

Fall Meetings Emerge Little Scathed from Recent Government Shutdown

By Michael Lucibella

Organizers of the fall APS meetings reported that attendance has largely been unaffected by the recent government shutdown, travel restrictions and budget sequester. The majority said that enrollment was either about the same or up from last year's counts, while those with fewer attendees were more likely to cite the location of the meetings, rather than government restrictions.

During October and November, APS sponsored ten meetings, of which three were organized by divisions, and seven by sections. Six, including the three large division meetings, either met or were on track to surpass their numbers from last year, while three re-

ported slight drops. At the time of publication, the Texas Section had not yet completed its attendance counts.

"The meeting attendance was beyond our expectations despite the hurdles faced by government laboratory attendees," said Ben Gibson, Secretary/Treasurer of the

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Division of Nuclear Physics. "Despite the issues relating to government laboratory travel restrictions, the government shutdown, and budget cuts, the attendance at our fall meeting was a record for

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Troy Shinbrot to Edit *PR Applied*

APS has named Rutgers physicist Troy Shinbrot as Editor of its new journal, *Physical Review Applied*. Launching in 2014, the new publication will feature both experimental and theoretical scientific research by and for applied physicists.

"There is a large and growing audience of both physicists working on applied topics, and engineers working on important applications that at their heart hinge on physical mechanisms," Shinbrot said. "*Physical Review Applied* seeks to be the place to publish, to discuss, and to promote the physics on which these new ideas hinge."

Shinbrot's research interests in-



Troy Shinbrot

clude the study of granular flows, chaotic mixing and the morphogenesis of neurons. Before taking a position in Rutgers' department of biomedical engineering in 1998, he worked at the Xerox Corporation and AD Little.

"Troy Shinbrot's qualifications, the breadth of his research interests, and his vision for the journal made him the best person for the position," said Paul Fleury of Yale University, who chaired the search committee.

Shinbrot has been a referee for journal articles since 1993, and in 2008 was one of the first named an "Outstanding Referee." He received

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Suggestions Sought for Historic Physics Sites

Early next year the APS Historic Sites Committee will meet to decide on the sites that APS will recognize in 2014. This activity is part of the APS Historic Sites Initiative, in which 32 sites in the US, and one in Canada, have been selected since the program began in 2005.

Once the 2014 sites are selected, at each one a member of the APS Presidential Line will present a plaque with a suitably worded citation to a representative of the designated institution. The plaque then serves as a permanent reminder of the site's significance in the history of physics. In addition, the site is recorded in the APS Ledger of Historic Sites, and a web page is created that describes

the achievements for which the recognition is made.

There were three sites honored in 2013. These were: the Department of Terrestrial Magnetism of the Carnegie Institution for Science in Washington, DC; Los Alamos National Laboratory; and the IBM T. J. Watson Research Center in Yorktown Heights, NY.

Interested individuals are encouraged to suggest worthy sites for consideration by the committee; this is easy to do online at www.aps.org/programs/outreach/history/historicsites/nomination.cfm. The list of sites already selected is available at <http://www.aps.org/programs/outreach/history/historicsites/>.

March Meeting Aims Mile High in 2014

The APS March Meeting is coming to the Mile High City in 2014. It will take place in the Colorado Convention Center in Denver from March 3 through 7. It is the largest yearly physics meeting in the United States and will feature 110 invited sessions, more than 600 contributed sessions and a total of more than 8,000 papers presented. Organizers are expecting almost 10,000 people to attend. The meeting highlights the latest research from the APS Divisions of Atomic, Molecular and Optical Physics; Biological Physics; Chemical Physics; Computational Physics; Condensed Matter Physics; Fluid Dynamics; Materials Physics; and Polymer Physics, as well as the topical groups on Statistical and Nonlinear Physics, Magnetism and its Applications, and Quantum Information.

This year's Kavli Foundation

Special Session will focus on the history and ongoing efforts to disentangle the "many-electron problem." Taking place on Wednesday afternoon, and titled "The Many-Electron Problem—Where Are We Now?" it will feature speakers Yoshinori Tokura of the University of Tokyo, Laura Greene of the University of Illinois at Urbana-Champaign, James Eisenstein of Caltech, Steven Kivelson of Stanford University, and Steven White of the University of California, Irvine.

Before the meeting, the Division of Polymer Physics will hold its popular annual short courses on recent advances in the field of polymer physics. The two-day sessions run from Saturday afternoon to Sunday evening and will focus on simulating polymers using computers.

Also on the Sunday before the

meeting, eight tutorials on a range of topics will be held. The tutorials are aimed at graduate students, postdocs, university faculty and industrial researchers who want to be brought up to speed on a particular field. There will be four in the morning, followed by a different four in the afternoon. The subjects are Density Functional Theory, Spintronics, Photovoltaics, Graphene, Density Functional Theory and Many Body Perturbation Theory, the Brain Initiative, Topological Materials and MATLAB for Physics Education and Research.

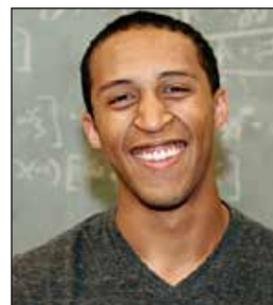
The APS prize and award ceremonial session will be held late on Monday afternoon, honoring the outstanding contributions of researchers to their fields. This will be followed by an opening reception for all participants on Monday evening.

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Hao Shi, Guy Geyer Marcus are Apker Recipients

In September, seven finalists gathered in Washington to be interviewed by the APS Apker Award selection committee. The Apker Award recognizes outstanding research by an undergraduate student. The committee, chaired by 2011 APS President Barry Barish, recommended two of the finalists as the 2013 Apker Award recipients, and the recommendation was approved by the Executive Board.

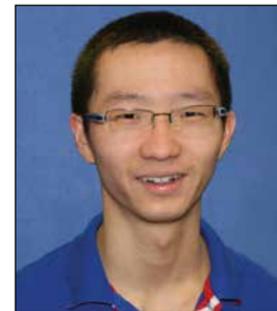
The recipient from a PhD-granting institution is Guy Geyer Marcus of Wesleyan University, whose research was titled "Rotational Dynamics of Anisotropic Particles in Turbulence: Measurements of Lagrangian Vorticity and the Ef-



Guy Geyer Marcus

fects of Alignment with the Velocity Gradient." His research advisor at Wesleyan was Greg Voth, and he is now pursuing graduate studies at The Johns Hopkins University.

The recipient from an institution that does not grant a PhD in



Hao Shi

physics is Hao Shi of the Rochester Institute of Technology. Under the supervision of Mishkat Bhattacharya he did research on "Torsional Optomechanics: A Dialogue Between Spinning Photons and Twisting Oscillators." He is now doing graduate work at Cornell.

APS President Hosts Japanese Fellows and Fellow Presidents

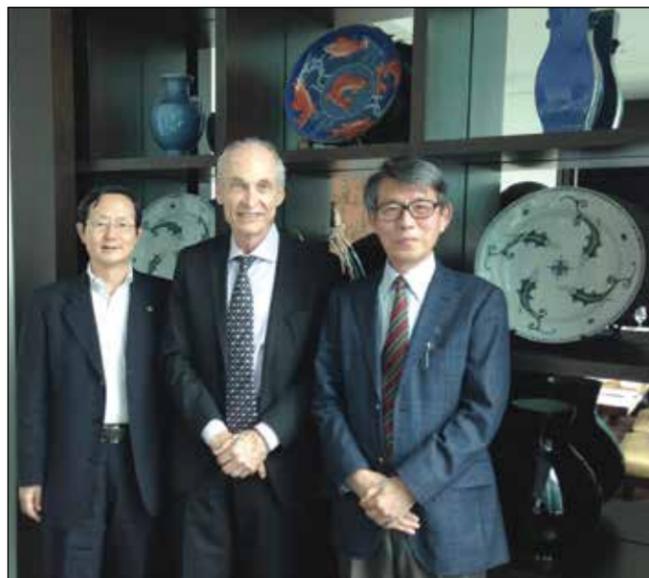


Photo courtesy of Michael Turner

On October 24, APS President Michael Turner hosted APS Fellows from the Tokyo area at a luncheon that also included the presidents of the two most prominent Japanese physics societies, the Physical Society of Japan (JPS) and the Japanese Society of Applied Physics (JSAP).

The photo shows Turner flanked by JSAP President Makoto Konagai (left) and JPS President Hiroyuki Shiba (right).

The two societies have largely disjoint memberships. JSAP has more than 23,000 members, and JPS about 18,000.

APS has 1762 members in Japan, about 3.5% of total APS membership, thus making Japan the country with the largest number of APS members outside of the US. Fifty-seven of the Japanese members are APS Fellows.

Members in the Media



“Both parties are concerned about the cost of these things.”

Lisbeth Dagmar Gronlund, *Union of Concerned Scientists, on the Department of Energy’s plan to refurbish nuclear weapons*, Los Angeles Times, October 18, 2013.

“I understand Lederman’s motivation at the time... If you call it ‘God particle’ or ‘best particle of all time,’ it helps capture the importance of the project. But we can’t get rid of that damn name 20 years afterward.”

David Kaiser, MIT, on how the Higgs boson got the “God Particle” nickname, PBS Newshour, October 23, 2013.

“Chill out, people. I’m just talking about a movie.”

Neil deGrasse Tyson, *American Museum of Natural History, referencing his tweets about the film “Gravity,”* CBS This Morning, October 25, 2013.

“Sperm cells interact with each other when in confined geometries... Just like birds when they fly in formation like a flock, similarly through the fluid, the sperm cells interact with each other and they synchronize their tails—they start beating in phase.”

Erkan Tüzel, *Worcester Polytechnic Institute, The Boston Globe*, October 30, 2013.

“They have not found dark matter... There is nothing smacking you in the face to make you think there is something there... If there is anything in there, it should become apparent.”

Neal Weiner, *New York University, on the recent results from the LUX detector*, The New York Times, October 30, 2013.

“This is only the beginning for LUX... Now that we understand the instrument and its backgrounds, we will continue to take data, testing for more and more elusive candidates for dark matter.”

Dan McKinsey, Yale, on the

recent dark matter results, CNN.com, October 30, 2013.

“[A] lot of the popular story is Einstein does special relativity in 1905, he does—he starts general relativity in 1907, finishes it in 1915 and the rest is history, you know, and Unified Field Theory, which he never got. Well, actually, most of that time he was much more focused on light and its interaction with atoms.”

A. Douglas Stone, Yale, on his new biography of Einstein, that highlights his central role in founding modern quantum mechanics, All Things Considered: Science Friday, November 1, 2013.

“We’ve got four top guns in the environmental movement telling [German Chancellor] Angela Merkel, ‘You’re wrong to shut down nuclear... I think that’s a relatively big deal.’”

Burton Richter, Stanford, CNN.com, November 3, 2013.

“The big question is why the Higgs (particle), with a mass more than 100 times that of the proton, is so light. That question is not answered by our picture of the universe.”

Joel Butler, Fermilab, CNN.com, November 5, 2013.

“The ILC will be able to study the Higgs precisely... It will be a Higgs factory and will be able to make measurements of the Higgs’ properties with 3% relative precision as opposed to the LHC’s 25% relative precision, people believe... The ILC could ‘crack open the Higgs’ and reveal the mysteries of nature’s first spin-zero particle.”

Tim Meyer, TRIUMF, CNN.com, November 5, 2013.

“I certainly never expected to see something of this scale or this magnitude... It’s certainly scary.”

Peter Brown, the University of Western Ontario, on the Chelyabinsk meteor, The Associated Press, November 7, 2013.

This Month in Physics History

December: Women and the Nobel Prize in Physics

Later this month, physicists Peter Higgs and François Englert will travel to Stockholm to receive the 2013 Nobel Prize in Physics for their development of the theory of how particles acquire mass—a theory confirmed in 2012 with the discovery of the Higgs boson at the Large Hadron Collider at CERN. It is among the highest achievements in physics. Since the first Nobel Prize in 1901, 196 physicists have been so honored, all most deserving of the honor—yet all but two of them have been men.

The most famous female physics laureate is the first: Marie Curie, honored with her husband, Pierre Curie, and Henri Becquerel in 1903 for the discovery and subsequent research on radioactivity. Following her husband’s untimely death, Curie went on to win a second Nobel Prize in 1911, this time in chemistry, for her discovery and isolation of a new element, radium, as well as her discovery of polonium.

It would be more than 50 years before the second female physics laureate was honored: Maria Goeppert Mayer, who inspired an eponymous APS award. As a young girl in what was then Prussia, Maria Goeppert attended a suffragette-run high school founded for the purpose of preparing young women for university studies. When that school abruptly went bankrupt, she took the entrance exam a year early, and passed, enabling her to pursue her education at the University of Göttingen. At the time, Emmy Noether was teaching there, and Goeppert initially studied mathematics before choosing to get her PhD in physics in 1930.

She married Joseph Edward Mayer that same year, and the couple moved to The Johns Hopkins University where he had been offered a faculty position. Despite her academic success, Goeppert Mayer worked as an assistant in the physics department, which at least provided her with access to research facilities. She published a seminal paper on double beta decay in 1935. When Mayer was fired in 1937 and moved to Columbia University, she once again was not given a similar position, although the physics department provided office space, and she found plenty of brilliant colleagues with whom to collaborate, including Harold Urey, Edward Teller, and Enrico Fermi.

It wasn’t until the couple moved yet again, to the University of Chicago, that Goeppert Mayer finally attained the rank of physics professor—albeit without a salary. She also worked part-time as a senior physicist at Argonne National Laboratory, located nearby. This was the period during which she developed her Nobel-worthy mathematical model for the structure of nuclear shells, explaining why certain “magic numbers” of nucleons produced especially stable atomic configurations.

Despite the obstacles she faced as a woman in a overwhelmingly male field, Goeppert Mayer’s

story has a happy ending. In 1960, she joined the faculty of the University of California, San Diego, as a full (paid) professor of physics, along with her husband. That is where she was working when news broke that she had won the Nobel Prize in 1963; the local San Diego newspaper featured the headline, “S.D. Mother Wins Nobel Prize.” (A German physicist named Hans D. Jensen had independently proposed a similar model around the same time. They shared the Nobel with Eugene Wigner.) She maintained that “winning the prize wasn’t half as exciting as doing the work itself”—a fitting sentiment for someone who pursued groundbreaking physics research with little professional reward for much of her career.

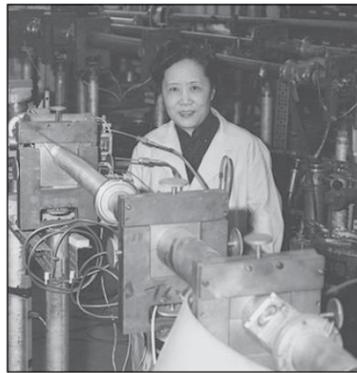
There is always contention when it comes to determining who deserves to share in a Nobel Prize, but women have historically been excluded more than their male peers. One name that usually crops up when physicists consider deserving female colleagues who failed to win is Lise Meitner, who worked on nuclear physics research for more than 30 years with German chemist Otto Hahn. Being Jewish, she was forced to flee Nazi Germany for Sweden in

1938, but she continued to collaborate with Hahn through correspondence. Her guidance was critical to the experimental discovery of nuclear fission, but Hahn alone received the 1944 Nobel Prize in Chemistry. Meitner never won, despite being nominated several times in both the physics and chemistry categories.

Then there is Chien-Shiung Wu, who specialized in weak interactions and undertook the pivotal experiments on Cobalt-60 atoms with colleagues at the National Bureau of Standards that demonstrated unequivocally that parity was not a symmetry of nature. As the work came to a head, Wu even skipped a long-planned trip back to China with her husband, recognizing the importance of the experiment, commuting between her teaching duties at Columbia University and the laboratory in Washington, DC. On a snowy Christmas Eve in 1956, she reported the large asymmetry she had observed to her Columbia colleague, Tsung-Dao Lee, who had laid the theoretical groundwork for the discovery with Chen Ning Yang. Lee and Yang won the 1957 Nobel Prize in physics for their work; Wu was not included.

One of the current top female contenders for a Nobel Prize is astronomer Vera Rubin, whose work with Kent Ford on spiral galaxies in the 1960s and 1970s provided the first direct evidence of the dark matter predicted by Fritz Zwicky in a 1933 paper. It is the heavily favored theoretical explanation for such observations, sufficient to snag Rubin a National Medal of Science and membership in the National Academy of Sciences. Perhaps her chances would improve if a dark matter particle

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Chien-Shiung Wu in her laboratory

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Tough Path Ahead for Science Funding Authorization

By Michael Lucibella

The reauthorization bill for some of the country's top science programs is facing an uphill battle in Congress. The America COMPETES Act, which authorizes funding for most of the country's fundamental research agencies, is up for renewal, but the atmosphere of bipartisan cooperation that backed it in past years is largely gone.

Several drafts of legislation have been released by House and Senate committees, and there are some dramatic differences among them. In the current fractious po-

litical climate in Congress, reconciling the disparate bills will likely prove difficult.

"I don't think there are going to be any authorization bills," said Michael Lubell, Director of Public Affairs at APS. "Given the way the Congress functions these days, I don't see the House and Senate coming to an agreement on this."

The COMPETES bill authorizes spending for the National Science Foundation, the National Institute for Standards and Technology, the Office of Science and Technology Policy and the Department of En-

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Experts Convene to Weigh Nuclear Weapons Issues

By Michael Lucibella

Speaking at an APS-sponsored conference in Washington in early November, leading nuclear weapons scientists and policy makers said that despite some troubling areas, the world is a safer place than in past decades, and they expressed cautious optimism that it is continuing in that direction. They warned, however, that despite this progress, crises involving nuclear weapons can still spiral out of control.

Over two days at George Washington University, 24 experts weighed in on an array of nuclear weapons issues, including arms control, enforcement of the test ban treaty, missile defense, combating proliferation, and terrorism. The conference offered a snapshot of what countries around the world either possess or are pursuing nuclear technology, and assessed the danger arising from them.

Closing out the conference, Pierce Corden, a visiting scholar at the American Association for the Advancement of Science summed up the central question of the weekend.

"Which way is proliferation moving?" Corden asked. "The net vector, and this is my judgment, is sharply down," pointing to large reductions in US and Russian stockpiles.

Arian Pregoner of Sandia National Laboratories echoed that assessment, saying that few countries were actively pursuing nu-

clear weapons despite technological improvements making them relatively easy to build. Currently there are eight countries with declared nuclear weapons, plus Israel with an undeclared stockpile.

"It's inescapable, as time goes on you're going to reach a point where all countries that want nuclear weapons can get them," Pregoner said. "The number of countries that want nuclear weapons seems to have stabilized."

That stability is tenuous in some parts of the world. Robert Gallucci, president of the John D. and Catherine T. MacArthur Foundation, said that two decades of bungled diplomacy led to a nuclear North Korea and the danger of further proliferation.

"US policy over 20 years has failed," Gallucci said. "The North Korea situation is not only worse than it was 20 years ago, but it gets worse every day because they are continuing to build."

He added also South Korea might soon decide it's in their interest to possess their own nuclear weapons as the North continues to arm itself.

Iran is currently pursuing nuclear reactor technology, and likely has a clandestine weapons program as well. After witnessing stops and starts in their weapons program, David Albright, president of the Institute for Science and International Security said diplomacy could still work to prevent a nuclear Iran. "There is general agreement that the Iranian regime has not decided to build a

nuclear weapon," Albright said.

Analyst Zia Mian of Princeton said that India and Pakistan are the two nations today most likely to attack each other with nuclear weapons. The countries are historic enemies, have had nuclear weapons for over a decade, and are currently locked in an arms race with each other.

David Hafemeister of California Polytechnic State University helped to organize the conference, one of a number of "short courses" he has put together that combine science and public policy. For example, in March of 2011, he organized a conference on the physics of sustainable energy that was hosted at UC Berkeley. The last such conference that focused on nuclear weapons was in 1988.

"The world has changed a lot since then," he said. "I hope that younger people will consider jobs in public policy."

He added also that one of the most important products of the meetings is the published text of the presentations. After the meetings, the American Institute of Physics publishes their conference proceedings, which serve as an overview of the state of the field.

"The physics libraries will have something to read in these areas," Hafemeister said. "I thought we had both technological and political depth."

The bound edition is due to be published by AIP Publishing in February.

Diversity Corner



Travel Support for Minority-Serving Institutions to PhysTEC Conference

The 2014 Physics Teacher Education Coalition (PhysTEC) Conference will be held May 19-20 in conjunction with the UTeach Institute Annual Conference in Austin, TX. The PhysTEC Conference is the nation's largest meeting dedicated to physics teacher education. PhysTEC is committed to supporting minority-serving institutions that wish to become leaders in physics teacher preparation, and are offering a limited number of stipends of up to \$800 to qualified institutions to support travel to the conference. Faculty and others involved in teacher preparation at minority-serving institutions are invited to apply for travel grants here: <http://www.ptec.org/conferences/2014/>.

Nominations for the CSWP Woman Physicist of the Month

The CSWP Woman Physicist of the Month award recognizes female physicists who have positively impacted other individuals' lives and careers. Each CSWP Woman Physicist of the Month is featured on the Women in Physics website (www.WomenInPhysics.org), announced in the *Gazette*, and recognized at a reception at an APS national meeting.

Nomination is easy: Email a three paragraph statement explaining why the physicist you are nominating is worthy to women@aps.org.

Climate Site Visits

The APS has had a long-standing interest in improving the climate in physics departments for underrepresented minorities and women. The Committee on the Status of Women in Physics (CSWP) and the Committee on Minorities (COM) both sponsor site visit programs. For more information on the Climate for Women in Physics Site Visit Program, visit: <http://www.aps.org/programs/women/sitevisits/index.cfm> For more information on the Climate for Minorities in Physics Site Visit Program, visit: <http://www.aps.org/programs/minorities/sitevisits.cfm>

Update Your Department's Female Friendly Graduate Program Survey

CSWP has facilitated the collection of responses to a series of questions about graduate programs in physics that should be helpful to those interested in assessing the climate for women at various graduate schools. You can find department responses to a short series of questions at: <http://www.aps.org/programs/women/female-friendly/index.cfm>

All responses are self-reported by department chairs (or their assignees). To update your responses, please contact women@aps.org.

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were detected in the near future. She seems satisfied with her life's work, regardless. "Fame is fleeting," she told *Discover* magazine in 1990. "My numbers mean more to me than my name. If astronomers are still using my data years from now, that's my greatest compliment."

The only field honored with a Nobel category that has fewer female recipients than physics is the prize for economics (which wasn't established until 1968);

just one woman has received the economics Nobel: Elinor Ostrom in 2009. The chemistry prize has been awarded to just four women to date. In contrast, 10 women have received the Nobel in medicine or physiology, and 12 women have won in literature. Times have changed; there are far more women doing important work in physics today than when Marie Curie and Maria Goeppert Mayer blazed the trail. Surely some of that work will prove to be Nobel-worthy one day.

APS Celebrates 20 Years in One Place

In the early 1990s, APS was headquartered at 335 E. 45th Street in New York, barely a Molotov cocktail's toss from the United Nations. But the building, shared with the American Institute of Physics (AIP), had gotten too small for the burgeoning Society. Relocation was necessary.

Several options were explored, including staying in New York (too expensive). Ultimately the decision was made to move to the Washington, DC area, although the Society at that time felt it was better to locate near the University of Maryland, in College Park,

rather than in downtown DC. (Many other societies, such as the American Chemical Society, the American Geological Union, the Optical Society, the American Astronomical Society, and the American Association for the Advancement of Science, made the opposite choice). In partnership with AIP and the American Association of Physics Teachers (AAPT), APS constructed a new building, the American Center for Physics, in a bucolic setting on a wooded plot of land.

In October, the American Center for Physics celebrated

20 years in College Park, since first opening its doors in 1993. Former AAPT Executive Officer Bernard Khoury led a discussion answering employees' questions about the dog statues that guard the back door and how the ellipse-shaped road surrounding the building came to be. Khoury finished with a series of photos of the building's construction and other captured memories. The audience included a number of long-time employees who had followed APS and AIP to Maryland when they relocated from New York City those many years ago.



Photo by Bernard Khoury

In April, 1994, six months after ACP opened, a dedication ceremony took place in a tent pitched on the ACP grounds behind the building. As the picture shows, despite some inconvenience, no trees were sacrificed. The ceremony featured several local dignitaries, including Maryland Governor William Donald Schaefer.

Although there was no room for letters in this issue, APS News is pleased to consider contributions to the letters column from its readers. These should be as brief as possible and may be submitted by email to letters@aps.org.



Bouchet Award Exceeds Fundraising Goal

APS's Edward A. Bouchet Award has surpassed its fundraising goal, rendering it fully endowed for the foreseeable future. The annual award honors Black, Hispanic or Native American physicists for outstanding contributions in their field.

"It's a great thing...It means the community thinks this is an important award," said Arlene Modeste Knowles, the APS diversity programs administrator. "It's great that the community came together and put money towards this award."

The Bouchet Award had been sponsored by the Research Corporation for Science Advancement since its inception in 1994. However, in 2010, due to budget concerns RCSA said they would be unable to continue to sponsor

the award every year.

"We decided we needed to endow the award and it would take about \$140,000 to do so," Knowles said.

The campaign surpassed its fundraising goal by more than \$20,000, raising more than \$161,000. The fundraising team was co-chaired by Beverly Hartline of Montana Tech and S. James Gates, Jr. of the University of Maryland. Gates was also the first person to receive the Bouchet award.

"They worked extremely hard, and had an outstanding fundraising committee," said Darlene Logan, Director of Development at APS.

While the committee was fundraising, the Sloan Foundation stepped in and sponsored the

award for three years. The 2014 award will be the first to use money earned from the endowment. Altogether, 40 individuals and organizations contributed to the fundraising effort, nine of whom contributed more than \$10,000.

The APS Committee on Minorities established the Edward A. Bouchet Award in 1994 in honor of the first African-American to earn a PhD in physics. Bouchet received his degree from Yale in 1876. In addition to the \$3,500 stipend awarded to its recipients, the award helps sponsor their travel to universities and schools to lecture about their work, and to the appropriate APS meeting to receive the Award.

"This award is a career-builder for people," Knowles said. "It's a great thing to have on your résumé."

Classroom Discussions Can Help Lower Gender Gap

High school class discussions about women's underrepresentation in physics may be the most effective way to encourage young women to pursue a career in the physical sciences. This is the conclusion of a recent study by a team of researchers who tested five common "hypotheses" of ways to close the gender gap.

"Lots of people have these hypotheses about what is good," said Zahra Hazari, an associate professor of engineering and science education at Clemson and lead author of the study. "We really wanted to empirically question some of those hypotheses and that common lore."

The gender gap in physics has remained stubbornly high, even as other scientific disciplines have approached parity. Currently about 20 percent of physics degrees are awarded to women. Many solu-

tions have been suggested to close the gap, but progress has been slow. The five hypotheses tested by Hazari were ones that show up frequently in the physics education literature.

Hazari's work explored whether female students pursued physics careers at higher rates after experiencing:

- a single-sex physics class
- a female physics teacher
- female scientist guest speakers
- class discussions on the work of women scientists
- class discussions about the underrepresentation of women in physics

Of these, only the last one showed small but statistically significant improvement in retaining female students. Discussing the work of women scientists hinted at some increased rates, but at just under statistically significant levels.

"We're not saying that role modeling can't help, what we're saying is it has to be more nuanced," Hazari said, adding that it is important for teachers to build relationships with students. "There is no sort of one-shot solution to the problem because the problem is complex."

She said also that she thought the reason talking about underrepresentation was effective is because it gets students talking about issues and how they relate to them.

"Those kind of discussions can be very useful for getting students aware that there are these equity issues," Hazari said. "They start to realize that there are equity issues that they weren't conscious of before."

The research drew on surveys from female students taken by Harvard University's Persistence

GAP continued on page 6

Attendance is Robust at Plasma Meeting, but Some Outreach and Education Programs Canceled

By Brian Jacobsmeier

Amidst uncertainty due to a recent federal government shutdown and the ongoing sequester, leaders of the Division of Plasma Physics (DPP) nonetheless reported above-average attendance at the Division's 55th annual meeting held in Denver, Colorado in November. However, federal budget issues affected the meeting's outreach and education efforts and prevented dozens of undergraduate students from attending.

Historically, the Division's annual meeting has strongly focused on outreach initiatives, including teacher-tutorial workshops, a plasma-sciences exposition, and a poster session for presentations by undergraduate and high-school students. Between 40 and 50 students from around the country who participate in a fellowship

program led by Princeton Plasma Physics Laboratory (PPPL), typically make up half of this poster session.

"We are a leader among the APS divisions in delivering science education and public outreach," said Mark Koepke, the Chair of DPP.

But this year, many of those students were unable to attend, primarily due to budgetary decisions made at the Department of Energy's Office of Science. PPPL had to cut not only its travel budget but also the total number of people it sent to the meeting, said Andrew Zwicker, PPPL's Head of Science Education and Outreach. Although a few students secured funding through their host institutions, the majority of the students who would usually attend had to stay home.

"To be part of the largest plas-

ma physics meeting in the United States is a key component of the entire experience [for undergraduates]," said Zwicker. "You can have an internship without it, but it would be incomplete."

In addition to supporting undergraduate students, meeting organizers also host an outreach expo geared toward local middle and high school students. But the Office of Science's decision to limit funding—along with the ongoing sequester and tight travel budgets—also kept several outreach and education specialists at home.

"I think of the expo as a 15-exhibit extravaganza, but there are keystone exhibits," said Paul Miller, the DPP Outreach and Education Chair. "Princeton [Plasma Physics Laboratory] was one of those keystone exhibits."

ROBUST continued on page 5

Meeting, greeting and getting connected with OSAPS

By Jessica Orwig

The Ohio-Region Section of the American Physical Society (OSAPS) was founded in 1939. For several decades, it was simply the Ohio Section focusing its efforts and outreach on physics faculty and students throughout the state of Ohio. In the early 21st century, however, the section reached out to border states Indiana and Michigan and consequently changed its name to the Ohio-Region Section, which now includes all of Michigan and Ohio and half of Indiana.

An expansion in the Section's geographical reach is just one of the many changes that OSAPS member and webmaster Perry Yaney has witnessed. Yaney first joined the Section when he was a professor at the University of Dayton in the early 1960s. Since its start, OSAPS has held two annual meetings, one in the fall and one in the spring, where students have the opportunity to present their scientific research and listen to guest speakers discuss recent advances in different fields of physics as well as connect with physics faculty from other nearby universities.

In his early days as an OSAPS member, Yaney remembers how students would learn to prepare presentations of their work on single sheets of glass that were then fed through a lantern projector—an early version of today's digital image projectors. Technology has come a long way and today most students who present at the Fall and Spring OSAPS meetings design and print posters of their work.

"The meetings have always been a good teaching opportunity and enable students and faculty to interact and network," Yaney said.

The Fall and Spring OSAPS regional meetings are the primary instruments with which the section fosters a physics community in and around Ohio. Moreover, the attendance rate is relatively small, in the hundreds, compared to national meetings such as the APS March Meeting. This creates an inviting, low-stress atmosphere for undergraduates and first- and second-year graduate students, who may feel intimidated at the prospect of public speaking, to present their work, said the OSAPS Executive Committee

OSAPS continued on page 7

APS Report Calls for Extending Nuclear Reactor Lifetimes

A new APS report recommends that, in order to maintain a source of low-emissions electricity, the Nuclear Regulatory Commission allow nuclear power plants to operate for up to 80 years. After a review of ongoing government and industry-sponsored research, the study's authors say that there appear to be no "show-stopping" technical hurdles to extending the operational life of some, but not all, reactors.

The report, titled "Reviewing Licenses for the Nation's Nuclear Power Plants," recommended also more research into plant safety and further federal support of new reactors. Currently, the NRC licenses plants for up to 60 years of operation.

"It is technically feasible to keep much of our fleet of nuclear reactors going," said Roy Schwitters of the University of Texas at Austin and chair of the study group that assembled the report. He added that doing so would buy more time as renewable energy sources mature.

Furthermore, the report urges utilities to consider the consequences of carbon emissions in their business decisions regarding extending the licenses of nuclear power plants.

The study comes as policy makers have started taking a second look at nuclear energy as a potential carbon-free energy source.

Eleven new plants since 2007 have applied for operating licenses, the most since the Three Mile Island accident. Recently, four influential climate scientists released an open letter to environmental policy makers calling for greater investment in nuclear power to combat climate change.

However the nuclear industry is also facing roadblocks to new investment. Public support of nuclear power has weakened somewhat following Fukushima. At the same time, advances in hydraulic fracturing, or "fracking," have led to cheap natural gas prices and attracted many new investors.

"That is clearly an attractive potential source for industries because of the cost involved," Schwitters said. He added that recertifying nuclear plants for an additional 20 years would make nuclear power more competitive because power companies wouldn't have to build expensive new plants. "For the industry, that can be very profitable because the large investments have been paid."

The committee cautioned also that if such licenses are not extended soon, the United States stands to lose as much as 20 percent of its clean energy supply starting in 2030. Currently there are about 65 nuclear power plants operating in the United States that were granted operating licenses

REACTOR continued on page 6

New APS Industrial Fellow Brings Broad Perspective

In September APS launched its Industrial Physics Fellowship, which brings an industrial physicist to its College Park headquarters. Steven Lambert is the first physicist selected for the Fellowship. Michael Lucibella of APS News spoke with Lambert about what this new fellowship will mean for the Society, and what his goals will be during his tenure in the position.

What is the Industrial Physics Fellowship?

APS wants to have more engagement with physicists who work in industry. My background is in using my physics training to do technology development and product development in the hard-disk-drive business. I will bring that kind of perspective, so that we can improve our engagement with physicists working in com-

panies that use physics, which is almost everybody, and enhance the services that we can provide to people doing that kind of work.

Tell me about your background and how that brought you here.



Steven Lambert

It's not an obvious path actually. I got a PhD in low tempera-

ture physics at the University of California in San Diego. My work was very fundamental, on how magnetism and superconductivity interact with one another. After finishing a postdoc in that same group, I went to IBM where I began doing research on hard-disk-drive technology. My first project was trying to understand the limits of that technology. The work we did said this is quite extendable, because there had been some debate about how far this could be extended. I've been in the hard-disk-drive business ever since. I spent four years at IBM Research, and since then I've been in more of a technology or product development framework. What that means in industry is what kind of technology is needed to continue our product development?

FELLOW continued on page 6

Eight Campuses to Host Conference for Undergrad Women

By Michael Lucibella

Eight campuses across the country will host the ninth annual Conferences for Undergraduate Women in Physics (CUWiP) in January of 2014. Over two days, more than a thousand female physics students will have the chance to network with other women in physics, a rare opportunity in a field that remains predominantly male.

"Just that experience of having 100 undergraduate women together is very empowering to them," said Mette Gaarde, a professor at Louisiana State University and organizer of their conference. "I think a lot of women come with the sense that they are very different because they have chosen to go into math and physics."

The conferences, organized by each of the individual schools with infrastructure support from APS, are designed to bring female physics students together to explore possible career options and help them network. They will feature career panels, science lectures, and talks from other female physics professionals, and will provide time to socialize. Many of the conferences are near a national lab and organizers have scheduled tours of the facilities.

"The aim that I see is to really attract and retain undergrad students in physics and related areas," said Abhay Deshpande of Stony Brook University. "We're trying to showcase some of the very successful women in physics and give a little bit about their background."

In addition, some talks will ad-

dress the persistent gender inequity in physics. However, many of the organizers said that this issue was not their main concern.

"There is kind of a fine balance. Attendees have to be aware of some of the issues [and] potential biases...but not so much so that they feel like they are not treated well," said Young Kee-Kim of the University of Chicago. "I want to try and stay very positive."

The conferences have been growing dramatically in popularity since their inception. The first conference, held at the University of Southern California in 2006, had 29 attendees. After two years there, the conference expanded to three universities and has kept growing ever since. This year, 1,363 people applied for the slots at the eight campuses. That is roughly the same number of women who receive undergraduate degrees in physics every year.

As the conferences were growing in size and complexity, several of the organizers approached APS in 2010 to help raise money for the conferences. According to its by-laws, the Society can raise money only for its own conferences, so it took on the growing CUWiP under the auspices of its Committee on the Status of Women in Physics (CSWP). Since then, APS has helped organize the conference's websites, enrollment and grant applications.

"We're here to provide logistical support for these conferences," said Theodore Hodapp, APS Director of Education and Diversity.

Although APS oversees the

meetings, groups at the individual institutions run and plan the actual conferences. Many have undergraduate and graduate students as the main organizers.

"The students are doing the work," said Susan Blessing, a professor at Florida State University and current Chair of CSWP. "Part of the goal of the conference is for them to learn how to do these things."

Megan Matthews, a junior at FSU, has been in charge of finding and booking speakers from academia, industry and national labs. After attending this January's conference at Central Florida State, she said she came away knowing that she wanted to help bring one to her school.

"It's a way to tell people that there are a lot of careers in science and physics," Matthews said.

Other schools include students in different ways. The majority of the organizing committee for Chicago's conference is undergraduate students. At LSU, students and recent graduates are on the organizing committee as well.

The eight host institutions are: Florida State University, Louisiana State University, Pennsylvania State University, Stony Brook University/BNL, the University of California, Berkeley, the University of Chicago/ANL/FNAL, the University of Maryland/NIST and the University of Utah. The conferences run from January 17th to the 19th. More information can be found at www.aps.org/programs/women/workshops/cuwip.cfm

1,400 and 1,800 attendees in recent years.

Koepke, DPP Division Chair, explained that the recent federal government shutdown had little impact on final attendance numbers. Proportionally speaking, he said the dominant impact occurred in the number of declined travel requests for government-lab education-and-outreach staff, resulting in the cancellation of the Plasma Expo at DPP2013. He added that steps will be taken to return all education and outreach activities to full strength for DPP2014.

ROBUST continued from page 4

In part because PPPL couldn't send enough people to the meeting, they eventually withdrew from the outreach expo. The funding uncertainty also led other key exhibitors to question their own participation.

"Losing [PPPL] immediately put the program into jeopardy," Miller added.

Organizers eventually decided to cancel the expo after additional exhibitors withdrew, including General Atomics. Nonetheless, the Division still hosted its annual session of workshops for science

teachers.

Although outreach and education efforts were dealt a blow, overall attendance remained strong with over 1,600 participants. Pre-registration was low during the government shutdown, but the numbers surged quickly after it ended.

The jump in registration after the government's re-opening "was very noticeable," said Don Wise, Senior Meetings Registrar for APS.

Wise noted that attendance was at or above average for a meeting that has typically ranged between

New Faculty Get New Ideas



Photo by Michael Lucibella

In the latest in a series of workshops that goes back to 1996, about 65 new US faculty members in physics and astronomy convened at the American Center for Physics in College Park from November 7 to 10. Originated by the American Association of Physics Teachers, and co-sponsored by AAPT, APS and the American Astronomical Association with financial support from NSF, the workshop is now a semi-annual affair, taking place both in June and November. It is designed to help new faculty understand how to become more effective as educators and to support their quest to gain tenure. In the photo, Edward Prather of the University of Arizona emphasizes the importance of classroom interactivity.

INSIDE THE Beltway



Time to Hit the Road

by Michael S. Lubell, APS Director of Public Affairs

The Tea Party stranglehold on the House Republican Conference shows little sign of easing anytime soon.

Two months ago, it caused the already squeaky wheels of Washington to freeze entirely. And in the process, it nearly catapulted the nation into a fiscal void.

But despite the abysmal approval ratings the public gives the federal government, 39 percent for the president, according to recent polling, and 9 percent—yes, you read that correctly—for Congress, our elected officials can't seem to find a way to end the awful impasse.

Their failure doesn't mean that all paths forward are impassable. It simply means that taking any one of them carries too much risk for a leader. And if you guess the leader I most particularly have in mind is Speaker of the House John Boehner (R-OH), you're correct. But where physics is concerned, I also have my sights set on the chairman of the House Science, Space and Technology Committee, Lamar Smith (R-TX).

Boehner, of course, has far more at stake, since only three additional votes cast against him last January would have separated him from the House gavel. Smith, by contrast, might face the barbs of the über-conservative brigade, but it's highly unlikely he would lose his committee chairmanship. Unfortunately, I have little confidence that either of them will step up and do what's necessary.

National Journal Daily recently provided the clearest forecast about the GOP's House of Representatives kingpin. In "John Boehner's Big Choice," Billy House wrote, "As John Boehner enters his fourth year as House speaker, his own website biography reflects little in the way of major accomplishments while holding the gavel...And so, with little more than a year left in his current term, the nation's 53rd speaker faces a choice: He can spend the

next year much like the last, trying to reconcile the rambunctious Tea Party wing of his conference with the more moderate Republicans in a stand against Democrats in the Senate and the White House. Or he can work with House Democrats and a loose coalition of roughly 30 Republicans..."

Boehner's spokesman, Michael Steel, provided an unequivocal response: "[Boehner] has been clear...that he intends to be Speaker again in the next Congress. And frankly the idea that he might ever abandon his members and his principles is a stupid liberal fantasy."

Which brings me to Lamar Smith, for whom I had high hopes when he took over the Science, Space and Technology chairmanship from Ralph Hall (R-TX). Under Hall's brief two-year stewardship, the committee had produced a very thin record. When Smith picked up the gavel last January, he did so with a promise of injecting new enthusiasm into a committee charged with charting the nation's science and technology future.

But that was before Tea Partisans made it clear they regarded the 2012 election as a mandate for continued legislative troublemaking, especially within the GOP ranks, despite an outcome that unambiguously returned Barack Obama to the White House. As a result, during the last 11 months, Smith has found it impossible to advance the policies and authorization levels needed to strengthen America's science and innovation enterprise without facing a Tea Party backlash.

With little chance of a budget deal that frees up significant money for discretionary spending, the prospects for a good science deal are poor—unless the public gets behind such an initiative. And that leads to the need for a science marketing road show.

It's possible to get lawmakers
ROAD continued on page 6

REACTOR continued from page 4

before 1977.

Though there has also been an upsurge in interest in solar and wind energy, Schwitters said that they have their limitations. Nuclear, he said, was the only mature low carbon technology that could be scaled up to a national industrial level while other technologies develop further.

“We just don’t see very good alternatives at the moment for the base power needs for the country,” Schwitters said. “We’ve viewed [extending nuclear plant operation] as a technically sensible approach for buying more time.”

To extend the lives of existing plants, the report included a list of recommendations for the Environmental Protection Agency and the Department of Energy, building

on ongoing research being done by the Department of Energy’s “Light Water Reactor Sustainability Program” and industry’s Electric Power Research Institute’s “Long-Term Operation Program.”

The recommendations advised that the EPA develop strategies to make low-carbon energy, including nuclear, economically competitive and that DOE provide greater funding to further research the safety and reliability of extended life plants.

The report was prepared under the auspices of the APS Panel on Public Affairs. The panel produces reports on topics being considered by government, to bring the perspective of physicists into the debate.

Primary audiences for the re-

port are the financial sector and investors who consider the consequences of carbon emissions in their business decisions by applying environmental, social and governance criteria to them. The study is being released via a series of webinars and discussions with investors, banks and utilities. John Rowe, chairman emeritus of the Exelon Corp., has joined Schwitters in advancing the report’s recommendations.

“POPA recognized almost two years ago now, this was a technological area where there was not much known and that these reactors would be approaching their end of licensing lifetimes,” Schwitters said. “It’s an important tech topic, so POPA decided to look into it and form a study.”

FELLOW continued from page 5

Sometimes that is two years out, five years out, sometimes it’s next week. “We need a solution for this now because we’re having this issue in our factory.” I’ve seen that full range, from “What are the esoteric limits for this technology?” to “What do we need tomorrow?”

What are the aims of the new position?

APS has structured this to be a one- or two-year fellowship, and the intention is to bring in people with different perspectives from the world of industrial physics. I’m happy to be here for a year; if I get extended for a second year that would also be fine with me. I’m excited to be participating in this and bringing this perspective to APS, which traditionally has been rather focused on academia, with some attention to the national labs. People in industry don’t really have much visibility in this building, and I’m happy to bring that perspective.

What have you been working on so far and what are some of the first things you hope to accomplish?

My first job is to figure out what my job is. Since this is a new position, there is not a clearly defined set of things to execute, but the overall objective [and] the success metrics are the number of physicists working in industry that are engaged with APS and how effective we are at serving the needs they have. Among the first steps are: What are the things that people want? What would make APS an effective organization for people who are working in industry? What sort of outreach should

we have to people who are using physics in industry? A particular focus will be on engaging with people early in their career. What happens today is many people are members of the Society of Physics Students and join APS as a consequence of that, but they sort of wander off and go into industry. Most people earning physics degrees these days wind up in industry and so we would like to be more effective in encouraging undergraduate and graduate students who have studied physics to maintain some kind of connection with APS. To do that, we need to offer things they’re interested in, whether that’s career guidance, information about industry, or highlighting the things we do to support physics teachers. We need to figure out what those things are that would be an effective value proposition for people to maintain a connection.

What are some of the other ideas you might be thinking about to get industrial physicists engaged with the APS?

One thing that has happened already, which I had nothing to do with, was starting up *Physical Review Applied*. This is a brand-new journal. It’s really targeted at people who are more focused on the applications of physics, rather than fundamental research. That is an indication of a much more open interest in the applied world. That’s one thing that’s already under way. There’s also been some suggestion of having more awards and prizes that might be focused on people working in industry. Some of that work is under way.

I think the main thing is to understand what the needs and requirements of this cohort of physicists should be, and I’m fortunate to be able to work with the Forum on Industrial and Applied Physics. Mark Bernius and John Rumble are the present and incoming leaders of that, and their mission is to engage with physicists working in industry. How do we solicit information from people and start to develop a value proposition that people would be interested in?

Long term, how do you see this position affecting the roles of APS and industrial physicists?

For me success would be that more people in industry are involved in APS and as a consequence that APS has a broader view of what is “physics” and what is important in the world of physical science and that there’s a voice which I think is mostly lacking these days, as to what is going on in the industrial world. That would be success.

I don’t want to give the impression that there’s nothing happening. It’s really to enhance the efforts that are under way. I’m really pleased that APS wants to do this. I have been an APS member since 1980, all during the time I’ve been working in industry, but I haven’t been to an APS meeting since 1987. I wanted to be attached to the world of physics, it’s part of my identity as a scientist and an engineer, and so I would like to find reasons that others would choose to maintain that same attachment.

MEETINGS continued from page 1

any DNP fall meeting held in the continental US.”

About 150 people registered for the Far West Section, down from about 180 at last year’s meeting held at the California Polytechnic State University.

“I don’t think it has anything to do with the government mess, as these meetings are geared towards undergraduates,” said Lynn Cominsky, past-Chair of the Section. “It is more a function that [Sonoma State University] is harder to get to than Cal Poly, and we have fewer physics majors than they do.”

The Prairie and New England sections also showed similar decreases. Organizers for both meetings said that they thought the drop in enrollment was likely due to factors like the venue’s location, and not the result of the government shutdown.

Although enrollment numbers were generally unaffected, several organizers said that the impact of the shutdown and travel restrictions was felt in other ways.

The shutdown ended one day before the Four Corners meeting started. A week prior, organizers convened an emergency meeting to replace plenary speakers who wouldn’t be able to attend, including Nobel laureate John Mather. As soon as the shutdown ended, with only 26 hours before he was scheduled to speak, Mather called the organizers saying that he was still interested and would catch the

next available plane to Denver.

The Ohio section meeting took place over the weekend of October 4, while the shutdown was still in effect. Chair Corneliu Rablau said he heard anecdotally that a few scientists traveled to the meeting using their own money.

Despite its high enrollment, many government scientists who wanted to attend the Nuclear Physics meeting were stymied by Department of Energy travel restrictions and the shutdown. Gibson said that the Lawrence Livermore National Labs was unable to send anyone, and a significant but unspecified number of Los Alamos scientists were likewise unable to attend. The Department of Energy requested two extensions for the meeting’s early registration deadline as it worked to secure approval to spend the necessary money to send scientists.

It ultimately secured approval for its researchers, but shortly thereafter the shutdown started. Various national labs said they would stay open until running out of already allocated funds. The NNSA, which runs Livermore and Los Alamos, said that they would close the labs down if the government had not opened again by the 18th. The DNP meeting then received a rush of cancellations from the labs, which included all scientists signed up from Livermore. The meeting started a week after the government reopened.

ROAD continued from page 5

ers to pump up science spending when budgets are going up by reminding them of the benefits to the economy, national security and medicine. But when budgets are heading down, the first priority for any member of Congress is to keep dollars flowing to programs the public values most. And as we have learned from polling, science isn’t one of them.

The explanation is simple: The public has little knowledge of the societal benefits of science, apart from diagnosing and curing diseases. And even there, the voters generally don’t know how and where the breakthroughs happen.

Their ignorance is mostly our fault. For decades, we have shunned the task of marketing science to the public, except to people who already appreciate it—and even then, only rarely by emphasizing the innovations that have

flowed from discovery. Even more rarely have we connected the dots from taxpayer dollars to taxpayer benefits.

The time has come for a game changer. And during the last few months, APS has been working with a number of other professional societies across all the sciences, including the social sciences, to launch a pilot project aimed at exploring whether advertising benefits of science can move the public needle.

If this experimental venture, “ScienceCounts,” proves successful in a small but representative testing area, we will have to marshal resources to carry out the campaign on a much broader scale. It will require the commitment of the entire science community. But with the future of American science hanging in the balance, we can do no less.

MARCH continued from page 1

There will be a variety of events for students attending the meeting. On Monday evening, students are invited to attend a special welcome reception and career panel highlighting non-academic and non-PhD career paths. There will also be a Tuesday evening reception where awards will be passed out and where students can meet and mingle. The graduate school fair will be open on Monday and Tuesday for undergraduates looking to learn more about continuing their education. The Job Expo will run from Mon-

day through Thursday. Graduate students can sign up for Lunch with the Experts, where they can enjoy a boxed lunch while having an informal, freewheeling discussion with an expert on their choice of topic.

The Committee on Minorities, in conjunction with the Committee on the Status of Women in Physics, will host a Diversity Networking Reception. Open to everyone, the reception will be a chance for physicists who want to learn about APS diversity efforts to meet one another and network.

The Forum on Industrial and Applied Physics will have a special round-table discussion with several physicists working in industry about the unique challenges faced by industrial physicists and how students can pursue careers in industry.

The exhibit hall will run from March 3 through 5 and will feature more than 130 exhibitors.

The APS Contact Congress booth will be set up for attendees to help them reach their members of Congress to express their concerns about science funding.

GAP continued from page 4

Research in Science and Engineering Project. The initial surveys asked more than 5,000 students in freshman English classes at 40 different institutions about their high school exposure to physics and gender issues. Hazari’s research team analyzed the results from a subset of about 1,600 female students who had taken a physics class in high school.

“We picked students in mandatory college English classes so we could get a more general population of students,” Hazari said. “We wanted to get the students who

hated physics in addition to the students who loved it.”

Hazari and her team are continuing their research by looking at how teachers and classes talk about issues of underrepresentation.

“In some of our follow-up work, we have been observing in the classrooms of teachers who have been engaging in these kinds of discussions,” Hazari said.

Hazari and her team’s results were published in *Physical Review Special Topics: Physics Education Research* on October 22, 2013.

ANNOUNCEMENTS

Childcare Grants Available

What: Small grants of up to \$400

Who is eligible: parents/caregivers who plan to attend the APS March or April Meeting with their small children or who incur extra costs to bring them along or leave them at home. Preference is given to early career applicants.

Deadline:

January 3, 2014 (for March)

January 31, 2014 (for April)

Details at:

www.womeninphysics.org



Reviews of Modern Physics

**Colloquium: Artificial spin ice:
Controlling geometry, engineering frustration**
Cristiano Nisoli, Roderich Moessner, and Peter Schiffer

Frustration, the competition between strong interactions, can lead to highly unconventional physical properties. The frustrated artificial spin ice materials not only allow for such emergence to be custom tailored but also to be visualized at the constituent level. This Colloquium collates ideas of the interdisciplinary field of the artificial frustration taken from classical correlated spin models, disordered systems, information theory, granular media, and micromagnetics; it also provides vistas on its future developments.

<http://link.aps.org/doi/10.1103/RevModPhys.85.1473>

<http://rmp.aps.org>

Corrections

In the story about the HEPAP meeting in the October *APS News*, the sentence that read "Currently running programs like the CDMS-II dark matter detector, Fermi-LAT gamma-ray space telescope, and IceCube's Deep Core neutrino detectors already have planned successors like SuperCDMS, HESS and PINGU respectively" **should instead have been**

"Currently running programs like the CDMS-II dark matter detector, the VERITAS gamma-ray telescope, and IceCube's Deep Core neutrino detectors already have planned successors like SuperCDMS, CTA and PINGU, respectively."

We thank Rene Ong of UCLA for pointing out the inaccuracy.

In the November "This Month in Physics History" about the Poincaré Conjecture, there were some spelling errors in the second paragraph. "Diphtheria" should have been "diphtheria"; "Ambulance Core" should have been "Ambulance Corps"; and "Franco-Prussion War" should have been "Franco-Prussian War". We thank Suren Tatulian and C. Needham for pointing them out, and we are still looking for the gremlin that caused them.

APS Congressional Science Fellowship 2014-2015

All Application
Materials Must Be
Submitted Online By
Close of Business
on January 15, 2014
(5:00 PM EST).

THE AMERICAN PHYSICAL SOCIETY is currently accepting applications for the **Congressional Science Fellowship Program**. Fellows serve one year on the staff of a senator, representative or congressional committee. They are afforded an opportunity to learn the legislative process and explore science policy issues from the lawmakers' perspective. In turn, Fellows have the opportunity to lend scientific and technical expertise to public policy issues.

QUALIFICATIONS include a PhD or equivalent in physics or a closely related field, a strong interest in science and technology policy and, ideally, some experience in applying scientific knowledge toward the solution of societal problems. Fellows are required to be members of the APS.

TERM OF APPOINTMENT is one year, beginning in September of 2014 with participation in a two week orientation sponsored by AAAS. Fellows have considerable choice in congressional assignments.

A STIPEND is offered in addition to allowances for relocation, in-service travel, and health insurance premiums.

APPLICATIONS should consist of a letter of intent of no more than two pages, a two page resume, with one additional page for publications, and three letters of reference.

<http://www.aps.org/policy/fellowships/congressional.cfm>

FUNDING continued from page 3

ergy's Office of Science [of these, OSTP is not a funding agency and does not conduct research on its own]. The original intent of the act, when it was first passed in 2007, was to double the federal government's research funding over seven years. When it was reauthorized in 2010, the timeline had slipped, with funding slated to double by 2017. This timeline is likely to continue to slip as Congress considers a new authorization.

As *APS News* goes to press, the House Democrats have released a discussion draft bill that aims to finish doubling the R&D budget by 2022. This makes for a gradual increase, one that is just above the projected rate of inflation.

"The Democrats' plan, ambitious though it might be, is just enough to keep treading water," said Matt Hourihan, director of the R&D Budget and Policy Program at AAAS. "If we fall short of those Democratic targets, it's pretty much assured that the three agencies in question will decline as a share of the economy."

House Republicans, however, have indicated that they plan on breaking the COMPETES act into two parts. The FIRST Act reauthorizes the NSF, NIST, OSTP and other smaller STEM programs, while the EINSTEIN America Act increases the Department of Energy's Office of Science funding by about 1.7 percent over current levels, but eliminates ARPA-E in the process. The draft for FIRST does not include funding levels.

"We could be waiting a while for the House Republican plan," Hourihan said. "The Senate seems

much more supportive of establishing a clear doubling trajectory."

Though at the time of publication no full draft has been circulated, the Senate has shown little interest in splitting the bills. The Senate Commerce, Science and Transportation committee held a hearing for a single overarching bill on November 6.

"The Senate has pretty much marched along doing the same thing, not really much of a change," Lubell said.

There are hints that the Senate might be more bipartisan and more ambitious than the House. A proposal authorizing the Department of Energy's science budget was released in mid-November with funding increases greater than the House Democrats' draft. Written by Lamar Alexander (R-TN) and Christopher Coons (D-DE), the proposal would boost the DOE's science budget from its current level of \$4.6 billion to \$6.9 billion by 2018. The House Democrats' language would increase funding only to \$6.3 billion.

Though the House Republican draft of the FIRST act does not include funding amounts, it does include several controversial sections. The most provocative of these are changes to the NSF's merit review process requiring the identification of grant reviewers. The new rules would involve a written statement about how each funded grant meets at least one of six criteria to benefit the United States, along with the names of the people in charge of approving it.

"If this ever happened, it

would be a cataclysmic change in the way the federal government conducts science," Lubell said.

At a hearing on the bill on November 13, Republicans defended the requirements as necessary for better accountability.

"Congress has the responsibility to work with the NSF and National Science Board to ensure that these taxpayer dollars focus on high priority research," said Rep. Larry Bucshon (R-IN). "The proposed legislation improves the transparency of taxpayer funded research by making more info available to the public about awarded grants and how they promote the national interest."

Democrats at the hearing generally opposed the bill's language on the NSF's merit review.

"While some of my colleagues may believe that these provisions merely increase accountability and transparency in the use of federal resources...I fear that the criteria used in the bill are vague and the process is unnecessarily burdensome," said Daniel Lipinski (D-IL). He added also that the language would likely add uncertainty and possibly even "fundamentally alter" how merit review is carried out.

The provisions are similar to the controversial "High Quality Research Act" that was circulated earlier this year. Though never introduced in the House, the draft legislation was sharply criticized by scientists and research advocates. Whether the provisions will make it to the floor is unclear, and Bucshon said several times that the proposed bill was a "discussion draft."

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Chair Corneliu Rablau of Kettering University in Flint, Michigan.

"What makes the regional section meetings so useful is the fact that they provide a venue and training ground for future physicists," Rablau said. "We offer a very friendly environment in which undergraduate and graduate physics students can present their work without the pressure of presenting in front of the biggest names in the field like they might do at a national meeting."

One such student who has benefited from the regional meetings is the OSAPS current Student-at-Large (SAL) and University of Cincinnati physics graduate student Masoud Kaveh. Kaveh was elected to the two-year SAL position last April and has since collected a mountain of email addresses as a way to reach fellow physics graduate students across the Midwest. About one third of the roughly 1500 OSAPS members are students.

"As the Student-at-Large, I want to be the voice for fellow students and colleagues and encourage students to become OSAPS members and attend the meetings," Kaveh said. "The meetings have given me a chance to meet with professionals in my area of

research that I couldn't have met with, or would have had a harder time meeting, and I feel more confident in myself and [my] capabilities to network now than ever before."

OSAPS also participates in outreach activities, the most prominent being the annual TechFest event, which Yaney, together with the Affiliate Societies Council of Dayton, started in 2003. The family-friendly event features hands-on demonstrations in many scientific disciplines including physical, environmental and life sciences, with the purpose to spark scientific interest in children. Over 50,000 people attended this year's event.

"Our goal is to keep members involved as much as possible," Rablau said. "You cannot emphasize enough the importance of presenting your scientific research. For the future I would like to see our membership grow to include more students who can learn to present their work to the science community as well as the public."

For more information about the Ohio-Region Section, visit their webpage on the APS website <http://www.aps.org/units/osaps/index.cfm>.

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his PhD in physics from the University of Maryland.

"With Dr. Shinbrot as editor of this vital new journal, I am confident in *Physical Review Applied's* future," said Gene Sprouse, the Editor in Chief of APS journals.

"I expect that the journal will take off rapidly, and quickly become a great resource for applied physicists."

APS will announce a call for papers for *Physical Review Applied* sometime in the near future.

The Back Page

Physicists are by training and professional title an exceptionally diverse group of individuals. We share an educational background that spans centuries of discoveries, in areas such as classical mechanics, electrodynamics, and quantum mechanics. Our training is highly relevant to understanding the intractable real-world systems we face as a society. As such, professional Physicists are employed in a wide range of industries and solve challenges that range from product engineering to improving health outcomes to the study of new physical phenomena. Since industry often employs physicists in titles that do not state Physicist, job expectations vary substantially. Even the types of degrees we earn extend from the applied to the purely mathematical. But together we form a society with a common set of interests, needs, and, most important, a common purpose. We model and manipulate the world around us. It only stands to reason that such a diverse group of individuals will face issues that are just as varied.

As individuals with jobs and goals, our needs change substantially as we progress through our careers. The support APS offers us should as well. An often overlooked segment of our community comprises those who either are working toward finding or have recently begun a new phase of their professional careers. This includes education just as much as changing jobs or even roles within an organization. We all move in and out of these critical time periods and it is during these transitions that the foundation of our careers is formed. Yet, traditionally, this is when we have the smallest voice for our concerns and the fewest resources to accomplish our goals. The early formative years and transitional periods are critical and require additional consideration from APS. Luckily, we form a Society where many of us have gone through these transitions and, as such, we are well suited to assist the transitional segments of our community to achieve their goals. Recent economic trends only strengthen the argument that we must protect and support these portions of our society. To address this community need, APS established a task force in the fall of 2012 to provide advice on how to better serve physicists throughout their academic studies, transitional career periods, and the first several years of their careers.

The nine-person committee, called the Early Career Task Force (ECTF), was charged with “identifying opportunities for APS to serve physicists more effectively in the early stages of their careers. Focusing on physicists in graduate school, postdoctoral appointments and first professional jobs, the Task Force should examine the needs of this cohort for career information, job and internship postings, and networking opportunities, and suggest additional ways to foster this member segment’s involvement with the APS. The objective is to help early-career physicists take their place in the physics enterprise, to facilitate stronger connections of this group to the APS physics community, and to encourage greater engagement of these members as volunteers.” The task force met in person on 15 October 2012 and thereafter through electronic means, and a final report was voted on and submitted to the APS Executive Board in April 2013.

The task force recommendations can be broken down into several broad categories, the most considerable being the formation of local chapters. The primary resource of the APS is its members and the community they form. The collective knowledge and experience the Society can offer is the most important benefit to being a member only so long as these benefits can be effectively transferred. Furthermore, facilitation of member involvement within society activities, such as networking and volunteering, is vital for a dynamic and vibrant community that supports its members throughout their careers. Early and transitional career members would benefit the most from such reciprocal interactions, as this transfer of information is essential to the concept of Physicist as a profession. The ECTF recommended that APS should provide ways for members to interact with each other and contribute to each other’s success, specifically through the creation of local APS chapters. These chapters would strengthen the organization and physics community as a whole by increasing member interactions and the availability of service opportunities. In essence, APS local chapters would not only be a place to find resources, but a community for Physicists to interact with other Physicists.

Local chapters are to be fundamentally inclusive and designed to attract students, early career physicists of all backgrounds, and those in transitional career periods, including ac-

Renewed Focus on Early Career Physicists

By Brad R. Conrad



ademic and non-academic physicists. While the chapters should be constructed to address the specific needs of early career physicists, they should not be limited to a specific community subsection and should strive to include physicists practicing at all levels and in all settings. Some chapters would best be served by direct affiliation with universities and educational entities, others with a specific industry or commercial hub, and some by a geographical location. It is important to note that the intent of local chapters, or more importantly APS’s role in local chapters, is one of support. Local chapters must be organic organizations that promote Physicists, offer opportunities for networking, communication between members, and provide volunteering support of both the local community and APS as a whole.

Local chapters are the ideal entities to facilitate networking within job markets, educational endeavors, and local community engagement by supporting self-determined events, activities, and resource access. A priority of each local chapter should be the inclusion of physicists and members from a variety of backgrounds, specifically those with non-academic experience. Only 20% of PhDs physicists ultimately end up in tenure-track positions. Successful local chapters will require both academic and non-academic physicists to have a sense of ownership. AIP statistics show that the largest percentage of permanently employed PhDs is in the private sector, at 57%. Many physicists do not have careers in academia and more closely identify with industrial career roles. Implementing local APS chapters would establish a more robust connection between academic physics entities and local industries. Actively encouraging non-academic physicists to engage in local APS chapter events and participate in volunteer roles both locally and nationally will strengthen not only the local chapter but a segment of the membership that is currently underserved by APS. It is recommended that each local chapter should strive to have a high level of autonomy, as each local chapter should represent the local community from which it is created.

Local chapters could provide a lifetime of career development resources and networking opportunities to all of its members, including industry-specific interactions, remote access of electronic resources, tools to assist job seekers with communication skills, informational sessions and topical meetings. However, to be successful this endeavor will require contributions from all levels of APS. Such an initiative requires additional resources which could include: membership infrastructure, activity guidance, electronic resources, financial support, organizational networking assistance, and educational materials. A special effort should be made to include local chapter events at regional and unit meetings. In return local chapters should support meeting activities. Such symbiotic interactions would improve attitudes toward the physics culture and the idea of Physicist as a profession.

Another primary recommendation of the ECTF is that APS must actively define itself as representing all physicists. By the very nature of the discipline, the physics community is broad. More so, it is common for Physicists to change fields. The Society must educate the public and its members about the varied career options available with a physics degree. Specifically, we need to do a better job of informing members, irrespective of title or degree, of the variety of opportunities available and begin to specifically

highlight non-academic positions. I believe this broadening of the Physicist identity not only represents who we are as a society but will increase the sense of belonging to the physics community and strengthen the concept of Physicist as a profession. Thus, the ECTF recommends that APS promote and market the definition of a physicist as one who obtains a degree in physics, works in a physics-related

field, or uses physics in his or her career. The physics community should be inclusive of all those who express interest in physics in any capacity and not be exclusive to the holders of doctoral degrees or those who pursue academic careers. Continuing to educate faculty and members on the changing definition of career physicist would contribute to an increased sense of community. This sense of Physicist identity should be a primary driver in APS initiatives. Additionally, an essential component of any healthy community is active member interaction through volunteering, and there are many opportunities to contribute. Local chapters would be a natural method of advertising and increasing volunteer support services. These volunteer positions must be easy to find, actively facilitated by APS and local chapters, and communicated effectively.

An overarching theme throughout the report is the visibility and participation of physicists in industry. The Society should increase industrial member sessions at meetings, provide meeting venues that are attractive to industrial members, promote networking opportunities, encourage industrial members to chair sessions, and target non-academic members to present their research. Since many physicists work in industry, APS should promote sessions at meetings where students can meet and network with industrial members. To build and strengthen the positive perception of non-academic physics careers, a network of non-academic physicists to serve as mentors for early career physicists should be established through local chapters. To prepare students for their careers, student must have access to mentors in the private sector. Since industrial mentors are not at academic institutions, local chapters can play a role in professional development by connecting students with industrial physicists at annual meetings.

To facilitate the professional development of Early Career Physicists, the ECTF recommends several changes to APS meetings. While APS is dedicated to representing all physicists, the vast majority of talks at meetings could be characterized as academic. Since these meetings attract an increasing number of undergraduates, there needs to be a focus on industrial and non-academic topics. This more personable setting is ideal for industrial member networking, establishing student-industrial member interactions, and broadening the purpose of the meeting to include the development of physics as a profession and increasing APS’s sense of community. Once established, APS local chapters would be a natural source for non-academic meeting involvement, improving both the meetings and service opportunities.

Additional suggestions focus on enhancing member interactions through networking. Poster sessions are often viewed as opportunities to directly connect in a way which simply is not possible in oral presentations. Poster conversations can be more in-depth, include a variety of advantageous professional interactions, and should be encouraged. Offering workshops which address professional skills and career planning at meetings would assist many early career Physicists. While implementing more professional development support at annual meetings is important, the impact of these efforts is inherently limited, since they occur over a brief period of time and are accessible only to those who are attending annual meetings. Promoting similar activities on a local level, within local chapters, would provide a sustained level of career support to a larger group of people over a longer time scale.

While the implications of these recommendations span the breadth of the Society and how it fundamentally relates to its members, it is my hope that they are a point of discussion for future development and self-improvement. APS has been actively researching these recommendations since the final report was submitted to the Executive Board. Finally, I thank the ECTF committee since many of the ideas, concepts, and script stated in this article come from their report and hard work.

Brad R. Conrad is an Assistant Professor of Physics and Astronomy at Appalachian State University. He was also the Chair of the APS Early Career Task Force, which generated the report discussed here.