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## Director's Matters

By *H. Frederick Dylla, Executive Director*



### SRC: The physics and astronomy data pros

Sixty years ago the physical science community relied on the US Department of Health, Education, and Welfare for data on the vitality of their disciplines. These data, collected nationally, were indeed helpful for making general inferences. However, information about specific fields that were included under the "Physical Science and Math" designation was hard to come by. The representation within AIP's Member Societies is a superb illustration of the breadth and diversity among the many disciplines amalgamated into the physical sciences.

To get an accurate picture of how the physics community was faring, AIP started collecting data on enrollments and degrees in physics. The data that AIP was able to collect was of such high interest to the community that we subsequently made it an annual function. Sixty years later, AIP's Statistical Research Center (SRC) is a stand-alone business unit in the Physics Resources Center, conducting over two dozen surveys each year.

So, what do we know now? Academic year 2010 was a record-setting year for the field of physics in the US, with the largest number of physics bachelor's degrees and PhDs awarded, the largest introductory physics enrollments, and the largest number of astronomy bachelor's, introductory astronomy enrollments, and graduate students.

(Based on data collected from the 2010 Survey of Enrollments and Degrees.)

Given the stagnant state of the US and much of the world's economy, it is

especially useful that we can connect these graduation statistics to employment trends, also made known through SRC data. We can authoritatively talk about where physics degree holders find work, what they do, and how their careers evolve. (See recent SRC reports based on data from Initial Employment and PhD + 10 surveys.)



We know a great deal about physics and the context in which it exists in the STEM (science, technology, engineering, and math) education system and workforce. Annually, nearly 250,000 people earn bachelor's degrees in STEM, only 6,000 of which are in physics. Among STEM disciplines there is

substantial variance in a bachelor's degree holders' success in finding employment in the STEM workforce. For example,

- Engineering, over 80%
- Computer science, chemistry, and physics, around 65%
- Biology, about 50%
- Agricultural science and environmental sciences, between 30 – 40%

Shedding light on physics in secondary school, the SRC Survey of High School Physics Teachers, now in its 25th year, tells us how many students are taking high school physics, at what level, and who's teaching them. Additional studies have been added to the SRC portfolio that reveal information about two-year colleges, the international physics community, as well as gender and minority demographics. Few other STEM disciplines can point to such a robust level of data.

Anyone interested in SRC's well-respected studies may [sign up for e-Updates](#) and cater notifications to their particular areas of interest. As a service to the community, AIP provides this service to the community free of charge. All SRC reports are also freely available through the [SRC website](#). Member Societies and AIP business units can feel free to call upon the SRC for guidance in developing or conducting future surveys/studies. If you would like further information on recent surveys or to discuss new studies, please contact the Director of SRC, [Roman Czujko](#).

## Publishing Matters

"Flying Carpet" takes us back to the future



When Princeton University's Noah Jafferis, Howard Stone, and James Sturm wrote in the abstract of their [Applied Physics Letters](#) (APL) article that their work confirms the physical basis for a "flying" carpet, they were careful to qualify the word with quotes. Their work did not construct an Aladdin scenario, but they did create movement that calls the concept to mind.

The researchers glued together two sheets of metal-coated polyvinylidene fluoride with a thin epoxy layer and ran an electrical current through it. The current drove pockets of air underneath the sheet, which traveled from front to back, moving the sheet in a stingray-like motion. The experiment made the sheet resemble a hovercraft moving at speeds of only two inches per second. Modifications to the design, however, could soon increase the speed.

The APL article was featured on the [BBC's Science & Environment website](#), where you can listen to Jafferis describe his "flying carpet," see a video of it in action, and learn more about potential applications for this technology.

Although the BBC picked up this story from another source, AIP's News and Media staff regularly survey AIP journal article abstracts and conference proceedings for stories that are important, novel, or just plain fun. Promoting select journal



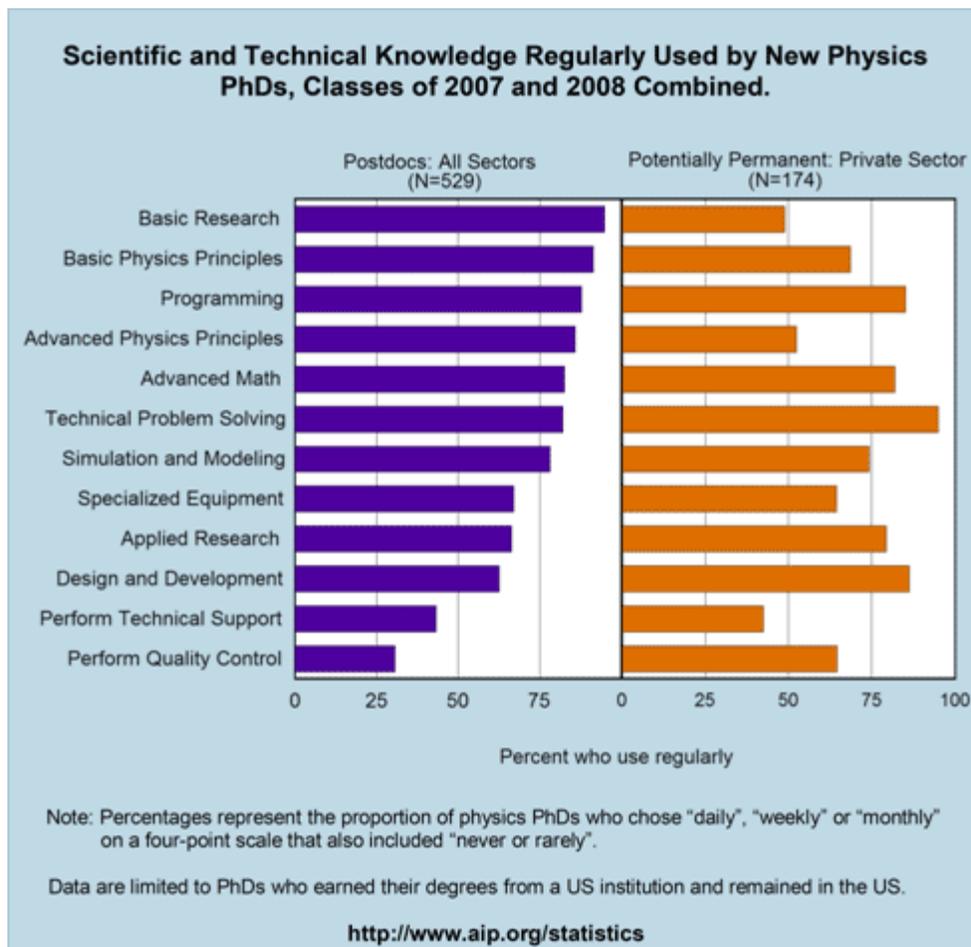
highlights to the media results in frequent postings to science news sites and pickup by large media outlets such as ABC News, Discovery News, and LiveScience. See recent research highlights on the [AIP news website](#).

## Physics Resources Matters

Knowledge and skills physicists use

Programming knowledge and technical problem-solving skills are heavily relied upon by new physics PhDs in the workplace. These and several other skills are regularly used, regardless of the part of the economy in which new PhDs are employed. However, the use of some types of knowledge and skills varies dramatically by type of employment and work environment.

These data are published in a report titled [focus on Physics Doctorates: Skills Used & Satisfaction with Employment](#). In addition to knowledge and skill set utilization, the report also includes information about qualitative aspects of jobs held by physicists who recently earned their PhDs, such as whether the positions are appropriate for a PhD-level education and whether the positions are professionally challenging.



Around AIP

Off the Press

## Open enrollment

For those of you that missed the Open Enrollment meetings in October, here are a few reminders:

- Employees staying with the same plan(s) for medical, dental, or vision can let those plans roll into the new year; no action is needed. Those enrolling in a plan for the first time or making changes to their current enrollment must submit paper forms.
- Anyone who wishes to participate in the flex spending plan in 2012 will need to go online and enroll, regardless of prior participation.
- The deadline for all enrollment activity is Friday, November 18.

[Human Resources](#) can help answer your questions or provide you with any forms.



Look closely at this twilight scene along the bank of the Charles River in Cambridge, MA, and you'll see that the reflected images of the clouds, the trees, and Harvard University's Eliot House clock tower are shifted out of place. Those abnormalities are the result of digital alteration, but a team of Harvard researchers has demonstrated how plasmonic antennas can be used to achieve the same effect in real life.

(Image courtesy of Nanfang Yu.)

## Member Society Spotlight

### Promoting advances in acoustics



Last week the News and Media Services (NMS) staff helped to publicize much of the exciting research being presented at the Acoustical Society of America's 162nd Meeting. The NMS team reviewed thousands of abstracts, wrote more news releases, and promoted the meeting to the national and international news media.

Among the noteworthy topics presented at the ASA meeting were reviving the sounds of the past through acoustical archeology, the mechanisms that control human speech, and uncovering why some cell phone conversations are difficult to understand. One of the more unusual topics, yet a popular story in the press, may not sound like science at all (actually, it's a sound you would probably rather avoid).

The jarring sound of [fingernails against a chalkboard](#), apart from setting your teeth on edge, also has baffled scientists trying to determine why humans find it so disturbing. The reason, according to researchers presenting at the ASA meeting, has much to do with the shape of the human ear. Other interesting ASA topics included determining [whether vuvuzelas are dangerous or just annoying](#), studies on the [evolutionary origin of human speech perception](#), and [advances in gunshot forensics](#). In case you didn't get to watch AIP/ASA's

inaugural media webcast, the video is archived at <http://www.aipwebcasting.com>. We hope to offer this service to other societies in the future.



## Coming Up

Monday, November 7 (College Park, MD)

- AIP Audit Committee
- AIP Executive Committee meeting
- ACP Art Reception, 5:30–7:30 pm

Tuesday, November 8

- AIP Governing Board meeting (College Park, MD)

Friday, November 11

- All staff update and milestone service awards, 10:00 am (College Park, MD)

Through November 18

- ACP food drive (College Park, MD)

Through November 30

- Long Island Cares holiday food drive (Melville, NY)