

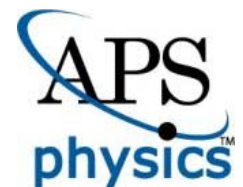


Supply and Demand: A Picture of Physics PhD Employment in the US

**Physics Careers in Industry and Government Workshop
Forum on Industrial and Applied Physics (FIAP)**

**APS March Meeting
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Overview

Supply of Physics PhDs in the workforce

How many Physics PhDs are entering the workforce?

Trends in Initial PhD Employment

Where are new Physics PhDs going?

Demand for Physics PhDs

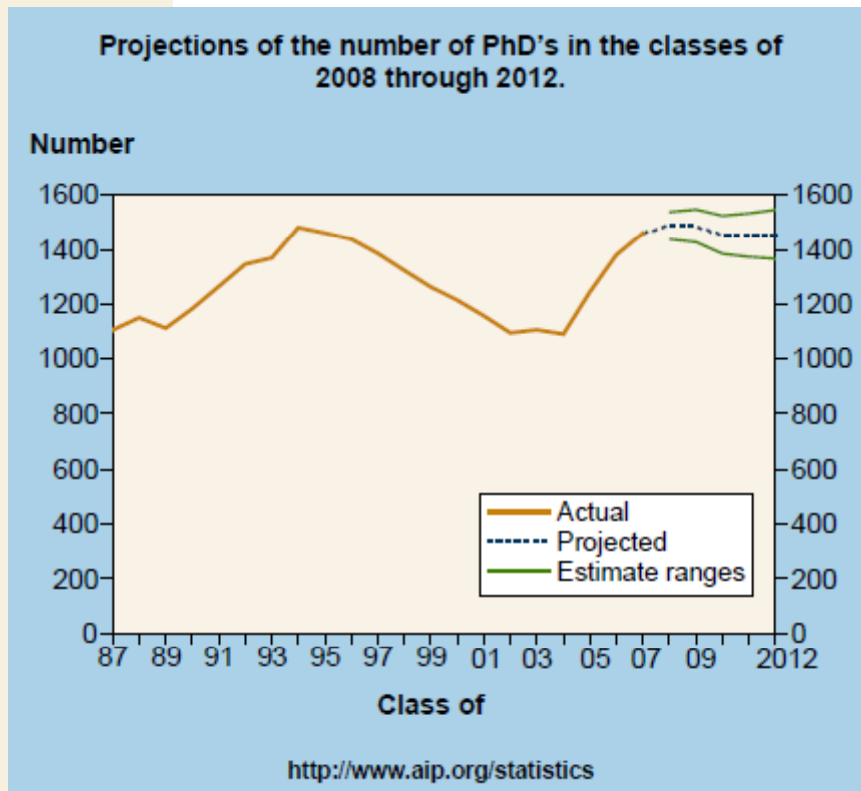
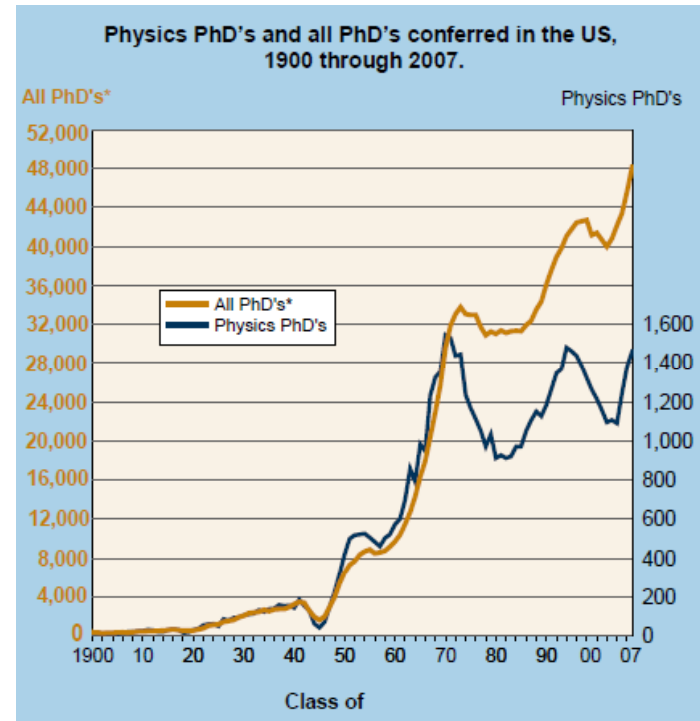
What employment base has the largest need—and capacity— for Physics PhDs?

Conclusions

APS Career Resources

PhD Job Force: Supply

In 2007, there was a 34% increase in the number of Physics PhDs produced compared to three years earlier.

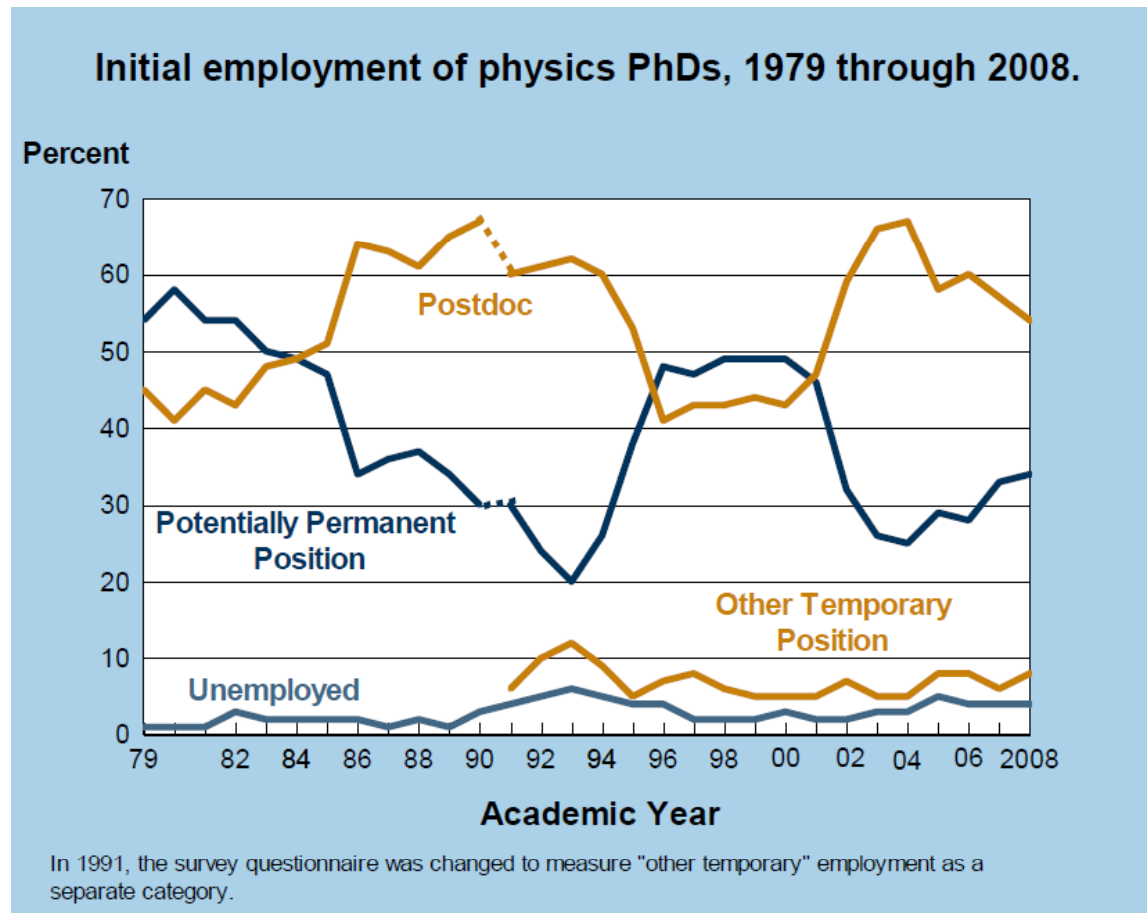


Based on current doctoral program enrollments, the AIP Statistical Research center estimates that the number of PhDs conferred between now and 2012 should level off...

...at close to the highest number/year produced in the past century.

Bottom line: the US can expect to continue supplying large numbers of Physics PhDs to the workforce.

What are PhD's doing with their degrees?



- Between 2003 and 2008, more PhD graduates have been going into potentially permanent positions than in previous years.
- Where are they going next—and why?

PhD Jobs: Demand

The majority (74%) of graduates who initially become postdocs are in academic settings. The remainder are at national laboratories (21%).

Most postdocs go into their positions in the hopes of moving toward permanent employment.

Postdocs from the classes of 2007 & 2008: "What was the most important reason for taking this temporary position?"

| | Percent |
|---|---------|
| Necessary step to get desired future position | 37 |
| To obtain research experience in my field | 25 |
| To work with a particular scientist or research group | 16 |
| Could not obtain a suitable permanent position | 7 |
| To switch to a different field | 6 |
| Personal or family-related reasons | 4 |
| Visa restrictions limited my options* | 2 |
| Other | 1 |

*6% of foreign citizens with temporary visas indicated they took a postdoc because of visa restrictions.

<http://www.aip.org/statistics>

Immediate Previous Positions of New Physics Faculty, 2007-08 for Tenured and Tenure-Track Hires*

| | Highest Degree Awarded | |
|---|------------------------|----------------|
| | PhD (%) | Bachelor's (%) |
| Postdoc | 54 | 32 |
| Research Scientist | 24 | 8 |
| Tenured or Tenure-Track Professor | 20 | 16 |
| Graduate Student | 1 | 11 |
| Adjunct, Part-time, or Visiting Faculty | 1 | 28 |

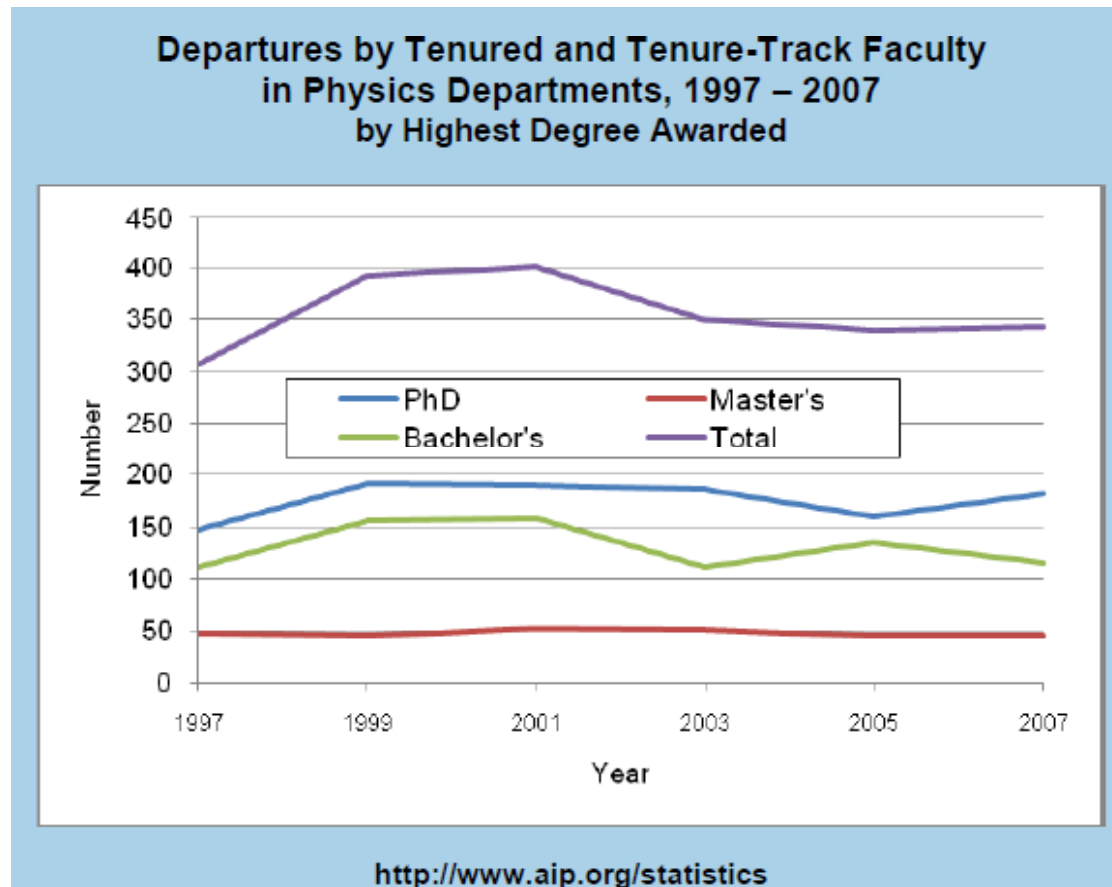
*Includes permanent non-tenured faculty at schools without tenure. (Only the 5 most common categories of previous position are shown.)

<http://www.aip.org/statistics>

In fact, research shows that at PhD granting universities, previous experience as a postdoc (or as faculty) is a strong indicator of the likelihood of becoming a faculty hire.

At the same time, becoming a new faculty hire with only a graduate degree is extremely unlikely—even at Bachelor's granting universities.

However the number of departures of tenured and tenure-track faculty has changed little since 2003.

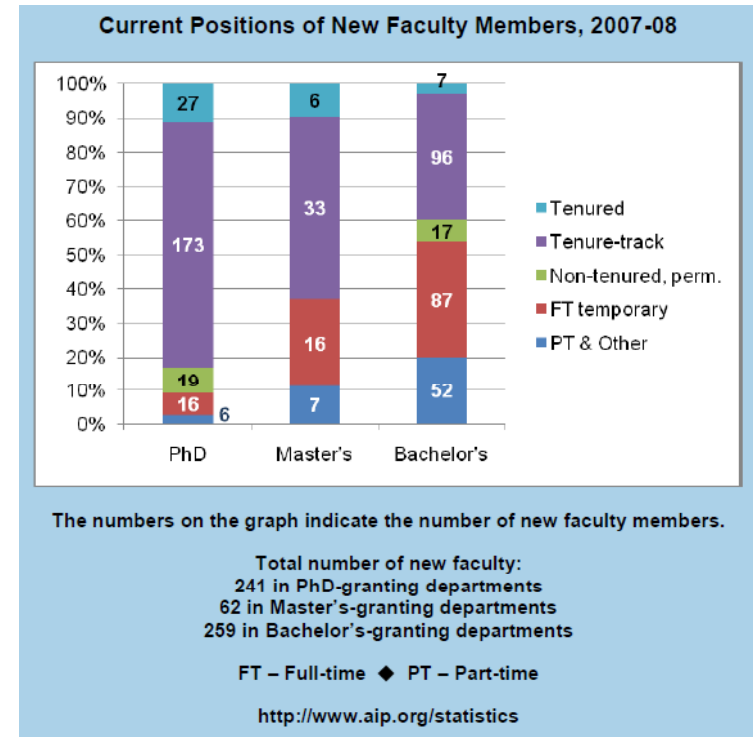


“While there were about 350 departures by tenured and tenure-track faculty during the 2006-2007 academic year...there were 475 recruitments for the same time frame, with 342 tenured and tenure-track faculty members hired in 2007-2008; this... is consistent with what we have seen in prior years.”

--Focus on the Faculty Job Market in Physics and Astronomy Departments,
AIP Statistical Research Center

Not all faculty positions are created alike.

- The type of faculty position varies widely according to institution
- Many individuals who do get new faculty positions will spend time waiting for a desired situation to open up.



Bottom Line: the job market for faculty in universities and other institutions is very stable.

“Stable” means that overall, not many jobs are being lost. At the same time, not many are being created, either.

Given that we will be graduating ~1400 PhDs over the next 2 years, and roughly half of them will go into postdocs with an intention of continuing as physics faculty, the supply will soon outweigh the demand in this market (if it has not already).

What about Permanent Employment in the Private Sector?

Recall that the majority (60%) of graduates between 2007-08 who initially went into permanent employment positions were in the private sector.

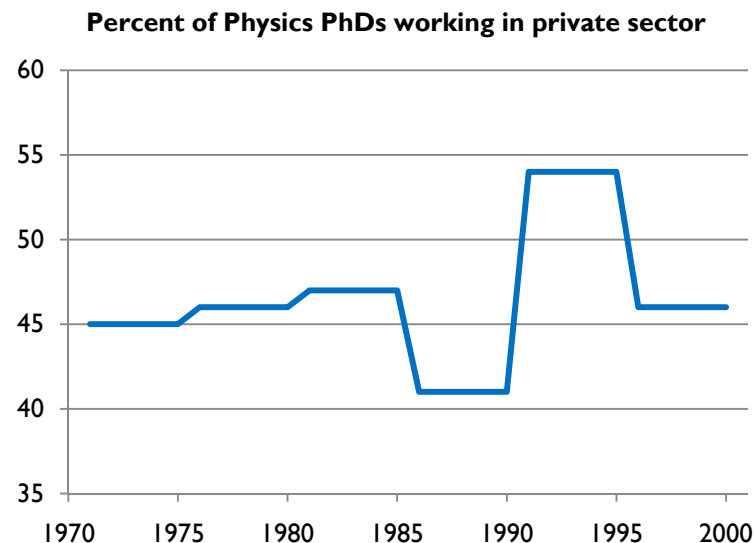
According to the NSF Survey of Doctoral Recipients, in 2006 the private sector was the largest single employment base of Physics PhDs: about 42% (the next highest was 4 year colleges, at 23%).

This was also true in 2001, when the private sector employed 46% of Physics PhDs¹...

...and was also true in 1993, when the private sector again employed 46% of Physics PhDs².

In fact, the same data has shown consistent support for Physics PhDs in the private sector since 1971.

Again, if trends continue, this job base will continue to support a large Physics PhD workforce.



Source: NSF Survey of Doctoral Recipients, 2001

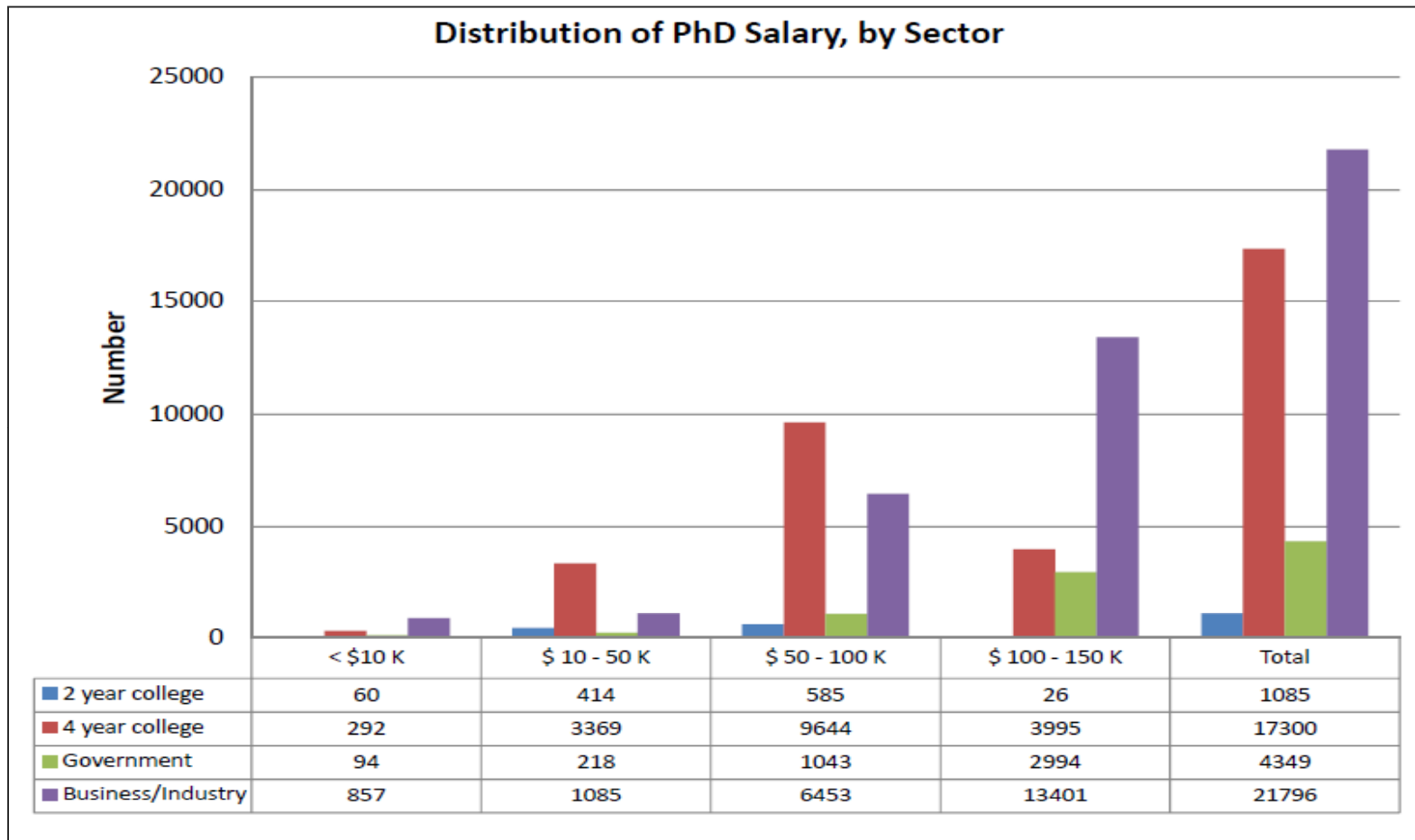
¹NSF Survey of Doctoral Recipients, 2001

²NSF Integrated Survey Data, 1993



What about Salary?

Source: NSF Integrated Survey Data, 2006



- 2-year college median salary (post secondary and pre-college teachers): \$50 K 1085
- 4-year college median salary (research scientists and professors): \$70 K 17,300
- Government (research scientists, engineers, and management): **\$115 K** **4,349**
- Business/Industry (engineers, top- and mid- level managers, non-science): **\$108K** **21,796**

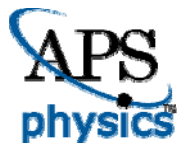
Conclusion

Why are more Physics PhDs taking more potentially permanent jobs and fewer postdocs?

Because postdocs do not typically lead to permanent employment in the private sector.

- The United States is currently generating Physics PhDs at nearly the highest rate we've ever seen (~1400/year)—and will probably continue to do so in the near future.
- About half of graduating PhDs go into postdoctoral positions. The majority of these are in academic settings
 - with the intention of pursuing permanent faculty positions!
- Yet, permanent faculty hires remain at a stable (and low) rate, with only a handful of new faculty hires each year.
- While at the same time, private sector positions in industry consistently employ the largest number of PhD graduates (~50%).

For Physics PhDs, careers in business and industry are not only the most available, but also among the most highly paid.



Career Resources

APS Job Center

- Partnered with numerous organizations employing scientists and engineers—including Physics Today, AAPT, AVS Science and Technology, IEEE Computer Society, and SPS
- Post your job or resume and reach over 125,000 specialized researchers and managers in physics, engineering, computer science, and related fields.
- Job Seekers can store copies of your resume, set up job alerts, search the database, and apply for jobs online: all for ABSOLUTELY FREE.

careers.aps.org

APS Webinars

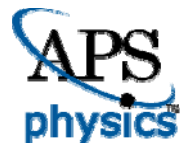
- APS webinars are designed to connect you with individuals who can offer insight into physics careers, educational programs, and professional development for students, working physicists, and educators.

www.aps.org/careers/webinars

APS Career Website

- The APS Career Website is the gateway to physics career resources. Here you can find links to the APS Job Center, information on upcoming workshops and meetings, career advice, and other career and job related resources (such as APS webinars, the APS Job Blog, and more!).

www.aps.org/careers



FIAP and CCPD

- The Forum on Industrial and Applied Physics (FIAP) and the Committee on Careers and Professional Development (CCPD) are working together to promote professional development programs for students, postdocs, and career physicists.

AIP Statistical Research Center

- The latest statistics are available on physics employment, enrollment, demographics, and more!

www.aip.org/statistics

Stay tuned...

- Webinars
- On-Demand Career Coaching
- Your ideas!

Thank you!!

Questions, comments, and ideas: bailey@aps.org