshops is to provide small, relaxed gatherings to promote open and informal discussions and the exchange of information needed to help assess the promise and challenges of an emerging field. The workshops comprise a limited number of presentations and leave considerable room for informal conversations, round-table discussions, and social activities. *Physics Next* workshops strive to include a mix of senior-, mid-, and early-career physicists.

The workshops are held on Long Island (NY), in close proximity to the APS Editorial Office, to promote interactions with the editors of the Physical Review journals.

While the scientific program is the responsibility of the organizers, the APS editorial and conference offices will provide logistical and financial support, including covering local expenses of the participants. Limited funds are also available for additional support in some cases. Further information on the *Physics Next* workshops is available at journals.aps.org/physics-next.

Revised 01/29/18

Indo-U.S. STEM Education and Research Center in India

By Sultana N. Nahar

The Ohio State University (OSU), jointly with Aligarh Muslim University (AMU) in India, has established an Indo-U.S. Center of Excellence in Science, Technology, Engineering, Mathematics Education, and Research (STEM ER).

The center is the culmination of a five-year partnership of OSU with AMU under the Obama-Singh (now Indo-U.S.) 21st Century Knowledge Initiative award (2013-2017) to support faculty training of Indian postgraduate students in STEM disciplines. For the project, OSU has developed a unique two-year dual degree master's in education program that trains Indian students to acquire world-class teaching skills at the undergraduate level (in contrast to high school) and carry out a research project with an OSU advisor in his or her discipline that constitutes a chapter in a Ph.D. thesis.

Such research experience is of crucial importance so that the student can begin long-term collaboration with colleagues in the U.S. and initiate and lead projects in India. India needs to train at least 300,000 faculty members for existing and planned institutions of higher education for about 150 million students.

OSU has made a considerable contribution to the project. With its support, eight Ph.D. students of AMU from the departments of physics, chemistry, biochemistry, biotechnology, nanotechnology, mathematics, and zoology were trained at OSU during 2014-2017. Due to lack of funds, only four of them would have been able to enroll in STEM education classes.

The project founded a STEM ER center in 2013 to carry out various activities of the program under the Knowledge Initiative award. The center conducted online interviews and distance learning classes, organized an international conference at STEM ER in 2016, and collaborated on two nanotechnology conferences, Aligarh Nano IV and V.

Anil Pradhan and I founded the center, from the initial concept to securing the physical space at AMU with the support of the AMU administration led by the past Vice Chancellor Zameer Uddin Shah. In April 2017, the center was formalized with legal and financial structures that can bring funds to (i) continue the program on STEM education and research for the postgraduate students and extend it nationally to enroll students from other Indian institutions and (ii) carry out outreach STEM activities for underprivileged school students, for which we have now received funding.

The STEM ER center is now in operation and it has been named after the Indian scientist A. P. J. Abdul Kalam, who later served as a President of India. Activity is underway for a team of OSU-trained students to build an advanced STEM ER structure at the Jahangirabad Institute of Technology in Gorakhpur with

INDO-U.S. continued on page 7

OSU and AMU members at the symposium held at AMU that formalized the structure of the STEM ER center.

This Month in Physics History

January 1, 1995: Confirmation of the Existence of Rogue Waves

For centuries, scientists believed rogue waves were a myth, despite eyewitness accounts from returning mariners. The 19th century French explorer and naval officer Jules Dumont d'Urville made a name for himself as a botanist and cartographer, sailing around the world on various expeditions. Yet for all his fame and prestige, when Dumont reported seeing rogue waves over 100 feet high on his voyages, bolstered by three eyewitnesses who'd been with him, his claims were dismissed. Prime Minister François Arago publicly ridiculed him.

The skeptics based their doubt on the then current scientific consensus that waves of such size simply did not exist. The standard linear models that oceanographers, engineers, and meteorologists used to predict wave height largely ruled out giant rogue waves. And eyewitness accounts were few and far between, perhaps because most mariners who encountered such a wave rarely returned to tell the tale. With the advent of steel-hulled ships in the 20th century, the probability of survival increased dramatically—and so did the number of reported sightings.

A Scottish oceanographer named Laurence Draper wrote the first scientific article about rogue waves—he called them "freak waves"—in 1964, detailing efforts by the National Institute of Oceanography in Southampton to record wave heights. Ironically, Draper—who trained as a physicist at Nottingham University—suffered from chronic seasickness, and initially feared it would derail his career. "I expect I had better resign. I am no good at sea," he told his employer after falling ill on his first working expedition. Instead, he put his scientific talents to good use on dry land and made his name as an expert in wave analysis and prediction. He came by his fascination with waves after stumbling upon a newspaper article on how ocean waves can adversely affect military operations.

Draper based his 1964 analysis on recordings made by a British weather ship in the North Atlantic. At the time, the highest wave recorded was about 67 feet. Most oceanography textbooks didn't even mention the possible existence of rogue waves. "[F]ar from ridiculing the old sailors' stories about enormous waves, modern research has confirmed that such monsters can occur, and that wave heights can exceed by an appreciable amount the maximum values which have been accepted in responsible circles," Draper wrote in 1971.

The first real measurement of a rogue wave occurred on January 1, 1995. It was recorded by a laser detector on the Draupner oil-drilling platform, owned by Statoil, which was located 100 miles off the coast of Norway. Statoil built the platform to withstand a wave of 64 feet, with a probability of occurring once every 10,000 years. Yet the "Draupner wave" of 1995 measured a whopping 85 feet—21 feet taller than predicted—and its

Measurements in 1995 with instruments on the Draupner oil-drilling rig confirmed a rogue wave height of 85 feet.

characteristics didn't fit any previous wave model.

Statoil's scientists followed up in 2000 with a paper concluding that, far from being an ultra-rare phenomenon, rogue waves were likely more frequent than previously believed from prior models. (This has since been confirmed by various satellite radar studies.) That same year, a British vessel called the RRS *Discovery* recorded a 95-foot rogue wave off the coast of Scotland, which made headlines because none of the theoretical models predicted such a wave under the conditions at the time.

In fact, there could be as many as ten rogue waves forming in the world's oceans at any given moment. This would explain the mysterious sudden loss of several ships, such as the cargo ship MS *München* in 1978 and the MV *Derbyshire* in 1980. Like the *Titanic*, the *München* was thought to be unsinkable, yet the ship and her crew were lost at sea, with a single starboard lifeboat recovered from the floating wreckage offering the first physical evidence of the force of rogue waves. The damage to the lifeboat was such that the wave that hit the ship must have been around 65 feet high.

The National Oceanic and Atmospheric Administration put together a catalog in 2007 listing 50 historical maritime incidents that were most likely due to rogue waves. Rogue waves may

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The APS Distinguished Lectureship on the Applications of Physics

Physicist is not a profession most people routinely encounter. Even physics students may never have met a physicist outside of the classroom. Yet only a small fraction of Ph.D. physics graduates find careers in the academic world [1,2]. The APS Committee on Careers and Professional Development and the Forum on Industrial and Applied Physics (FIAP) endeavor to inform physicists of the many other career options open to them. One communication channel is the Distinguished Lectureship on the Applications of Physics. Each year one Distinguished Lecturer is selected to carry the message of broader opportunity to physics students and others interested in how physicists productively interact with the wider world.

Rudolf Tromp, a scientist at the IBM T.J. Watson Research Center in Yorktown Heights, NY, received the Distinguished Lectureship Award in 2017, for "extensive and significant contributions to the field of surface physics." He delivered his inaugural lecture at the 2017 APS March Meeting in New Orleans, under the title "So you have a degree in physics. Now what?" In his talk, which he has now given a half-dozen times in both the U.S. and Europe, he discusses some of the challenges that today's students experience, ranging from an extreme paucity of jobs in the academic sector (even though a majority of students expects to find employment there), to mental health issues and a lack of a compelling vision for the future.

Tromp reassures students that failing projects are a part of being a scientist, not a personal shortcoming, and that even after four decades as a scientist, his experiments can fail too. Nonetheless, prospects are good, with jobs available across a broad range of industries, small and large. The key to success is to not get stuck in the present, but to make innovation a lifelong habit, to continue to learn about things you know nothing about, and to think both deeply and broadly, he said.

The 2018-2019 Distinguished Lecturer is Robert Kleinberg, a physicist at Schlumberger-Doll Research in Cambridge, Massachusetts. Schlumberger is the world leader in the application of geophysical measurements to oil and natural gas exploration and production. Using his training as a physicist, Kleinberg has invented several geophysical instruments that have been deployed in oil and gas fields worldwide. In his inaugural address, to be given on Industry Day at the 2018 March Meeting in Los Angeles, he will show how these very practical measurements grew out of his thesis work on liquid helium-3, which becomes a Fermi-Dirac superfluid at temperatures below 0.003 kelvin—for which no practical application was ever envisioned.

The deadline for nominations for the 2019-2020 Lectureship is Friday, June 1, 2018. Nominations for the award must include a letter evaluating the nominee's most significant qualifying contributions and other related accomplishments (such as invited talks on his or her research); a description of the work being cited and a suggested title for the lecture series; and the nominee's curriculum vita and/or brief biographical sketch. In addition to these materials, the competitive nomination should also include a list of the nominee's important publications or patents relating to the work cited or lecture series topic; at least two, but not more than four, seconding letters; up to four of the most important reprints, preprints, patents, or other written

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Profiles in Versatility

Giant Cookbooks and Dinosaur Bones

By Katherine Kornei

When a six-volume, 54-pound, 2600-page cookbook was delivered to Nathan Myhrvold's desk recently, the 58-year-old entrepreneur wasn't surprised. That's because Myhrvold—who has a doctorate in theoretical and mathematical physics and was Chief Technology Officer at Microsoft until 2000—is also an accomplished chef. The cookbook, in fact, was his own.

Myhrvold leads a team at Intellectual Ventures—the think tank and invention lab he founded after leaving Microsoft—that's wildly diverse in its pursuits. He also heads up Modernist Cuisine, a group of chefs and chemists, among others, devoted to the culinary arts. Modernist Cuisine's staff spent the last four years baking over 36,000 loaves in bread for the cookbook *Modernist Bread*, the first printing of which showed up on Myhrvold's desk in September. There's also a humanitarian side to Myhrvold's work, such as his team's invention of the Arktek, a solar-powered dewar that's capable of keeping vaccines cold for up to a month. "We write giant cookbooks, and we try to solve some of the problems experienced by the poorest people on earth," Myhrvold explains. A

Left: Nathan Myhrvold. Inset: The Arktek, a solar-powered dewar for keeping vaccines cold

testament to the diversity of work going on at Intellectual Ventures: Manuscripts recently published by Myhrvold and his colleagues have appeared in publications spanning *Mathematical Biosciences, Scientific Reports*, *The American Journal of Tropical Medicine* and *Hygiene*, *Biomicrofluidics*, and *The Journal of Chemical Physics.*

In the Intellectual Ventures headquarters in Bellevue, WA, a rocket engine greets visitors in the lobby, and a small metal plaque hanging from it reads "NOW *THIS* IS ROCKET SCIENCE!" And the art installation on the ceiling that doubles as illumination is an homage to Isaac Newton: Lights shine through small and large holes that correspond to the 0s and 1s of binary code, and the pattern of holes spells out the original Latin text of the scientist's three laws of motion.

After a brief stint as a postdoc at the University of Cambridge in the UK, Myhrvold left the world

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form even in lakes, via a phenomenon known as the "Three Sisters," in which three large waves form at the same time, and can strike a vessel in quick succession, creating a large backwash and overloading a ship's deck with water. The famed 1975 wreck of the SS *Edmund Fitzgerald*—immortalized in the popular ballad by Gordon Lightfoot—may have been due to the Three Sisters.

Rogue waves are an active area of research, and may not be limited to oceans and lakes, having recently been reported in liquid helium and microwave cavities. Scientists now think they form as the result of constructive interference, when different waves travel at different speeds and pile up under certain circumstances. While there is no known way to predict when rogue waves will form, we are learning to spot them sooner. In 2016, MIT scientists devised a new algorithmic prediction tool to spot clusters of waves in the ocean that could develop into a massive rogue wave, giving sailors a few minutes warning before the wave hits.

There may even be "super rogue waves" that can appear suddenly in seemingly calm seas and engulf unsuspecting ships. Scientists at Australian National University, Hamburg University of Technology, and the University of Turin demonstrated the possibility in a 2012 experiment involving a LEGO pirate on a ship floating in a fish tank that was published in *Physical Review X*. Their findings were consistent with the so-called "Peregrine soliton" explanation for how rogue waves form, namely, that nonlinear interactions between waves allow one wave to sap energy from surrounding waves and focus it into one much larger, short-lived wave.

Further Reading:

Casey, S. 2011. *The Wave: In Pursuit of the Rogues, Freaks, and Giants of the Ocean*. Anchor Canada.

Chachoub, A. *et al*. 2012. Super Rogue Waves: Observation of a Higher-Order Breather in Water Waves. *Physical Review X* 2, 011015.

Zirker, J.B. 2013. *The Science of Ocean Waves: Ripples, Tsunamis, and Stormy Seas*. Baltimore: Johns Hopkins University Press.

Letters

Members may submit letters to letters@aps.org. APS reserves the right to select letters and edit for length and clarity.

The Harvard Computers

I enjoyed your "This Month In Physics History" article on Henrietta Swan Leavitt, which appeared in the December 2017 issue of the *APS News*. Some of the wording, however, helps to perpetuate a prevalent myth about the origin of the female Harvard Computers. The article could leave the impression that Williamina Fleming was the first woman to be hired at the Harvard College Observatory, and that Charles Pickering was the first to hire female computers there. As Dava Sobel's book, which is cited in the article, details, the first female computer at Harvard was Anna Winlock in 1875, hired before Pickering became director. The process accelerated quickly from there. In 1879, two years *before* Fleming was hired as computer, a parody of Gilbert and Sullivan's *H.M.S. Pinafore* was written about the Harvard College Observatory, featuring an all female chorus of computers, suggesting the practice was well established by that time.

Some of the other aspects of the typical origin story are also misleading or oversimplified. Pickering did not initially pay female computers less than male computers, although he did favor a large staff of computers to reduce the expense of hiring professional astronomers, who at the time were all male. Over time, as the skills and duties of the women developed, they were doing the jobs of astronomers but paid at a much lower rate as computers, but that was not the case at their initial hiring.

Why are these details important? For one thing, the prevalent myth places the idea for hiring female computers at the feet of Charles Pickering, solely as a way of getting better performance for less cost. But Maria Mitchell, one of the most prominent American astronomers of the period (and herself a former computer for the United States Coast Survey) and someone who had worked closely with all of the previous directors of the Harvard College Observatory, gave a major speech in 1876 arguing in favor of women being hired into such roles. Pickering would surely have been aware of those views, and at times alluded to the ideas Mitchell expressed. Ironically, in leaving out Mitchell's role in encouraging the hiring of female computers, the contributions of a key female scientist are inadvertently suppressed.

These ideas are covered in more detail in my recent book from IOP, *Beyond Curie: Four Women in Physics and Their Remarkable Discoveries, 1903 to 1963*.

Scott Calvin
Bronx, New York

Doublet Dudes

The Back Page article on "Doublet Dudes" (*APS News*, December 2017) described the origins of the General Atomic (GA) fusion program.

Perhaps the greatest accomplishment of the GA program has been achieving the status of "last man standing."

At one time there were major magnetic fusion facilities at LLNL (Livermore), LANL (Los Alamos), ORNL (Oak Ridge), PPPL (Princeton), MIT, U. Texas and U. Wisconsin. Over the past three decades, *all* those facilities have been shut down, some because they were backing the wrong horse (mirrors, pinches, or multipoles), and the others because of engineering inadequacies or severe managerial incompetence.

Today the large fusion facility at GA soldiers on alone in USA magnetic fusion, as far as large facilities are concerned. Was this outcome foreseen by the Doublet Dudes?

Daniel Jassby
Plainsboro, New Jersey

Gravitational Waves

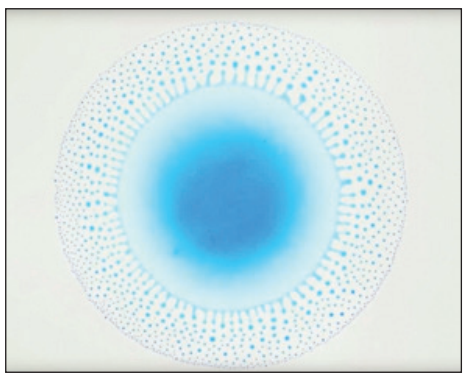
The article on the 2017 Nobel Prize (*APS News*, November 2017) states "Gravitational waves from distant cataclysmic events propagate as compressions and expansions of spacetime." This is rather misleading, because it suggests gravitational waves are locally isotropic compressions and expansions, as in sound waves in a gas. In fact, a better description would be "transverse shear strains." Also, "spacetime" is like a medium because the metric is a dynamical field. So it would be more accurate to say "transverse shear strains of the spacetime metric." Why not be more accurate when it's so easy to be so?

Ted Jacobson
College Park, Maryland

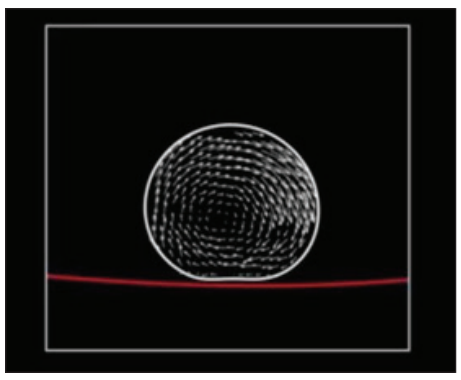
Galley of Fluid Motion Winners for 2017

Every year, the APS Division of Fluid Dynamics (DFD) invites submissions of videos and posters that highlight the beauty and science of fluids. From among these, a panel of judges selects entries to receive the APS/DFD Milton van Dyke Award and the APS/DFD Gallery of Fluid Motion Award. These top-ranked winners will be published in the APS journal *Physical Review Fluids* in 2018. The video winners are listed below; the poster winners will be mentioned in the next issue of *APS News*. The full collection of submissions can be found at gfm.aps.org

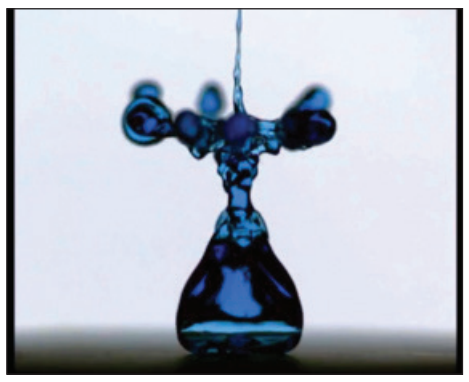
2017 Milton van Dyke Award Video Winners



Marangoni Bursting (V0020): Stunning patterns emerge when an alcohol-dye droplet evaporates on an oil surface. doi.org/10.1103/APS.DFD.2017.GFM.V0020

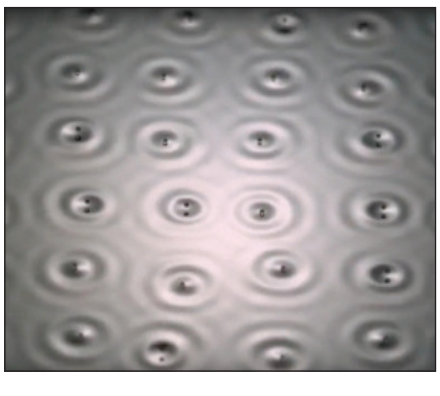


Leidenfrost Wheels (V0052): Internal flows cause tiny liquid droplets levitating on a hot surface to roll around. doi.org/10.1103/APS.DFD.2017.GFM.V0052

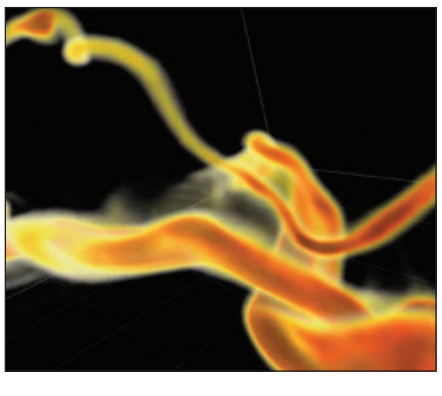


Kicking Droplets (V0080): Droplets on vertically moving plates form intricate shapes when they lift off. doi.org/10.1103/APS.DFD.2017.GFM.V0080

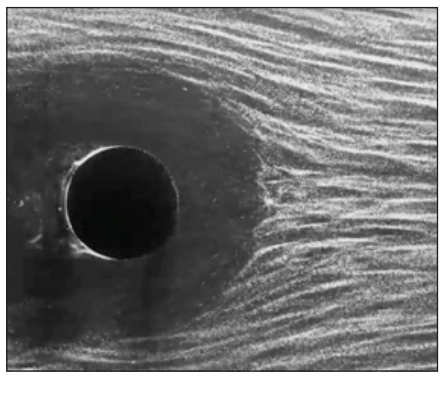
2017 Gallery of Fluid Motion Award Video Winners



Spin Lattices of Drops (V0018): Spinning droplets interact with each other via surface waves, forming regular lattices. doi.org/10.1103/APS.DFD.2017.GFM.V0018



Vortex Ring Collisions (V0037): When two vortex rings collide, they break up into smaller and smaller structures, eventually dissipating into a turbulent cloud. doi.org/10.1103/APS.DFD.2017.GFM.V0037



Order and Chaos in C-Major (V0053): Fluid motion often involves the interplay of coherent structures and random processes. doi.org/10.1103/APS.DFD.2017.GFM.V0053

Soap Opera in the Maze (V0098): Thanks to surface tension, soap molecules can follow the correct path out of a labyrinth of channels. doi.org/10.1103/APS.DFD.2017.GFM.V0098

Education & Diversity Update

MSI Travel awards available for the 2018 PhysTEC Conference

Travel support is available for Minority-Serving-Institution faculty interested in attending the 2018 Physics Teacher Education Coalition Conference on February 9–10 in College Park, MD. This annual conference is the nation's largest meeting dedicated to the education of future physics teachers. It will be followed, on February 10–11, by the Building Thriving Undergraduate Physics Programs workshop, which assists departments in developing strategies for increasing enrollment of physics majors. The deadline for registrations and applications for funding is January 18th. Find out more at phystec.org/conferences/2018/

Workshop for Educators of Elementary Science Teachers

Register before January 18th for a one-day workshop to learn about Next Gen Physics and Everyday Thinking (PET)—a Next Generation Science Standards-based course for prospective elementary teachers. Travel support is available if you are considering implementing a version of PET at your institution. This workshop precedes the PhysTEC conference. Check it out at phystec.org/conferences/pet18/

HBCU/BSI Physics Chairs Summit

In response to the sense of urgency felt by the APS Committee on Minorities (COM) to understand the decline of the percentage of physics bachelor's degrees earned by African Americans, the committee decided to host a one-day summit for physics chairs of Historically Black Colleges and Universities (HBCU) and Black Student Initiatives (BSI) in order to identify actions that could be taken. The HBCU/BSI Physics Chairs Summit was held at the Ellis Hotel in downtown Atlanta, Georgia on September 28, 2017. The 31 attendees participated in a series of focused discussions on key topics identified by COM, which was compiled into a comprehensive report that includes recommendations for future work. Please take a moment to view the report: go.aps.org/2l8tYTV

Braslau Family Travel Award

The Braslau Family Travel Grant Fund has been established to provide needed support for students and early career physicists to attend key meetings to advance their career and professional aspirations. The deadline to submit applications is January 12, 2017. Please visit go.aps.org/2l7OjbV to learn more.

Professional Skills Seminars for Women at the APS March Meeting: Sign up by February 9

Homeyra Sadaghiani

Undergraduate and graduate women in physics are invited to attend a professional skills seminar on Sunday, March 4, 4:00–6:00 PM, at the 2018 APS March Meeting in Los Angeles. This two-hour seminar will focus on professional skills that students can use to interact effectively on teams and with a mentor or advisor, think tactically, articulate goals, enhance their personal presence, develop alliances, and negotiate a position in academia, industry, or at a national lab. This highly interactive workshop will be led by Homeyra Sadaghiani, a professor of physics at Cal Poly Pomona.

Visit go.aps.org/2zDF73m and aps.org/meetings/march for more information. Sign-up in advance is required.

APS/IBM Research Paid Internships for Undergraduate Women and Underrepresented Minority Students: Application Deadline February 15

APS and IBM co-sponsor two undergraduate research internship programs; one for undergraduate women and one for underrepresented minorities. The goals of the programs are to encourage women and underrepresented minority undergraduate students to pursue graduate studies in science and engineering. Both internship programs offer salaried positions, at IBM research locations, that are typically 10 weeks long and provide an opportunity for interns to work closely with an IBM mentor. Two letters of recommendation required. For more information visit go.aps.org/2lgpMkc

First Harry Lustig Award Winner Announced

By Andrea Palounek

Sarah Bromley receiving the award from Kathrin Spendier, the chair of the Harry Lustig Award committee.

Sarah L. Bromley from the University of Colorado, Boulder, emerged as the first winner of the APS Four Corners Section's new prestigious Harry Lustig Award—and boy, what a competitive and exciting session it was!

If anyone had any doubts about the outstanding abilities of our young colleagues, the exciting, stimulating and thoroughly enjoyable award session put them to rest for good.

The three finalists were: Chandramouli Nyshadham (Brigham Young University), "Materials Prediction Using High-Throughput and Machine Learning Techniques," Andrew Missert (University of Colorado, Boulder), "Neutrino Oscillation Measurements Using a Maximum Likelihood Event Reconstruction Algorithm", and the winner Sarah L. Bromley (University of Colorado, Boulder), "Probing Many-Body Physics in an Optical Lattice Clock." They were chosen from an impressive field of nominees whose topics spanned all of current physics, a testament in itself to the breadth of science being done in the Four Corners States.

The special Harry Lustig Award session during the annual Four Corners Section Meeting at Colorado State University in Fort Collins included twenty-minute talks from each of our three finalists in which they described their research. It was a difficult decision but eventually Ms. Bromley's talk won the day.

The annual Harry Lustig Award recognizes exceptional graduate-level work done in one of our states, and consists of a $1,000 award and a certificate of acknowledgement. It honors Harry Lustig, who taught physics at CCNY, was APS Treasurer from 1985 to 1996, and was instrumental in the creation of the Four Corners section in 1997.

The deadline for nominations for next year's award is July 10, 2018. For more information visit go.aps.org/2CkHPAe or email lustigaward@aps.org. As the award is not yet fully endowed, anyone wishing to make a contribution to this important new award should do so directly at the Campaign Website (aps.org/about/support/campaigns/lustig/). For more information, contact Irene Lukoff, APS Director of Development, at 301-209-3224.

The author is secretary/treasurer of the APS Four Corners Section.

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of academic physics but kept the mindset of a scientist.

"The attitude of physics—that we can understand this, or at least we should try—is with me with in everything I do," says Myhrvold. "We're trying to harness the laws of physics … to solve important problems."

Cooking is one of Myhrvold's passions, and he's infused a decidedly scientific bent into his culinary work. "The centrifuge has become one of our favorite cooking tools in the lab," says Myhrvold, referring to his 3,000-square foot kitchen in the Intellectual Ventures building. "Food is full of biochemicals," he explains. "It's not surprising that the various tools that scientists have found useful for separating and analyzing biomolecules also work on food."

Myhrvold recounted the time he and his team decided to toss frozen peas into the kitchen's centrifuge. They whirled the veggies at 40,000*g* for a little over an hour and found that the peas separated into distinct layers sorted by density: pea starches on the bottom, then a thin layer with a texture like soft butter, and finally a fairly large layer of pea-flavored water. Myhrvold refers to the thin layer—an intensely flavored, spreadable essence of peas—as "pea butter" and has served it at the dinners he occasionally hosts in the kitchen. "Oh my God, that stuff tastes good," Myhrvold says.

Myhrvold and his team are known for their photographic cutaways of cooking-related tools such as BBQs, stoves, and blenders. "One of my favorite cutaways is the microwave oven," says Myhrvold. "It's omnipresent in our lives, but virtually none of its users know what it looks like inside." To create a cutaway, staff carefully take the object apart, cut each of its parts in half, and reassemble everything. Myhrvold's first cookbook, *Modernist Cuisine: The Art and Science of Cooking*, featured cutaways in abundance, as does *Modernist Bread*.

When he's not experimenting in the Intellectual Ventures kitchen, Myhrvold is often thinking about dinosaurs. He's part of a team that discovered a *Tyrannosaurus rex* skeleton in northern Montana in 2016, and Myhrvold is currently working on a paper about dinosaur growth rates. "The very largest of the dinosaurs may have rivaled blue whales in size," says Myhrvold. "How did they grow that large?" Myhrvold is studying rings in dinosaur bones—akin to tree rings—to determine the animals' growth trajectories.

Myhrvold is also fascinated by asteroids, which is perhaps not surprising given his interest in dinosaurs. "We've been so damn lucky," he says, to have evaded a truly catastrophic asteroid impact in human history. Myhrvold has studied how well several proposed ground- and space-based telescopes would be able to detect asteroids, including those that might pose a danger to Earth. He's also examined how data analysis techniques used to analyze asteroids might bias determinations of their physical properties.

Myhrvold's days, in his own words, are "many and varied," and he constantly seems to develop new interests. But a firm belief in science underlies everything the physicist-turned-entrepreneur does. "Once a physicist, always a physicist," says Myhrvold.

The author is a freelance science writer in Portland, Oregon.

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Being among the highest producers of STEM teachers in the state of Texas, A&M-Commerce has shown an institutional focus on teacher education. They are also currently on track to becoming a Hispanic Serving Institution (as defined in the U.S. Higher Education Act of 1965). Over the past few years they have overhauled their physics teacher preparation program. Fellows William Newton and Robynne Lock will build on this by establishing mentoring for pre-service teachers and formalizing a track to becoming a certified teacher through their M.S. in Physics.

With 80% of its graduates remaining in the Houston area, the University of Houston seeks to expand its role in addressing the local shortage of physics teachers. They are a UTeach replication site (uteach.utexas.edu) and have established a high-quality certification program for STEM teachers. Fellows Donna Stokes, Paige Evans, Rebecca Forrest, and Reggie Bain will expand recruitment activities within university physics courses and promote teaching as a respected career choice.

Serving the communities of Dayton, Ohio, Wright State University is nationally known for the programs it provides to students with disabilities, veterans, and first-generation college students. Recent changes in the physics department have led to revitalization of their physics teacher education program. Fellows Jason Deibel, Eric Rowley, and Beth Basista are working to modify their program so that all students will be able to obtain their B.A. and licensure within four years. They will also increase marketing of the program and collaboration with other PhysTEC institutions.

Lastly, with the highest retention rate in the nation, Worcester Polytechnic Institute is excited to further its emphasis in research and teaching. Fellows Douglas Petkie, Rudra Kafle, Izabela Stroe, and Shari Weaver will increase awareness by encouraging their faculty to promote the teacher prep program in their freshman physics classes. They will also develop informal and formal teaching experiences, including summer programs, outreach to local schools, and Learning Assistant positions.

PhysTEC supports such activities to help these institutions grow and improve their physics education programs. They will be given access to tools and strategies to improve their programs, help to build institutional support, and the opportunity to learn from the entire PhysTEC Fellow cohort. This program will also demonstrate what other external resources are available for physics teacher preparation and will help them increase their competitiveness for funding opportunities.

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(AL); and Mike Mayo (TX). Each stressed a key message, including the importance of federal investment in science and the nation's science infrastructure, as well as the critical value of science, technology, engineering, and mathematics (STEM) education. The articles are archived at aps.org/policy

The aforementioned authors met with the local congressional offices, often with positive results. For example, in the case of Jessica Winter of The Ohio State University, U.S. Sen. Rob Portman's staff in Ohio visited the campus to meet with her and her colleague Chris Hammel and tour the physics department.

In most cases, the combination of the op-ed, grassroots advocacy, and a local meeting generated favorable and demonstrable support for science by the targeted member of Congress.

Nationwide Advocacy Campaigns

APS OGA ran 15 national, unit-specific advocacy campaigns in 2017, which included activities during several APS meetings. The staff worked with unit executive committees to craft messages and with the APS Communications Department to send emails to unit members.

Campaigns for the Division of Nuclear Physics (DNP) and Division of Particles and Fields, which involved members of the Topical Group on Hadronic Physics (GHP), urged support for federal science funding, with examples of nuclear science and high energy physics. The Forum on Education (FEd) addressed science education funding, specifically for teacher preparation and informal programs, amplifying Karen King's op-ed.

The Forum on Physics and Society advocated for Congress to increase the current caps on the federal budget. APS OGA also partnered with the Society of Physics Students to stress the importance of federal funding that enables undergraduate research, such as the Research Experiences for Undergraduates program. The Forum on Graduate Student Affairs (FGSA) advocated rejecting a proposal in the House "Tax Cuts and Jobs Act" that would tax graduate students' tuition waivers.

The various campaigns often had substantial APS member participation and produced results. For instance, APS OGA worked with FGSA to first encourage the Senate to reject the House proposed tax on tuition waivers, and then to ask both chambers to not include it in the overall bill—reaching out especially to members on the conference committee negotiating the final version. The second phase also involved the Forum on Early Career Scientists and FEd. About 2,500 people sent nearly 7,000 messages to Congress in this two-stage campaign. Recipients included 27 out of 29 members of the conference committee—and this tax was ultimately not included in the final tax reform bill.

Physics Students Met with Congressional Staffers During Poster Sessions

During the 2017 APS March, Division of Atomic, Molecular, and Optical Physics, and DNP meetings, APS OGA staff escorted congressional staffers to the student poster sessions to hear from local students. In March, physics students had opportunities to share the impact of their research with staffers representing Sens. Bill Cassidy (R-LA) and John Kennedy (R-LA)

"I very much enjoyed the opportunity to educate Senate staffers on Louisiana's relationship to agencies such as NSF and DOE, using my personal experiences," said Noah Rahman, a Tulane University student researching solar cells.

In October, students who attended the DNP meeting in Pittsburgh were elated to discuss their research with a staffer representing U.S. Sen. Bob Casey of Pennsylvania.

"This opportunity was surprising. Usually, the only people who ask me about my research are the other physics majors, graduate students and professors," said Morgen Benninghoff, a junior at Duquesne University whose research on detectors could impact proton therapy treatments.

APS OGA Government Relations Specialist Greg Mack said his office's work with APS units was an effective form of advocacy through 2017. Francis Slakey, APS Director of Government Affairs added, "We've established an effective partnership that we'll build on in 2018."

Additional Key Science Policy Initiatives

Through APS OGA's new online Advocacy Dashboard, APS members can be advocates at any time on the Society's main issues of the federal budget, energy and the environment. education, visas/immigration, and critical resources. APS OGA worked on these issues in 2017 through its lobbying efforts and activities with the APS Panel on Public Affairs (POPA).

Tawanda W. Johnson

Gregory Mack

In February, POPA issued its first ever report on an education issue: "Recruiting Teachers in High-Needs STEM Fields: A Survey of Current Majors and Recent STEM Graduates," which examined students' attitudes toward teaching as a profession to determine how more of them might be encouraged to pursue it as a career.

In April, APS OGA hosted a workshop examining the use of neutrons in research and how to meet those needs without the use of highly enriched uranium. This workshop was broadcast live online to more than 50 participants who were able to pose questions to expert speakers and study committee members. The information gleaned from this workshop will inform an APS POPA report, to be released early 2018. A story with further detail is slated to be published in *APS News* in March.

Regarding energy and the environment policy, the APS Council approved a new statement on global energy in April, which was shepherded through the statement review process by the APS OGA staff. Additionally, the office recently completed its first portion of the APS greenhouse gas inventory, which is detailed in an article in the December 2017 edition of *APS News*

Tawanda Johnson is Press Secretary and Gregory Mack is Government Relations Specialist in the APS Office of Government Affairs. A portion of this article was published last month in the APS GHP newsletter.

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publications from the above list; and one video clip of the nominee giving a presentation, which need not be the proposed distinguished lecture, but any talk highlighting presentation skills. The recipient chosen in August 2018 will deliver his or her first talk at the FIAP Prize session at the March 2019 Meeting. More information is available on the Distinguished Lectureship homepage; female and underrepresented minority nominations are especially encouraged: go.aps.org/2DkJHG4

References:

1. go.aps.org/2pKVc7K
2. go.aps.org/2BGGjVx

Prepared with contributions from R. Kleinberg, FIAP's 2018 Distinguished Lectureship awardee, R. Tromp, 2017 awardee, T. Brintlinger (lectureship selection committee) and C. Bailey, APS Careers Program Manager.

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largely undergraduate students.

For the outreach component, I have proposed the "Women in STEM Roadshow" program of the US-India mission, which has received a grant from the U.S. Department of State. We will be holding nine workshops (in Aligarh, Delhi, Hyderabad, Kolkata, Kurnool, and Patna) with year-long follow-up activities to encourage and help female college students study STEM fields in the U.S. and in India.

Sultana Nahar is professor of astronomy at The Ohio State University, co-director for the Research and Liaison Office of the STEM ER Center, and adjunct professor of physics at AMU.

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tial to achieve this triumph (see the Focus **Three-Way Detection of Gravitational Waves** at physics.aps.org/articles/v10/110). With three detectors running, the scientists were able to more accurately pinpoint the source of the gravitational waves, localizing the event to a patch of sky small enough for telescopes to survey.

Cooking Up a Time Crystal

Time crystals are quirky states of matter whose structure repeats both in time and in space. The idea, theorized five years ago by Frank Wilczek (see the Viewpoint **Crystals of Time** at physics.aps.org/articles/v5/116), was initially discarded because theorists proved that time crystals cannot exist in thermal equilibrium. But this year, a quartet of U.S.-based scientists exploited an open loophole in the argument against time crystals: such states can exist in nonequilibrium systems that are driven periodically by an external force. The researchers presented a recipe for cooking up a time crystal using a string of cold, trapped ions (see the Viewpoint **How to Create a Time Crystal** at physics.aps.org/articles/v10/5). In their scheme, the ions are subjected to periodic spin-aligning pulses. The team predicted that the ions would evolve to form time crystals, whose signatures would be periodic oscillations in the spins' magnetizations. Within three months of the proposal, time crystals were realized in two different systems: a chain of trapped atoms and spin impurities in diamond.

Quantum Cause and Effect

Red suits and white beards are highly correlated this time of the year, and statistical tools can verify that they share a common cause (or Claus!). However, similar inferences are tricky in quantum physics. For example, two entangled photons are by their very nature strongly correlated, but a common cause (or "hidden variable") is ruled out by so-called Bell-test experiments. To deal with these quantum peculiarities, researchers from the UK and Canada reworked the definition of causality (see the Viewpoint **Causality in the Quantum World** at physics.aps.org/articles/v10/86). The team based their model of quantum cause and effect on unitarity, which says that quantum information is conserved as a system evolves. Under their new formalism, one can determine whether a quantum system A is the common cause of two correlated quantum systems B and C by relating the probability distributions of quantum variables in the different systems. This quantum causality model could help in predicting the effects of peeking at information in a quantum cryptography system.

Wi-Fi: The Radar That's Everywhere

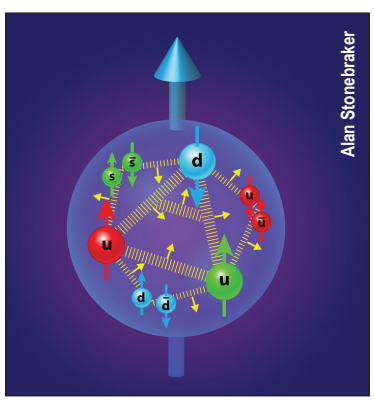
A Wi-Fi router connects you to the world, but its microwave radiation can also be used to produce images of its surroundings, according to researchers at the Technical University of Munich (see the Focus **Imaging with Your Wi-Fi Hotspot** physics.aps.org/articles/v10/50). This imaging is difficult because the router blasts radiation in all directions, which leads to multiple reflected images. The team solved this problem by processing Wi-Fi radiation data as though they were decoding a hologram—a 2D encoding of a 3D image. They placed a meter-sized cross between a router and a detector and scanned the detector across a 6-m^2 area, demonstrating that they could reconstruct an image of the cross. The team also simulated the imaging of a small building's interior, suggesting that the technique could be used to locate objects in a warehouse. Since the radiation penetrates walls, Wi-Fi imaging might eventually be used for law-enforcement purposes.

Cuprate Superconductors Not So Unconventional?

Copper oxide superconductors, or cuprates, hold the record for the highest critical temperature, but their behavior still defies theoretical explanation. It is generally believed that the standard theory of superconductivity, known as the Bardeen-Cooper-Schrieffer (BCS) theory, cannot adequately describe cuprate superconductors because it predicts certain signatures that have not been observed in these materials. Using a scanning tunneling microscope, a team of researchers in Switzerland and Germany found a hallmark of BCS superconductivity in a cuprate compound: twirls of supercurrents containing pockets of nonsuperconducting electrons (see the Viewpoint **Cuprate Superconductors May Be Conventional After All** at physics.aps.org/articles/v10/129). While the results don't yet clarify the mechanisms that make cuprates superconduct at high temperature, they suggest that a BCS-based description may hold the key to solving this grand puzzle of condensed-matter physics.

Gluons Provide Half of the Proton's Spin

The gluons that bind quarks together in nucleons provide a considerable chunk of the proton's total spin. That was the conclusion reached by Yi-Bo Yang from the University of Kentucky, Lexington, and colleagues (see the Viewpoint **Spinning Gluons in the Proton** at physics.aps.org/articles/v10/23). By running state-of-the-art computer simulations of quark-gluon dynamics on a so-called spacetime lattice, the researchers found that 50% of the proton's spin comes from its gluons. The result



The inside spin

is in agreement with recent experiments and shows how such lattice simulations can now accurately predict an increasing number of particle properties. The simulations also indicate that, despite being substantial, the gluon spin contribution is too small to play a major part in "screening" the quark spin contribution—which according to experiments is only 30%—through a quantum effect called the axial anomaly. The remaining 20% of the proton spin is thought to come from the orbital angular momentum of quarks and gluons.

WIMPs Are No-Shows, Again

Of the many theories about dark matter, the most popular describes it as composed of weakly interacting massive particles (WIMPs). But this "favored" theory is now looking a little, well, less favored. In the last 16 months, the collaborations behind the world's three largest dark matter detectors reported that they had observed no WIMPs in the theoretically expected mass range. The experiments all use mammoth vats of liquid xenon, which are scrupulously shielded to avoid false signals from cosmic rays, to spot a WIMP's interaction with regular matter. Writing in January about the null results from the LUX experiment in the U.S. and PandaX-II in China, Jodi Cooley said that some physicists had started to question the simplest WIMP model (see the Viewpoint **Dark Matter Still at Large** at physics.aps.org/articles/v10/3). By October, when XENON1T in Italy (2000 kg) and PandaX-II reported that their more sensitive WIMP searches had also come up empty, Dan Hooper said that dark matter research was in "a state of major disruption" (see the Viewpoint **The Relentless Hunt for Dark Matter** at physics.aps.org/articles/v10/119).

XENON1T: No WIMPs here

Topological "Face" Recognition

The term "topological" often conjures up images of donuts and pretzels, but condensed-matter physicists know that recognizing topological phases is harder than sorting pastry items. To help them out, researchers from Cornell University devised a machine-learning-based method for determining if a material is topological or not (see the Viewpoint **Neural Networks Identify Topological Phases** at physics.aps.org/articles/v10/56). The idea of using machine learning in condensed-matter physics is not new. Researchers have trained neural networks to spot local order, such as a magnetic alignment of spins. However, topological materials have nonlocal order that is less easy to pin down. To make the identification easier, the team developed a computing protocol to transform system information, such as the many-body electron wave function, into an image that could be fed into a neural network. They applied such a protocol to different insulators, showing that it could identify which systems hosted a quantum Hall topological phase.

The Back Page

A Tale of Two Anniversaries: 125 Years of the Physical Review and 25 Years of *Physical Review E*

By Matthew Salter and Michael Thoennessen

In July 1893, Ernest F. Nichols, then a professor of physics at Colgate University and later president of Dartmouth College and MIT, published an account of fundamental research in spectroscopy entitled "A Study of the Transmission Spectra of Certain Substances in the Infra-Red." The paper, which appeared 125 years ago this year was the first ever to be published in *The Physical Review* [E. F. Nichols, *Phys. Rev*. 1 (1893) 1)].

The first issue of *The Physical Review*, covering the months of July and August 1893 was a slender one. Nichols's paper was one of just five articles published in the inaugural issue, which contained a mere 80 printed pages.

How times have changed; fast forward to 2017: In the same period—July and August—almost 3,500 original research papers and more than 33,000 pages were published in the Physical Review journals which had by then expanded to a portfolio of 13 peer reviewed general and specialist titles. The remarkable growth in volume and breadth of *The Physical Review*—publication of which was taken over by the American Physical Society (APS) in 1913—has tracked the increase in understanding and profile of physics, and has been made possible by the great vision of past leaders of the Physical Review and the APS.

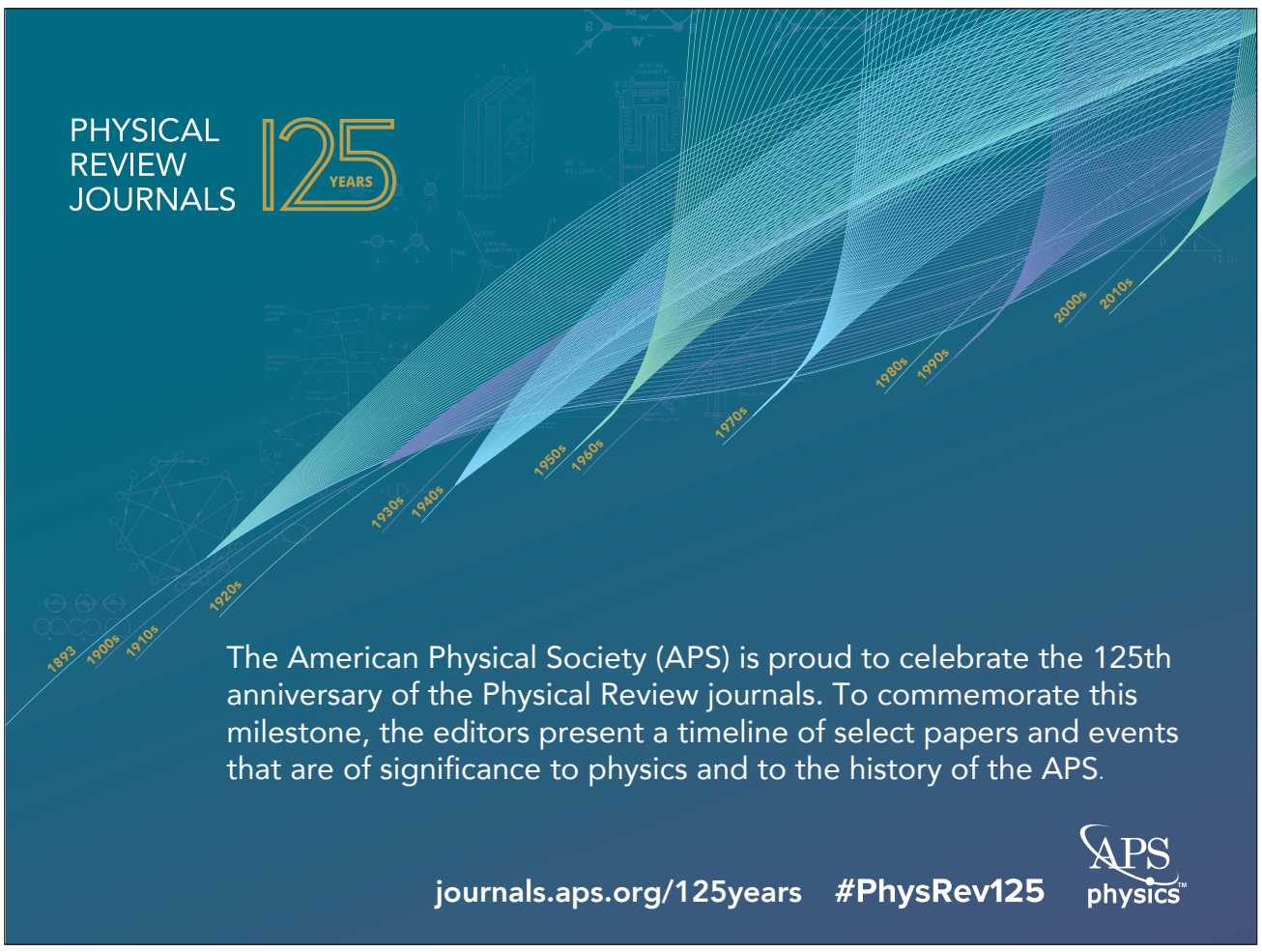
The landscape of scientific publication has changed significantly in the 125 years since E. F. Nichols' inaugural paper graced *The Physical Review*, but the Physical Review journals have proved equal to the challenge of meeting the constantly evolving requirements of the physics research community. An early innovation was the launch of *Reviews of Modern Physics* (RMP) in 1929 which fulfilled the demand for a high-quality journal offering authoritative accounts of the current state of the increasingly numerous and diverse fields in physics. Revolutionary at the time, RMP quickly established a reputation as the foremost reviews journal in physics, a position it has maintained for almost nine decades.

"The landscape of scientific publication has changed significantly over the past 125 years but the Physical Review journals have managed to meet the constantly changing requirements of the physics research community."

Another challenge came with the research boom of the post-war period which brought with it a growing need for swift publication of high-profile results. This led to the creation in 1958 of *Physical Review Letters*—the world's premier physics letters journal—which for 60 years has published short, high-quality reports of significant and notable results in the full arc of fundamental and interdisciplinary physics research.

Further growth in the number of papers published in *The Physical Review* led to its division into a number of individual topical journals—*Physical Review A-D* in 1970 and *Physical Review E* in 1993. In subsequent years a number of specialized journals focused on individual research fields were added. Other advances and challenges made possible by technology, such as online electronic publishing and most recently the demand for open access publishing have all been embraced by the Physical Review journals.

Over the 125 years since the publication of Nichols' inaugural paper, the Physical Review portfolio has grown into the largest and most complete suite of physics journals in the world. As of 2017, this comprises 13 peer-reviewed journals—of which three are fully open access—publishing over 19,000 original research and review articles. Many of these were highlighted in the free APS online commentary journal *Physics*—just one way in which APS adds value to the high-quality research it publishes.



From Robert Millikan's famous oil drop experiments to the discovery of gravitational waves, many history-making discoveries have been published in the Physical Review journals. To celebrate the 125th anniversary of *The Physical Review*, throughout 2018 APS will spotlight one paper of great importance per week from the journals that document the tremendous advances in physics as they appeared to our readers.

Choosing these articles, which will be made free to read, was a tremendously difficult task and resulted in much passionate debate among the editors. Many other worthy papers could easily have been included and even some papers cited in the awarding of a Nobel Prize did not make the final cut.

All selected papers are displayed on a timeline at the website journals.aps.org/125years along with landmark events in the history of the Physical Review. Throughout 2018 we will also highlight these papers on social media (#PhysRev125) and we hope and anticipate that this selection will spur lively conversations within the physics community. We encourage you to join the discussions either online or in person with the editors at one of the many meetings they plan to attend around the world. A list of these meetings can be found on the individual journal websites. Please take these opportunities to meet the editors who are always open for suggestions, criticism, as well as praise.

"Over the 125 years since the publication of Nichols' inaugural paper, the Physical Review portfolio has grown into the largest and most complete suite of physics journals in the world."

In addition to the 125th anniversary of *The Physical Review*, 2018 also marks the 25th anniversary of *Physical Review E*. This landmark will be celebrated by spotlighting one article—25 in total—from each year of publication. Each of these seminal articles in statistical, nonlinear, biological, or soft matter physics will be marked as a PRE Milestone and will be featured on the journal's website.

While reminding us of our history, anniversaries also provide a valuable impetus to look to the future. In their first 125 years the Physical Review journals have made significant contributions to the dissemination of science. As physics continues to grow and form synergies with other fields of science, the Physical Review journals will again need to adapt to the changing needs of this broad and expanding community to remain current, compelling, and relevant.

"As physics continues to grow and form synergies with other fields of science, the Physical Review journals will again need to adapt to the changing needs of this broad and expanding community to remain current, compelling, and relevant."

The scientific publishing landscape itself will surely continue to evolve at increasing speed in the years to come. Input from all our stakeholders—authors, referees and readers—will as always be crucial to ensuring that the Physical Review journals anticipate and prepare for these changes so they continue to meet the needs of the community for the next 125 years and beyond.

Matthew Salter is APS Publisher. Michael Thoennessen is APS Editor in Chief. This article was reprinted from the Physical Review website (journals.aps.org).

Matthew Salter

Michael Thoennessen