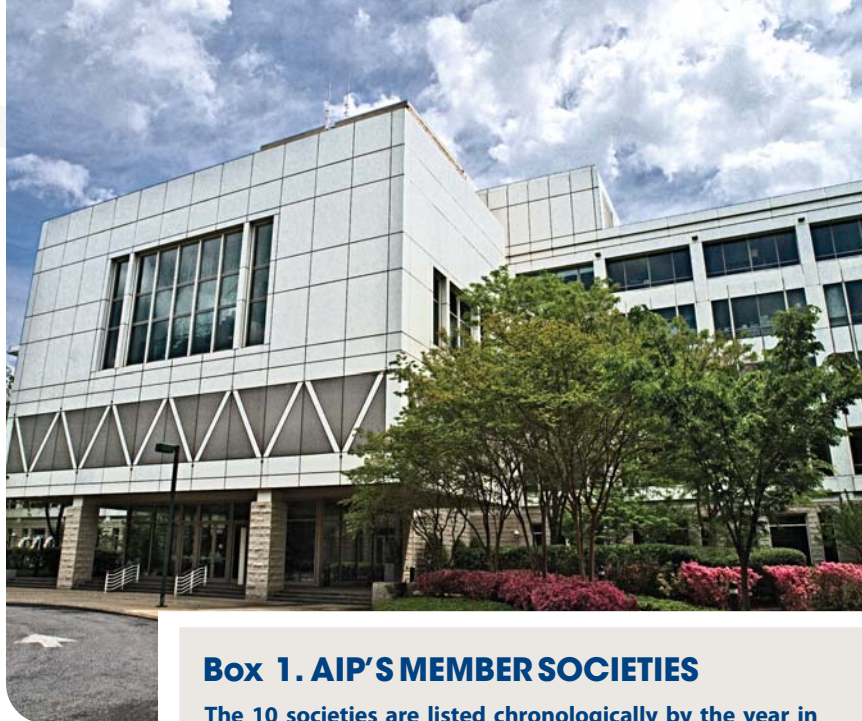


# Physics resources for varied communities



**Catherine O’Riordan**

Through manifold partnerships, the Physics Resources Center at the American Institute of Physics serves scientific societies, the public, and individuals, including researchers, students, journalists, and administrators.

You might be familiar with the Alpher-Bethe-Gamow paper in cosmology, but have you heard of Delter, the other author? Did you know that in 2009 a record high percentage of US high school graduates had taken physics? Or that last year, hundreds of physics undergraduates presented research at their first scientific meeting? You might have learned those facts or a myriad of others if you had joined the more than 6 million people in 2011 who visited the Web exhibits hosted by the history center of the American Institute of Physics (AIP), or if you were among the thousands of university faculty and administrators who perused reports from AIP’s data gatherers, or if you had joined AIP’s Society of Physics Students and knew of its close collaborations with several scientific societies.

Those are just a few examples of how AIP’s Physics Resources Center serves people and organizations interested in the physical sciences. Those communities include not only scientific researchers but also science historians, students at two- and four-year colleges, journalists, workforce administrators, parents of potential students of science, policymakers, and the public. AIP works with its 10 member societies (see box 1) and other partners to serve their members and the public

## Box 1. AIP’S MEMBER SOCIETIES

The 10 societies are listed chronologically by the year in which they joined the American Institute of Physics. The first five societies founded AIP in 1931.

**ASA:** Acoustical Society of America, 1931

**AAS:** American Astronomical Society, 1931

**APS:** American Physical Society, 1931

**OSA:** The Optical Society, 1931

**SoR:** The Society of Rheology, 1931

**AAPT:** American Association of Physics Teachers, 1932

**ACA:** American Crystallographic Association, 1966

**AAPM:** American Association of Physicists in Medicine, 1973

**AVS:** Science and Technology of Materials, Interfaces, and Processing, 1976

**AGU:** American Geophysical Union, 1986

through outreach programs housed in the Physics Resources Center.

### In the beginning

In 1931, during the Depression, five US scientific societies came together to found AIP as a publishing services cooperative. Over time, AIP expanded to include five additional member societies, but since its inception, the institute’s mission has remained steadfast: “to advance and diffuse the knowledge of physics and its applications to human welfare.”

In addition to publishing the various societies’ journals, AIP began to fill scholarly niches by publishing its own journals, primarily in areas of applied physics. The net revenue from those publications enabled AIP, in close collaboration with its member societies, to further advance its mission through outreach programs for the societies, their members, and the public. As the physics community grew in size and complexity, the governing board of AIP, composed of representatives of the societies, created an increasingly broad array of outreach programs, products, and services. Today those programs are grouped under the Physics Resources Center (PRC) at AIP’s corporate headquarters in the American Center for Physics in College

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Park, Maryland. The building, shown at left, is shared with three member societies: APS, AAPT, and AAPM. (For acronyms, see box 1.)

One of AIP's earliest products was *PHYSICS TODAY* magazine, launched in 1948 to unify the fields of the physical sciences. Today, PRC programs reach students, scientists, historians, and the public—in the US and globally. The PRC comprises eight divisions: Magazines (*PHYSICS TODAY* and *Computing in Science and Engineering*), History Programs (the Center for History of Physics and the Niels Bohr Library and Archives), News and Media Services, the Statistical Research Center, Education (including the Society of Physics Students and Sigma Pi Sigma, the physics honor society), Career Network, Government Relations, and Industrial Outreach. Those divisions are supported by about 85 staff members—physicists, statisticians, sociologists, historians, archivists, journalists, news producers, physics educators, graphic artists, data managers, Web designers, and other experts.

## PRESERVING HISTORY

On 26 September 1962 J. Robert Oppenheimer spoke at the dedication of the Niels Bohr Library in New York as seen in the photo below. In an interview in 1970, former AIP executive director Elmer Hutchisson said, "One of the things that I contributed perhaps more than anything was in building up the Bohr Library and the Archives . . . to make the institute stand out as something special and something which stood for excellence." Today the AIP history programs—the Center for History of Physics and the library and archives—represent not only important resources for historians but also an internationally recognized model for documenting scientific history.

The history programs also advise and assist the member societies in preserving the documentation—including oral interviews, records, and photographs—of their history and the history of their field. Shown here are archivists as they catalog 80 years of records from the American

The following pages highlight the PRC's diverse programs and demonstrate how the divisions work with the member societies to collectively serve the various communities. To learn more, visit the various programs' websites (box 2). Taken together, PRC programs provide a breadth and depth of outreach that goes beyond what any single member society can do alone. We regularly evaluate the reach and success of AIP programs and welcome input from the community. To that end, we encourage you to contact us online at <http://www.aip.org/aip/contactus.jsp>.

## Box 2. WEB RESOURCES FOR THE DIVISIONS OF THE AIP PHYSICS RESOURCES CENTER

**Magazines:** <http://www.aip.org/pubs/magazines.html>

**History Programs:** <http://www.aip.org/history>

**News and Media Services:** <http://www.aip.org/news>

**Statistical Research Center:** <http://www.aip.org/statistics>

**Physics Education:** <http://www.aip.org/education>

**Career Network:** <http://www.physicstoday.org/jobs>

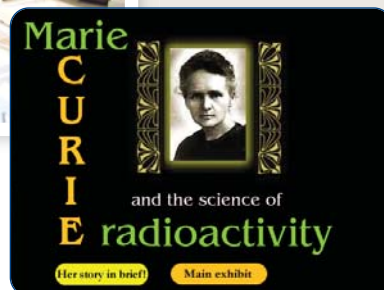
**Public Policy Center:** <http://www.aip.org/gov>

**Industrial Outreach:** <http://www.aip.org/industry>

Geophysical Union. As of 2012, records from all 10 member societies are archived in the library.

The Niels Bohr Library and Archives hosts researchers from around the world who visit either in person or over the internet. Online offerings include more than 23 000 photos—including the ones shown here of Oppenheimer and of Theodore Maiman's first laser—and 650 oral histories. All 69 000 pages of the Samuel A. Goudsmit Papers, one of AIP's most important manuscript collections, are also now online. AIP's International Catalog of Sources is a clearinghouse of information on archival physics-related resources worldwide; the catalog provides access to more than 9000 records at 900 archives. Not only for the physics and history communities, the digital resources are also accessible to the public.

Millions of visitors each year learn about scientific discoveries of historical importance through the history programs' Web exhibits; recent exhibits have included Albert Einstein, Marie Curie, and cosmology. The design of the Marie Curie exhibit, shown here, was intended to appeal to students and young adults; it has proven to be very popular.



## MAGAZINES

Every member of AIP's 10 member societies and the Society of Physics Students receives PHYSICS TODAY and has access to a rich reservoir of back issues and additional content on the magazine's website, <http://www.physicstoday.org>. Many of the ideas for feature articles, Search and Discovery stories, and Physics Updates come from the research communicated through the journals and meetings of AIP's member societies.

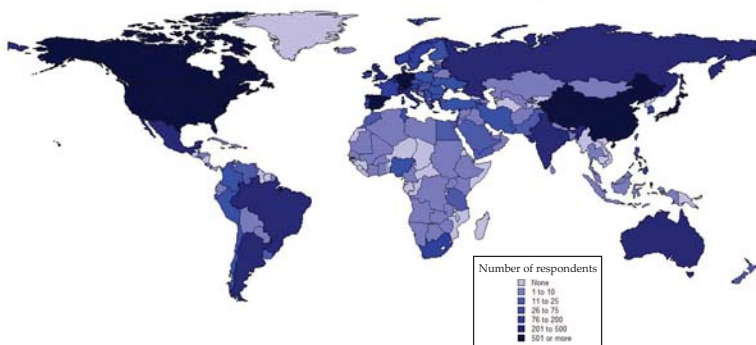
The Magazines division also partners with the IEEE Computer Society to publish *Computing in Science and Engineering*. Member society members can subscribe to *CiSE* at reduced rates; many societies make the magazine available as a benefit when their members renew each year.

The Career Network serves the community of job seekers by hosting and maintaining society job-board websites, many of which share job postings. The newest Career Network partner, AAPM, launched its site in January 2011. Other participants include APS, AAPT, and AVS. The IEEE Computer Society also participates as a nonmember society.



The network has been online since 1993, with roughly 90% of US-based physics departments using it to advertise their physical sciences and engineering jobs. Weddle's, an authority on the online employment industry, recognized the Career Network as a top 100 employment site.

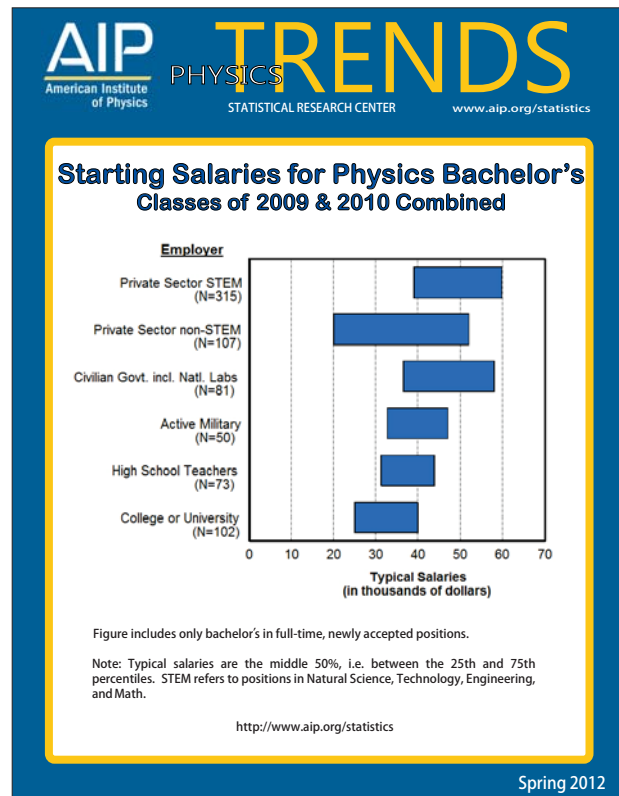
Global Survey of Physicists: country of respondent



## UNDERSTANDING THE PHYSICS WORKFORCE

The Statistical Research Center (SRC) takes a close look at enrollment and employment trends that reveal the state of health of the physical sciences and the membership of AIP's member societies. Through the SRC's research and reports we know that the number of bachelor's degrees in physics in the US has been growing steadily since 2000 and that women now make up 20% of all physics baccalaureates. Data collected in 2011 also show that the number of US students admitted into physics graduate programs has also grown. One recent study, the Global Survey of Physicists, focused on the status of women in physics around the world (see the article by Rachel Ivie and Casey Langer Tesfaye in *PHYSICS TODAY*, February 2012, page 47). Shown here are the countries of respondents.

In addition to conducting such workforce surveys, the SRC provides survey research expertise to AIP units,



Spring 2012

member societies, and other scientific organizations. The SRC also highlights significant findings of particular interest to students and sends the resulting Physics Trends flyers to nearly 1000 SPS chapters and physics department chairs in the US.

## FUTURE PHYSICISTS

More than 3000 undergraduates from 700 colleges and universities in the US have the opportunity each year to join one of AIP's member societies through the reciprocal membership program with AIP's Society of Physics Students. SPS also provides travel awards for undergraduate presenters and stipends for student reporters. More than 400 students, some of them shown here, presented their research at the 2012 APS March Meeting in Boston, in a series of sessions and other events cosponsored by APS and SPS. Hundreds more undergraduates attended the 217th AAS meeting in Seattle.

Each year, meetings are held across the US for students in SPS chapters to get together, discuss research and careers, and have some fun. In June 2010 Southeast University established the first SPS chapter in China, where student activities are supported by the headquarters office as well as by the AIP Beijing office. SPS chapters regularly provide community outreach. The students seen here from California State Polytechnic University, Pomona, and California State University Long Beach engage San Diego Girl Scouts in optics outreach. Through the Mather Policy Internship program, SPS members Cabot Zabriskie (left) and Courtney Lemon (right)—shown here with Representative Rush Holt (D-NJ), the only physicist now serving in Congress, and John Mather, who shared the 2006 Nobel Prize in Physics for his measurements of the primordial radiation from the Big Bang—experienced Capitol Hill firsthand during the summer of 2011. SPS recruits additional interns each summer for research positions at NIST and NASA and for outreach positions with AAPT, APS, OSA, and SPS.

Sigma Pi Sigma, the physics honor society, provides continuing contact with the physics community for SPS members who excel academically. Approximately 1000 students are inducted each year in local ceremonies. Thousands of Sigma Pi Sigma members have gone on to pursue careers in other fields, yet they stay connected to the world of physics. Members are eligible for lifetime subscriptions to the honor society's *Radiations* magazine.



KEN COLE, APS

Every four years, Sigma Pi Sigma hosts a congress for physics undergraduates and their mentors. Fermilab hosted the most recent one in 2008. This coming November, more than 800 participants are expected to attend the 2012 congress, "Connecting Worlds through Science and Service," in Orlando, Florida.

AIP produces the Grad-schoolShopper.com website and print directory. It is the only online graduate school guide exclusively dedicated to physics and related fields, and it has become an important resource for prospective graduate students and graduate departments.

AIP and its member societies also support AAPT and its selection of high school physics students for the US team competing in the International Physics Olympiad. This year's competition will be held in July in Estonia.



COURTNEY LEMON



## REACHING SCIENTISTS IN THE PRIVATE SECTOR

As we know from SRC studies, the vast majority of physics degree holders at all levels are pursuing careers outside of academia in a variety of industries and capacities. Among the ways that AIP works with the member societies to serve physicists in the private sector and to build bridges between colleagues in academia and industry are the Industrial Physics Forums (IPFs). AIP's Industrial Outreach program partnered with AVS in 2011 to host an IPF titled "Energy: Transition to a Sustainable Future." In April 2012 AIP teamed up with the Abdus Salam

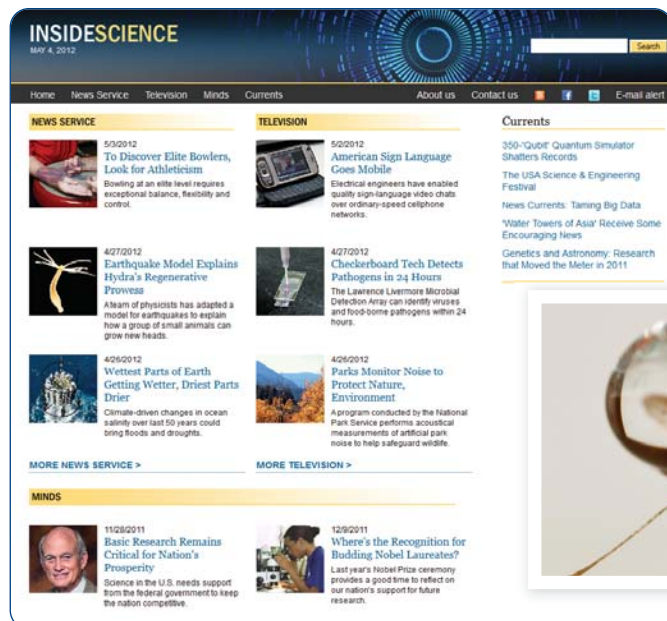
International Centre for Theoretical Physics, with assistance from APS, to hold the first IPF outside the US. The gathering was aptly named "Capacity Building for Industrial Physics in Developing and Emerging Economies."

Over the years AIP has collaborated with several member societies to host IPFs, co-sponsor Industrial Physics Leadership Summits, and bring a focused industrial presence to their national meetings through regional

networking forums with the AIP Corporate Associates Program.



AIP-ICTP INDUSTRIAL PHYSICS FORUM



GEORGIA INSTITUTE OF TECHNOLOGY

of developments in general scientific research, with an emphasis on the physical sciences. Also in the suite are a newswire service (Inside Science News Service), a blog (*Inside Science Currents*), and opinion pieces (*Inside Science Minds*). Member societies routinely

## REACHING THE PUBLIC

Through many studies and polls, we know that members of the public have a large appetite and appreciation for scientific discoveries, even if their own backgrounds lack scientific training. To help satisfy that need for reliable information, AIP's News and Media Services division works with a broad coalition of societies to provide Inside Science, a comprehensive suite of science news products. Inside Science TV is a collection of 90-second video programs disseminated to local TV stations across the US and through YouTube. Every week ISTV produces two segments covering a wide range

contribute ideas to all of the news programs.

Working with member society leadership and staff, the News and Media Services group writes and distributes press releases, organizes news briefings, and creates virtual press rooms and special video segments that promote the physical sciences. Press releases and Inside Science stories alike have gone viral. A press release for the APS division of fluid dynamics 2011 meeting in Baltimore, Maryland, about how mosquitoes fly in the rain, was the top story last year on the Newswise wire service. An Inside Science story about quantum entanglement in diamond has received more than 60 000 hits to date on the InsideScience.org website.

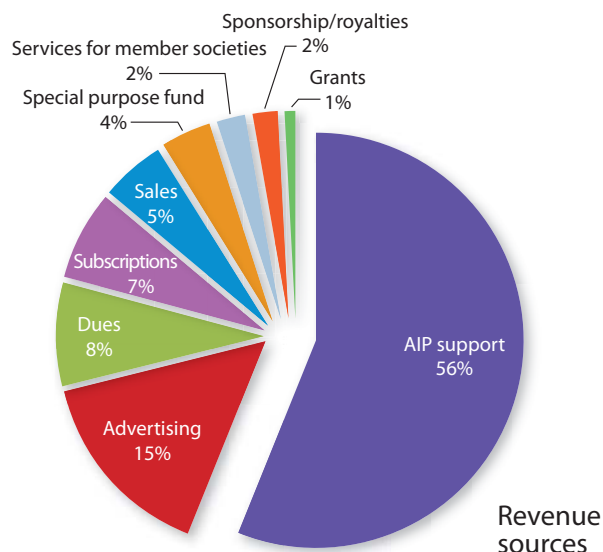
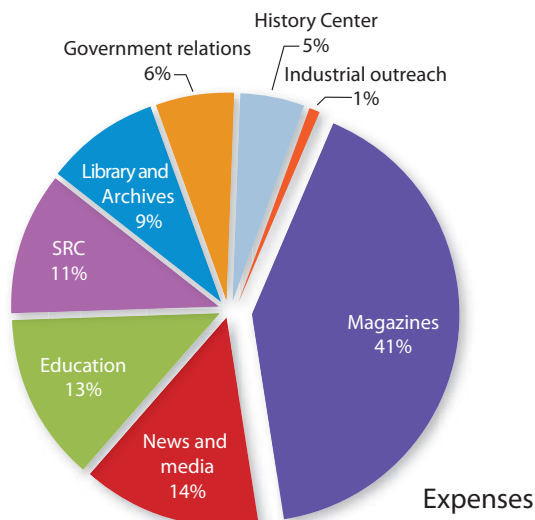
## ON THE GROUND IN WASHINGTON, DC

With support from ASA and AAS, AIP currently sponsors three science policy fellows who work in Congress and in the US State Department. Makenzie Lystrup (left) serves in the office of Rep. Edward Markey (D-MA). Meredith Drosback (center) serves in the Senate Committee on Commerce, Science, and Transportation on the majority staff of the science and space subcommittee. Sarah Case (right) works in the State Department's Office of Chinese and Mongolian Affairs.



To serve the policy goals of AIP and the member societies, the government relations team keeps track of bills, actions, and policies that affect the physics com-

community and shares the knowledge through FYI, a science policy news bulletin. Distributed by email to about 5000 regular subscribers and widely available via Facebook and Twitter, FYI provides concise, timely, and unbiased analyses of US science policy news from Capitol Hill, the administration, the National Academies, and elsewhere. AIP also works with many of the member societies to organize congressional visits and to accompany mem-



## PAYING FOR IT ALL

Any operation has expenses that need to be covered by revenue. More than half of the total cost of running PRC programs goes to support the expert staff needed to carry out the PRC mission. The first pie chart shows the center's total expense budget—\$21.3 million in 2012—separated into the various division programs.

The second pie chart shows the revenue sources as a percentage of the PRC total for the 2012 budget. Although each member society pays a small fee per member in dues to AIP, the bulk of the financial support is drawn from the net revenues of AIP's publishing arm. Publishing programs include 15 journals in applied physics, conference

proceedings, and publishing services for five of the AIP member societies. Additional revenue is raised from PHYSICS TODAY subscriptions (from libraries and institutions as well as individuals who are not members of AIP member societies), PHYSICS TODAY advertising, sales of PRC products, sponsorships, and royalties. PRC divisions also bring in revenue through grants, primarily to the history programs, education division, and the SRC.

*I thank Judith Flippen-Anderson, Tim Cohn, and Philip Hammer for many helpful comments and suggestions. Unless otherwise noted, all images are courtesy of colleagues in AIP.* ■

# L A K E S H O R E T E M P E R A T U R E S O L U T I O N S



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