Preparations are under way by the APS Panel on Public Affairs (POPA) to review and possibly update the Society’s statement on climate change. In the coming months, the APS membership will have a chance to weigh in on any proposed revisions before the Society adopts a final draft.

“We intend to keep the membership informed at every stage in this process,” said Robert Jaffe, a physicist at MIT and Chair of POPA. “We’re quite eager to make sure that the revision of the climate change statement is done in the most open and orderly way.”

The subcommittee of POPA that is conducting the review posted its background and research materials to the APS website, along with its charge. The research materials include the transcripts of the subcommittee’s January workshop, biographical information on outside climate experts who participated in the workshop, and their slide presentations. These materials are now available at http://www.aps.org/polICY/statements/climate-review.cfm.

The standing policy of the Society is to review its statements every five years. The Society first adopted the climate change statement seven years ago, but appended an addendum in 2010. The review also coincides with the release of the latest report on the physical science basis of climate change from the U.N.’s Intergovernmental Panel on Climate Change (IPCC).

“We intend to keep the membership informed at every stage in this process.”

The months-long process started last year with the formation of the subcommittee and a steering committee, which is guiding the subcommittee through the review. In addition to weighing the opinions of experts from its workshop, the review subcommittee is researching information related to climate change and reviewing the roughly 1,500-page climate change report by the IPCC.

If a new statement is drafted, it will be submitted to the full POPA committee in June. If approved by POPA, it will go to the APS Executive Committee for a vote on whether the statement should be officially adopted in its final form.

“We’re not rushing this. Climate science and climate change will be around a long time and we want to get this right before sending it out to the membership for review and comment,” Jaffe said.

Soft matter scientists are working to create an APS topical group for their research.

The organizing committee for the group is being finalized, and will soon start drafting by-laws and collecting signatures to form the group.

“It’s our hope that the APS annual meetings become the ‘go-to’ meetings for soft matter in the US,” said Sharon Glotzer of the University of Michigan, the chair of the organizing committee.

She added that members of the research community are working to create the new topical group because the field has been expanding over the last few years.

“Soft matter is one of the most rapidly growing areas of physics right now,” Glotzer said. “You don’t feel a strong presence of soft matter within the community because it’s spread apart.”

This subfield of condensed matter physics includes researchers working on foams, colloids, liquids, gels, and granular matter. The organizers have been working with other groups and divisions to co-ordinate the formation of the new group.

“The executive committee of DPOLY [the APS Division of Polymer Physics] is very pleased that APS has found a way forward to address the concerns and the needs of the soft matter community,” said Karen Wires of the University of Pennsylvania and the chair of DPOLY. “Soft matter topics used

Funding for Physical Sciences Shows Some Gains

The National Science Foundation (NSF) received only a modest bump as well. Its $5.8 billion overall budget represents a 4.2% increase over 2013, and 0.9% over 2012. Within the NSF however, research spending grew 6.1% over 2013 and a 2.4% increase over 2012, meaning that their budget for construction of new facilities shrank.

“That’s one area where the physical sciences didn’t do quite so well,” Hourihan said.

The budget would restore NSF’s ability to award grants to near pre-sequester levels, but construction of new facilities could feel a pinch. Projects already in progress will be prioritized, potentially squeezing the Large Synoptic Survey Telescope (LSST), the NSF’s only construction project slated to start this year. But the project’s leader thinks that the cut from $27 million to $17 million won’t end up being an issue.

“The NSF is authorized to put additional money into the LSST if it can find it in their budget,” said Steven Kahn, director of the LSST, adding that he felt confident the NSF would reallocate enough funding to keep the project on schedule. Researchers on individual projects that had been facing shutdown or a delayed start have hailed the budget.

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The Defense Department is the only research budget that decreased. Overall, DoD research will decline 1.5% from the 2013 mark, meaning a 1.0% drop from 2012. However, much of that decrease is from the department’s applied research accounts. On the other hand, basic research got a boost, increasing 8.1% over 2013 levels, which almost keeps it at pace with 2012 inflation-adjusted levels.

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“We now have the opportunity to determine what the sources are, if we are indeed seeing sources of cosmic rays….The big difference is that we are not using light, we are using neutrinos to look at sky.”


“This creation of a Dirac monopole is a beautiful demonstration of quantum simulation….Although these results only offer an analogy to a Dirac monopole, their compatibility with theory reinforces the expectation that this particle will be detected experimentally.”

Lindsay LeBlanc, University of Alberta, commenting on another team’s creation of a “Dirac string,” BBCNews.co.uk, January 29, 2014.

“Hawking’s paper is short and does not have a lot of detail, so it is not clear what his precise picture is, or what the justification is.”

Joseph Polchinski, the Kavli Institute for Theoretical Physics, on Stephen Hawking’s recent surprising announcement that black holes don’t exist, The Christian Science Monitor, January 29, 2014.

“It’s not possible to have both of those things, to have no drama at the apparent horizon and to have the information come out.”

Raphael Bousso, University of California, Berkeley, on Stephen Hawking’s recent surprising announcement that black holes don’t exist, The Christian Science Monitor, January 29, 2014.

“It’s quite close to application….Not too much extra needs to be done.”

Zhifeng Ren, University of Houston, on a conductive material he developed that’s transparent and flexible, The New York Times, February 4, 2014.

“Despite seeing them all the time, icicles are actually poorly understood by physicists.”


“Now the story is that if you go and buy a can of conventional house paint, anyone of us can be a Picasso.”

Volkert Rose, Argonne National Laboratory, on using X-rays to identify pigments used in famous paintings, AFP, February 15, 2014.

“We are not sure the government appreciates the scale of the role that our research plays…The real question is, how does it view not-directed, non-industrial, curiosity-driven blue-sky research? I worry the view is that it is irrelevant at best and that in many cases they actually dislike it.”


This Month in Physics History
March 1880: The Curie Brothers Discover Piezoelectricity

Microphones, quartz watches, and inkjet printers are just a few of the many everyday uses for the piezoelectric effect found in various crystals, ceramics, and even bone. It was discovered by none other than French physicist Pierre Curie, working with his brother, Jacques. Pierre was named a physicist by his father Eugène Curie, Pierre’s early education was decidedly unorthodox: his father opted for private tutors for his son, believing it to be the best approach given his temperament and keen intellect.

Pierre showed an early aptitude for mathematics, and at 16 entered the Sorbonne for his university studies. He successfully earned the equivalent of a master’s degree by 18, but was forced to postpone his doctoral studies. During this time, he earned a meager living as a lab instructor.

Pierre started conducting chemistry experiments at the age of 20 with Jacques, focusing on the structure of crystals. They made an especially interesting discovery in the piezoelectric effect, in which a change in temperature in a crystal material generates an electric potential. The brothers, inspired by work done in the mid-19th century, thanks to the work of Carl Linnaeus and Franz Aepinus, and subsequent scientists had hypothesized that there could be a relationship between the properties of mechanical stress and electrical potential. But experimental confirmation proved elusive.

The brothers Curie thought there would be a direct correlation between the potential generated by temperature changes and the mechanical strain that gave rise to piezoelectricity. They expected that a piezoelectric effect would arise in materials with certain crystal asymmetries. Armored with the crudities of tinfoil, glue, wire, magnets, and a simple jeweler’s saw—they tested various types of crystals, including quartz, topaz, cane sugar, Rochelle salt, and tourmaline. As a result, the Curies found that when such materials were compressed, the mechanical strain did indeed result in an electric potential. The strongest piezoelectric effects were found in quartz and Rochelle salt. The brothers put their discovery immediately to good use by inventing an electric cigarette lighter.

There was a twist to the piezoelectric saga still to come. The following year, mathematician Gabriel Lippman demonstrated that there should be a converse piezoelectric effect, whereby applying an electric field to a crystal should cause that material to deform in response. The brothers rushed to test Lippman’s theory, and their experiments showed the mathematician was correct. Piezoelectricity could indeed work in the other direction.

After the initial flurry of excitement died down, piezoelectric research faded into the background for the next 30 years or so, in part because the theory was so mathematically complex. But the experimental progress was still being made. In 1910, Waldemar Voigt published the definitive treatise on the subject, Lehrbuch der Kristalphysik, a massive tome describing experiments with the fundamental properties of crystals, and the development of piezoelectric properties. More importantly, it rigorously defined the 18 possible macroscopic piezoelectric phenomena. This set the stage for subsequent development of practical applications for such materials, beginning with sonar in 1917, when Paul Langevin developed an ultrasonic transducer for use on submarines using thin quartz crystals. May automobiles today have ultrasonic transducers to assist drivers in measuring the distance between the rear bumper and any obstacles in its path.

Pierre moved on to investigating magnetism, uncovering an intriguing effect of temperature on paramagnetism now known as Curie’s law. Another discovery was the Curie point: the critical temperature at which ferromagnetic materials lose their ferromagnetism. He even flirted with paranormal spiritualism as the 19th century drew to a close, developing sensitives with mediums such as Sigrid Palladino, approaching them as a scientific experiment with detailed observational notes, in hopes that such study would shed light on magnetism. "I must admit that those spiritual phenomena interested me very much," he wrote to his fiancée, Marie Sklodowska, in 1894. "I think in them are questions that deal with physics."

Pierre married Marie the following year, when he also finally completed his doctorate, thanks to her encouraging him to use his magnetism work as a thesis. He became a professor of physics and chemistry at Paris in 1895. (Jacques became a professor of mineralogy at the University of Montpellier.) His new wife replaced his brother as his scientific partner. The two discovered radium (and later, polonium), sharing the 1903 Nobel Prize in Physics with Henri Becquerel. The piezoelectric quartz electrometer invented by Pierre and Jacques all those years before proved an essential instrument in their ongoing work.

Towards the end of his life, Pierre showed early signs of opposition to radium. In fact, his clothes were often so radioactive he had to postpone experiments for several hours by burning it with his instruments. The unit of radioactivity is called the curie in his and Marie’s honor. But he was spared a gruesome death by radiation sickness. Instead, he was killed in a freak accident, run down on a wagon on the Place Dauphine as he was crossing the busy street.

Marie always felt Pierre did not get the respect and support he deserved from his scientific col...
Gaps Widen in Attitudes Toward Science

By Michael Lucibella

According to a recent survey, public attitudes towards science and scientists generally remain supportive. However, controversies over certain topics have deepened. The survey found that 80 percent of Americans say they are interested in new scientific discoveries, a level of interest higher than in Europe. "There are some very specific debates that have become politicized," said Cary Funk, a senior fellow at the Pew Research Center. "The Pew Research Center conducted the surveys. "People on balance see more benefit than harm, but there are areas where they're concerned about GMOs [genetically modified organisms] or they're concerned about climate change."

The report found also that Americans generally believe the science behind climate change, and only about 30 percent describe themselves as climate change believers. The report says that if the science is clear, government leaders who support the use of political science should be divided on the issue continues to grow. "We found really an amazing level of stability," Funk said, adding that the word over the last decade or longer," Funk said. "And we found that had changed is a growing partisan gap."

Funk added that this polarization was not necessarily unique to science. "Lots of issues have become politicized over the last decade or so," Funk said.

The biennial Science and Engineering Indicators report issued by the National Science Foundation always includes a chapter about public attitudes and knowledge of science. It brings together surveys from a variety of polling organizations, including GallupInc., and the Pew Research Center.

"It's a wonderful trove of data about what Americans know about science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science… where they get their science...
Industrial Postdocs Offer Long-term Benefits

Brad Conrad, in his article “Re- renewed Focus on Early Career Physicists” (“APS News, December 2013) makes many useful points about how APS can help non-a ca demics. He提到 that there is a gap between early stages of their careers. I believe he omit one such important aspect.

Over the last half-century, a standard, well-recognized, route into academic physics was the postdoctoral position—basically short-term, temporary employment with a well established academic research institution. The APS served as a clearinghouse for postdoctoral positions with available postdoctoral positions: advertising and assisting recruitment for existing positions. This is a critical part of the financing of additional ones.

To the best of my knowledge, APS has not done the same for industrial postdocs. Small industrial firms are not likely to be in the position to offer many such useful temporary positions (useful to both the firm and the candidate postdoc), but the larger firms—GE, IBM, Boeing, etc.—may very well be able to do so. I think it would be very useful for the APS to formulate policies on Industrial and Applied Physics) to attempt to proselytize among these larger firms for the creation of “industrial postdocs,” pointing out to them the long-term benefits to them of creating a national cadre of well-versed non-academic physicists as well as the benefits they would see in the benefits of augmenting their staffs with “new blood.”

I believe the improvement of the senior science executives of these firms, called by the APS, could initiate a series of these well-publicized industrial postdoctoral positions. This could establish a new career route for newly graduated physicists and those seeking career changes.

Alvin M. Saperstein
Detroit, Michigan

An Arresting Career Brings Technology to Law Enforcement

By Alaina G. Levine

These days, if you want to take a bite out of crime, you are going to be aided by a variety of technologies ranging from simple databases to X-rays to a friendly face. And yet most police departments do not have staff with science or engineering backgrounds.

“Police are an underserved market of respect for science and technology,” explains John M. Pake, a criminal justice professor. “They are not. In fact, part of his charge is to relate a technological need to the mission of their agency,” he says.

As a result, law enforcement organizations may spend billions of dollars on specialized equipment. And yet, “are at a disadvantage because they have to depend on the vendor to tell them how to use it,” he notes.

That’s where Morgan comes in. His company, Coptech LLC, offers “cost-effective solution” to police departments to help them understand science and technology and equip them with training and resources to use it. Morgan is a former military officer “administrative and engineering” in science and engineering from Johns Hopkins, he served in the Maryland State Police as an investigator, and has a PhD in materials science and engineering from the University of Pennsylvania. He is a former officer in the military and has been involved in the field of science and technology for more than 40 years. He is a member of the International Academy of Police Science and Technology, the research arm of the Department of Justice (the research arm of the Department of Justice (DOJ)) as its director.

At the DOJ, Morgan spent much of his time overseeing R&D programs to develop and deploy novel innovations to the criminal justice system, such as forensic technology (e.g., DNA fingerprinting, fingerprints, body armor, less lethal weapons), and information and sensor technology. He feels that one of his most important accomplishments was spearheading a program that helped analyze dozens of backlogged DNA samples nationwide, and altered the way DNA is used as a forensic, crime-fighting tool.

He trains law enforcement professionals to think like engineers when solving problems, whether they require technology or not. In fact, part of his charge is to create “policing technologists,” professionals who are tasked with running projects that are technology related. “We teach the basics of systems engineering and how to relate a technological need to the mission of their agency,” he says. His other projects include assisting technology companies to better understand law enforcement issues so they can more successfully develop products to meet their growing needs, and international policing development. “The US spends very little money on helping foreign police departments,” he notes. “And yet this is the front line of combatting terrorism and an extraordinarily important part of improving government governance, especially in the developing world.” Law enforcement is woefully underinvested in international relations and I’d like to fix that.

Morgan certainly has the skill set to lead these initiatives. With a BS in physics from Loyola College in Maryland and a PhD in materials science and engineering from Johns Hopkins, he served in the Maryland State Police as a forensic, crime-fighting tool. “We failed to carry the day regarding laser printers,” he notes. “We won regarding laser printers, a modem at that price, but since the stripped-down Macintosh at just under $10,000. It didn’t even have a modem at that price, but since the price tag was below a common $10K “capital request” threshold, many engineers could purchase one without justifying their decision.” (They didn’t know what it was good for, yet, but they knew they wanted one.)

Xerox didn’t respond adequately to the Macintosh, and lost the market. When we won in the personal computer market but only through a play developed by White and me. We established a separate operation—xerox— one each for high-speed, midrange, and low-end printers—and a fourth program that contained all of the business, a fourth program that contained all of the business.

We failed to carry the day regarding the personal computer. The ALTO research prototype ($80,000 per cop) was engineered to become the $16,000 Star, which had limited market appeal. Apple introduced the similar Lisa computer at $15,000, but adroitly followed up with the stripped-down Macintosh at just under $10,000. It didn’t even have a modem at that price, but since the price tag was below a common $10K “capital request” threshold, many engineers could purchase one without justifying their decision. (They didn’t know what it was good for, yet, but they knew they wanted one.)
The United States has long been a magnet for top science and engineering talent from every corner of the world. The contributions of hundreds of thousands of international students and immigrants have helped this country build a uniquely powerful, productive, and creative science and technology enterprise. It leads the world in many fields and is responsible for the creation of millions of high-value jobs. A few statistics suggest just how important foreign-born talent is to US science and technology:

- Over 30 percent of all Nobel laureates who have won their prizes while working in the United States were foreign born.
- Between 1995 and 2005, a quarter of all US high-tech startups included an immigrant among its founders.
- Forty percent of Fortune 500 firms were started by immigrant or their children, among them Google, Intel, Yahoo, eBay, and Apple.
- Among the ten universities that produced the most patents, more than half were headed by one foreign patent involved at least one foreign-born inventor.
- More than 40 percent of all information technology patents in 2010 listed a foreign national among the inventors.

But the world is changing. Countries that were minor players in science and technology a few years ago are rapidly entering the major leagues and actively competing for talent on the global market place. The advent of rapid and inexpensive global communication and air travel within easy reach of researchers from many countries has fostered the growth of global networks of collaboration and are changing the way research is done. Our visa and immigration systems need to change, too.

For the past year, I have been engaged in a study of the impacts of US visa and immigration policies on foreign scientists, engineers, and STEM students in light of the increasing globalization of science. Through this study, I’ve identified a number of important priorities that will help the United States respond to these developments and prepare for the future. Take, for example, the section of US immigration law known as 214(b) that requires consular officers to treat every person applying for a US visa as an “intending immigrant.” In practice, this provision means that a person being interviewed for a nonimmigrant student visa must persuade the consular officer that he or she does not intend to remain permanently in the United States. Just stating the intent to return home following completion of one’s educational program is not enough. The applicant must present evidence to support that assertion, generally by showing strong ties to the home country. Such evidence may include connections to family members, a bank account, a job or other steady source of income, a house or other property. For a student from China, this is often not a straightforward matter. It is not surprising, therefore, that the most common reason for denial of a visa application, including student visas as well as other major visa categories is 214(b), failure to overcome the presumption of immigration intentions.

Section 214(b) of the Immigration and Nationality Act dates to 1952, an era when foreign students in the US were relatively rare. In 1954-55, for example, there were about 34,000 foreign students in the United States. In contrast, in 2011, there were nearly 765,000 foreign students in US higher education institutions, nearly two-thirds of them at doctorate-granting universities. In those early post-World War II years, the presence of foreign students was regarded as a form of international cultural exchange. Today, especially in STEM fields, foreign graduate students and postdocs make up a large and increasingly essential element of US higher education.

It’s time to re-examine the application of 214(b) to STEM students. Congress has recently made changes in science and higher education that have taken place over the past 60 years. As NAFSA, the Association of International Educators, states in a recent policy brief, “Educated students are exactly the kinds of immigrants we should encourage to stay in the United States. We should not force them, before they even start their studies, to say that they have no intention of staying, working, and contributing to our country after they graduate.”

The presumption of intent to immigrate is not the only hoop through which we put STEM students and potential science and engineering workers. Others include the security review process code-named “Visas Mantis,” the limits on H-1B visas (for foreign workers in specialized occupations), and the necessarily complex rules that govern J-1 visas (for foreign exchange visitors). Visa applicants who work in or intend to study certain technical fields or are from certain countries are frequently referred by consular officers to security reviews involving nearly a dozen federal agencies. The “Visas Mantis” review is currently applied to about 10 percent of technical visitors, it is largely opaque, keeping applicants in the dark about their status, subjecting many innocent individuals to lengthy delays, and tarnishing the image of the United States as an open, welcoming society. Adding more consular officers with scientific or engineering training could facilitate screening applicants at the consulates and reduce the number of “unusual circumstances” cases, allowing security officials to focus on serious security risks. Keeping applicants informed of the status of their applications during Mantis reviews would also help.

The H-1B visa category covers temporary workers in specialty occupations, including scientists and engineers in R&D. The program is capped at 65,000 each fiscal year, but an additional 20,000 foreign nationals with advanced degrees...
CUWIP continued from page 1

were the Southeastern Conference at Florida State University, South Central at University of Arkansas at Little Rock, and Southwestern at University of Arizona State University, Northeast Conference at Pennsylvania State University, and Rocky Mountain at Brook University/Brookhaven National Laboratory, West Conference at UC Berkeley, Midwest Conference at University of Chicago/Ar- gonne National Laboratory/Fermi National Accelerator Laboratory and the Western Regional Conference at the University of Utah.

During the three-day conference, students had the opportunity to present their research and explore in poster sessions, participate in career workshops and panel discussions, and network with one another. There were over 1000 professional physicists, both female and male, about cutting edge physics research.

Learning from these invited speakers offered some of the most inspiring moments for Nova Jaber, who had yet to accept the position at the University of Maryland. Jaber is a freshman at Bryn Mawr College in Pennsylvania and first learned about the conference while chatting with Angela Walker. Walker is a senior scientist at the National Institute of Standards and Technology and was one of Mary Jaber's new physics professors.

“I never get tired of hearing how [Williams] got there and how she managed to develop leadership roles, as in inspiring and described Williams’ confidence as contagious. Jaber plans to declare her physics major next year when she’s a sophomore.”

Jennifer Liang, another undergraduate physics student who attended the conference, said that she was surprised to see the large number of women at the conference.

“I didn’t know there were so many women in physics,” said Liang, who is a junior at the University of Maryland.

It has inspired me to…keep moving toward my goals,“ said Jaber, who is a new nuclear graduate student in physics next year. Since 2012, APS has helped co-ordinate these conferences by facilitating registrations and co-organizing events with host institutions. This year, APS received about 880 new female student members as a result of the registration process and even attempted the confer- ences, explained APS Women and Education Program Administrator, Deanna Ratnivoda.

However, it is not possible to attend the conferences, they were given the option to opt-out of the free one-year student membership, “Ratnivoda said. “If they did not opt out, they were awarded free membership for a year… the attendance for the 2014 conferences was 1006 stu- dents.”

One of this year’s APS represen- tatives, Careers Program Manager Crystal Bailey, gave a talk entitled “Breaking the myth of the non-traditional physicist.” Students first entering physics as undergraduates may think that pursuing a career in academia is the norm, but Bailey explained that is not the case.

“...physicists in the law enforcement community will also grow. “I love the purity of science for science’s sake, but there’s wonderful satisfac- tion in seeing science and technol- ogy put into practice in a practical way,” she says. Currently there is a desperate need for analysts and data scientists, especially with an uptick in electronic crime, he notes, but there are other avenues in which physics-educated professionals can contribute. “People with physics backgrounds have more to offer in this landscape than they might real- ize,” he says. “For someone who is creative and interested in stepping out of their comfort zone, this is the industry for you.”

Alaina G. Levine is the author of Networking for Nerds (Wiley, 2014) and President of Quantum Success Solutions, a science career and professional development con- sulting enterprise. She can be con- tacted through www.alainalevine. com, or followed on twitter @AlainaGLevine.

Huls in support of the President’s Advancing Justice Through DNA Technology initiative, and Morgan was awarded the Service to Amer- ica Medal, the highest honor a civil- ian can receive, for his contribu- tions. He later served as the Commanding Officer of the US Army Special Operations Com- mand, where he oversaw research in myriad technical areas, includ- ing low-light-seeing robotics, night- vision gear, and information analy- sis.

But all of these experiments in fighting crime and terrorism wouldn’t have been possible with out a foundation in physics; argues Morgan. The important problem-solving abilities, but it also “gives me instant credibility be- cause police departments are hungry for information on science and technol- ogy and they want someone with real credentials to help them.”

As technology continues to per- vade every facet of society, every- one can make a difference. “Once you understand the basics, you can make sense for them and gain the skills they need to be successful in the path they choose.”

ENFORCE continued from page 4

In addition to staff support from APS, the conferences received fi- nancial aid from the National Science Foundation and DOE which together will provide about $210,000 to support these confer- ences through fiscal year 2014. Any tips on how much of the bulk of the funding, however, came from individual sites, which in total exceeded $440,000 for this year’s conferences.

ENFORCE continued from page 3

DISPATCH continued from page 5

NIH was funded at a rather disappointing $29,908 (-2.5%), which is $800m less than in FY12.

Finally, the Office of Science and Technology of the President was funded at $5.5M (+23.4%).

WASHINGTON OFFICE ACTIVITIES
ISSUE: MEDIA UPDATE

Michael S. Lubell, director of public affairs, opined that science offers a path for bipartisanship in his Jan. 24 op-ed in Roll Call. He cited the helium reserve bill as an example of how Congress can work together on an issue that affects the whole nation. Read the column here: http://bit.ly/1CzDy5

Following word of the proposed move of the Air Force Office of Scientific Research, Science published an article detailing the sci- entific community’s opposition to the plan. Read the story here: http://bit.ly/1CwWb7

ISSUE: Panel On Public Affairs

A proposed APS Statement on Undergraduate Research was posted on the APS website for review by APS members. POPA reviewed the member comments and worked with the APS Committee on Education to include several edits. The statement was forwarded to the Executive Board and Council for a final vote.

POPA is undertaking a review of the APS 2007 Statement on Climate Change. Information about the process can be found at: http://www.aps.org/policy/statements/climate-review.cfm

The APS Committee on the Status of Women in Physics and the APS Committee on Careers and Professional Development have both approached POPA with proposed APS statements. The POPA Subcommittee on Physics & Public is working with those committees on draft statements that will be considered by POPA at its annual meeting.

Several ideas for POPA studies were suggested by new members at the February meeting. Any APS member can propose that POPA carry out a study. A template for proposals can be found online, along with a suggestion box for future POPA studies: http://www.aps.org/policy/reports/popaproposals/suggestions/ index.cfm.
We Want your Nominations for Historic Sites

Owing to technical difficulties, the website for APS Historic Sites suggestions did not retain any past nominations.

Please submit nominations, both new and previously submitted, via

http://www.aps.org/programs/outreach/history/historicsites/nomination.cfm

Nominations received before the end of February will be eligible to be considered in the 2014 cycle.

Questions?
Contact bridgeprogram@aps.org

www.apsbridgeprogram.org/link/apply.cfm

Distinguished Traveling Lecturer Program (DTL)

Help convey the excitement of laser science to undergraduate students

The Division of Laser Sciences (DLS) of the American Physical Society announces its lecture program in Laser Science, and invites applications from schools to host a lecturer in 2014/2015. Lecturers will visit selected academic institutions for two days, during which time they will give a public lecture open to the entire academic community and meet informally with students and faculty. They may also give guest lectures in classes related to Laser Science. The purpose is to bring distinguished scientists to colleges and universities to convey the excitement of laser science to undergraduates.

DLS will cover the travel expenses and honorarium of the lecturer. The host institution will be responsible only for the local expenses of the lecturer and for advertising the public lecture.

Awards to host institutions will be made by the selection committee after consulting with the Lecturers. Preference will be given to those predominantly undergraduate institutions that do not have extensive resources for similar programs.

Applications should be sent to both the DTL committee Chair Rainer Grobe (rgrobe@ifa.tu-darmstadt.de) and to the DLS Secretary, Treasurer Anne Myers Kelley (amkelley@uncs.edu). The deadline is 30 May 2014 for visits in Fall 2014.

For a list of lectures for 2014/2015, see
www.physics.sdsu.edu/~anderson/DTL/lecturers.html

http://physics.sdsu.edu/~anderson/DTL/

Correction

“This Month in Physics History” (APS News, February 2014) recounted James Chadwick’s discovery of the neutron. Owing to an editing error, the statement “Chadwick replicated a German experiment in which polonium struck a beryllium target...” is incorrect. The alpha particles from the polonium, not the polonium itself, struck the target thanks to Charles Kaufmann of the University of Rhode Island for bringing this to our attention. We regret the mistake.

The formation of the group would be the culmination of several years of grassroots effort to establish a home for soft matter researchers.

Europe has a very strong soft matter community,” Glotzer said. “We don’t have the same kind of thing here in the US.

The effort also comes in part as the Society tries to expand its appeal among industrial physicists. There was specifically an effort to include industry,” said Trish Lerti, the director of APS Membership.

“The timing is right to help us achieve some of the goals APS identified in its strategic plan.”

from US universities are exempt from this ceiling and all H-1B visa holders who work at universities and government-affiliated nonprofits, including national laboratories are also exempt. Presumably intended to strengthen US science and engineering capabilities by bringing in international talent, the program has been exploited by firms (mainly from India) that outsource information technology workers (programmers, software developers) to US clients. One relatively easy fix for this problem might be to expand the exempt subcategories of H-1Bs to include all PhD scientists and engineers engaged in R&D, not just those at universities and nonprofits, thus putting them in a separate class from those using the program for outsourcing of IT personnel.

The I-1 exchange visitor visa, which covers research scholars and professors, is entangled in a maze of rules and regulations. There are restrictions on how long a visitor may remain in the United States that depend on the dates and durations of previous visits. There is a two-year home country residence requirement that applies to some visitors and there are 12 and 24 month bars that prevent visitors from returning to this country, again depending on various factors. There are reasons behind each of these rules, but altogether they create an unnecessarily complex picture to potential visitors and those who would invite them to US labs and classrooms.

Up to now, we have still managed to attract large numbers of top STEM students, postdocs, and senior scientists and engineers. But other nations are not just standing by idly and watching. They know how important scientific and engineering talent is to their futures. China, India, and South Korea, among others, have set up programs to draw expatriate scientists back home. They are offering attractive salaries and funding to set up labs and hire staff. In 2011, China established a "Thousand Foreign Experts Program" explicitly aimed at foreign scientists and entrepreneurs. Korea has opened a "one-stop" center to help foreign researchers immigrate. Canada has created a new visa program to attract foreign entrepreneurs. Australia, Chile, and Brazil are among the other nations with programs to attract international scientists. As US federal agencies and universities see their budgets shrink and the US visa and immigration system remains locked in the past, the appeal of such programs to scientists who might other- wise come to the United States grows. The changes advocated here and others explored in this study can help level the playing field and maintain the position of the United States as a world leader in science and technology. Albert H. Tuch is Research Professor of Science, Technology & International Affairs, Center for International Science & Technology Policy, George Washington University, Washington, DC.
Urban Physics

By Steven E. Koonin, Gregory Dobler, and Jonathan S. Wurtele

CUSP’s Urban Observatory view of the east side of lower and midtown Manhattan from a rooftop in downtown Brooklyn. The night scene consists of major and minor building lights, street and river lights, and roughly 10,000 window lights. An 8 megapixel visible camera acquires three-color images every 10 seconds. Privacy protections include a resolution no finer than a few pixels/window.

The second facility is the CUSP Urban Observatory (UO), created to observe significant regions of the city at multiple wavelengths. Multiple urban vantage points (e.g., tall buildings) afford platforms from which sensors can consistently and synoptically cover the city without the mass, volume, power, or data rate constraints inherent in aircraft or satellite observations. The range of current or future instrumentation includes multiband visible imaging, broadband IR imaging (SWIR, MWIR, and thermal), hyperspectral imaging (to measure trace gases, building surfaces), LIDAR (to study building and bridge motions as well as pollution), and radar (building and surface motion, building damage, traffic). Important correlative data includes meteorology, topography, and geolocation of scene elements; parcel and land use data, demographics, etc.

The UO has begun optical imagery of NYC, providing three-color visible images every 10 seconds. Privacy protections include a resolution no finer than a few pixels/window.

• Enhanced monitoring of public health (spread of infectious diseases, behavioral and environmental impacts). In many of these examples, benefits are amplified by an open data architecture that promotes an increased understanding of the urban system in all sectors of society.

• Research and Education

Four CUSP facilities are being created to anchor its research projects. First, the Data Warehouse curates and controls NYC-relevant datasets from diverse sources, including open city data, proprietary commercial data, and data generated by CUSP itself. The notions of data curation and data "users" are familiar to the high-energy physics and astronomy communities. Curating open data, which come from disparate city agencies in a wide range of formats, is a useful and important task. The Data Warehouse balances desires for openness against the proprietary and privacy concerns of the data sources. Unlike physics datasets, much urban data is about people, entailing the need to ensure the individual privacy of the citizens whose collective behavior is being studied. Both the government and the private sector routinely collect diverse data, sensorial, inscriptive, and computational, that allow us to understand urban systems. For CUSP's work, reflected in the responsibilities of its Chief Data Officer and the approval of the NYU Institutional Review Board for projects that involve more than open data. Other privacy safeguards include strict data access rules, immediate data encryption, and degrading of information. CUSP and its partners aspire to develop and demonstrate best practice in the responsible and transparent use of personal data in research and for public good, not only through norms and procedures but also through implementation of new technologies.

The third CUSP facility will be an integrated Urban Observatory (UO), founded to work with citizens of New York—volunteers who acquire data using personal, mobile environmental, or stationary home sensors and who analyze data by applying computational and statistical techniques. Examples include this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project. The fourth CUSP facility will be an integrated simulation of the city. Reduced models might provide insights into urban dynamics, but they must be complemented with detailed, high-resolution, validated, high fidelity models of urban systems. An integrated city model would combine traffic and land use codes with communications, economics, energy, etc., in a single agent-based formulation. None of this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project. The four CUSP facilities will be an integrated simulation of the city. Reduced models might provide insights into urban dynamics, but they must be complemented with detailed, high-resolution, validated, high fidelity models of urban systems. An integrated city model would combine traffic and land use codes with communications, economics, energy, etc., in a single agent-based formulation. None of this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project.

The in situ monitoring and study of environmental parameters and their sources, e.g., trucks, buses, etc.

In many ways, CUSP resembles a "national laboratory for cities," with a strong applied research component coupled to New York City. Its researchers and students work with the city on real problems, where success is measured "on the street" or in fiscal/operational terms. CUSP physicists must work with data and computational scientists, electrical and civil engineers, social scientists, and city operators. The difficulty of understanding how complex systems work, which appeals to many physicists, coupled with an opportunity to have a positive impact on society, brought us to urban science. To successfully contribute to this new field, physicists will have to understand the academic, commercial, and social landscapes of urban science, a challenge facilitated by CUSP’s interdisciplinary structure.

Physicists are trained to solve complicated problems, to handle large data sets, to develop new instrumentation, to work with interdisciplinary teams, and to apply careful experimental and modeling procedures to avoid self-deception. None of this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project. The fourth CUSP facility will be an integrated simulation of the city. Reduced models might provide insights into urban dynamics, but they must be complemented with detailed, high-resolution, validated, high fidelity models of urban systems. An integrated city model would combine traffic and land use codes with communications, economics, energy, etc., in a single agent-based formulation. None of this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project. The fourth CUSP facility will be an integrated simulation of the city. Reduced models might provide insights into urban dynamics, but they must be complemented with detailed, high-resolution, validated, high fidelity models of urban systems. An integrated city model would combine traffic and land use codes with communications, economics, energy, etc., in a single agent-based formulation. None of this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project. The fourth CUSP facility will be an integrated simulation of the city. Reduced models might provide insights into urban dynamics, but they must be complemented with detailed, high-resolution, validated, high fidelity models of urban systems. An integrated city model would combine traffic and land use codes with communications, economics, energy, etc., in a single agent-based formulation. None of this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project. The fourth CUSP facility will be an integrated simulation of the city. Reduced models might provide insights into urban dynamics, but they must be complemented with detailed, high-resolution, validated, high fidelity models of urban systems. An integrated city model would combine traffic and land use codes with communications, economics, energy, etc., in a single agent-based formulation. None of this is straightforward and the challenges include incorporating city "boundary conditions," determining what will be learned, and privacy protections are all questions under consideration in the current definition phase of the project.