Who is a Physicist?

Anyone with a Physics Degree

• BS
• BA
• MS
• PhD, etc.

Why?

• Definition is consistent with other disciplines (e.g. Chemistry)
  • Defines a common set of experiences (and texts)
  • Inclusive view is better for survival of discipline

What makes them Physicists?

Shared experiences creates familiarity—not only with the same Physics concepts, but also with the culture of the discipline.

However, most importantly, even a basic Physics training imparts essential problem solving skills—“how to think”—which is the hallmark of a physicist.
Where do Physicists Work?

Not where you think!

What is a “traditional physicist”? A physics professor? A PhD researcher? The “most common” career path?

The AIP Statistical Research Center estimates that 1 in 7 physics bachelors will choose to finish a Physics PhD.

So ~14% of all Physics Degree holders will actually become Physics PhDs—and by extension “traditional physicists.”
Bachelor’s Degree

Between 1995 and 2007, about one-third to one-half of Bachelor’s degree recipients went directly into the workforce.

The remainder went on to graduate school:

- Mostly in Physics and Astronomy
- A significant proportion went to graduate school in other fields.

Many physics bachelor’s degree recipients pursued advanced degrees in other areas...

...and less than 7% of them were unemployed!
Initial Employment of Physics Bachelors

Over half of physics bachelor’s degree recipients in 2009-2010 found work in the private sector.

Initial Employment Sectors of Physics Bachelor’s, Classes of 2009 & 2010 Combined

- Private Sector: 53%
- College & University: 13%
- High School: 11%
- Civilian Gov’t, National Lab: 10%
- Active Military: 8%
- Other: 5%

Physics Bachelors in 2009-10 found initial employment in a variety of areas.
Physics Bachelors in the Private Sector

Of these, many went into engineering or computer science.

A significant portion went into “non-STEM” fields.

Physics bachelors are highly employable, in a variety of career paths.

STEM refers to natural Science, Technology, Engineering, and Mathematics.

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In fact...

A physics bachelor’s degree now ranks higher in starting salary than many other technical fields (including mechanical engineering).

The typical starting salary for a physics bachelor degree has increased by nearly $10,000 since 2003.
Maggie Seeds, Physics BS  
Consultant  
Clarkston Consulting, North Carolina

Educational Background  
BS – Physics  
As a consultant, Maggie has to play many different roles depending on clients’ needs, ranging from technical to strategic. She says that her physics background is what allows her to thinking analytically and examine problems from many angles—not to mention persevere through tough situations!

Aaron Weiss, Physics BS  
Electrical Engineering Group  
Google Advanced Technology and Projects – Mtn View, CA

Educational Background  
BS – University of Colorado, Boulder  
From his earliest days, Aaron wondered how everything worked, and was drawn to physics because it helped him uncover the complex and fascinating nature of the universe.

Today, he uses what he has learned about the natural world—combined with a healthy love of building electronics—to create devices which are on the cutting edge of technology.
Beyond the Bachelor’s Degree

Medical School

Physics majors out-performed many other majors (including pre-med) on all three sections on the MCAT.

<table>
<thead>
<tr>
<th>Major</th>
<th>Physical Science</th>
<th>Biological Science</th>
<th>Verbal Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics</td>
<td>11.1</td>
<td>10.4</td>
<td>9.8</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>11.1</td>
<td>10.6</td>
<td>9.6</td>
</tr>
<tr>
<td>Mathematics</td>
<td>10.6</td>
<td>10.4</td>
<td>9.3</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>10.9</td>
<td>10.1</td>
<td>9.4</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>10.1</td>
<td>10.6</td>
<td>9.5</td>
</tr>
<tr>
<td>English</td>
<td>9.6</td>
<td>10.1</td>
<td>10.2</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>10.1</td>
<td>10.4</td>
<td>9</td>
</tr>
<tr>
<td>Chemistry</td>
<td>9.5</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Psychology</td>
<td>9.1</td>
<td>9.6</td>
<td>9.1</td>
</tr>
<tr>
<td>Biology</td>
<td>9</td>
<td>9.7</td>
<td>8.7</td>
</tr>
<tr>
<td>Premed</td>
<td>8.7</td>
<td>8.9</td>
<td>8.1</td>
</tr>
</tbody>
</table>

* Based on test takers who applied to medical school, and based on applicants’ most recent MCAT scores. Source: AIP Statistical Research Center compiled from the Data Warehouse of the Association of American Medical Colleges.

Physics majors also account for less than 1% of individuals taking the exam...

These factors make Physics majors stand out compared to other med school applicants.
Or Law School? Physics majors also received the highest average LSAT scores compared to several other majors (including Pre Law).

So, a physics bachelor’s degree provides excellent training for careers in medicine and in law.

Source: Compiled by the Statistical Research Center based on data collected from the Law School Admission Council.
Master’s Degrees

Between 2009-2011, 50% of physics masters recipients entered or remained in the workforce.

- High School teachers taught Physics, Chemistry and Math
- Salaries for those continuing employment after earning their MS were $13,000 more than new hires.

Master's Degrees
Private Sector 44%

College/University 23%

Civilian Government 11%

High School 10%

Other 12%

- Typical titles include adjunct faculty (2 yr. colleges), lab manager, and research assoc.
- Median Starting Salary: $38,500

- Positions mostly at National Labs, Armed Service Branches, or Trademark Office
- Median Starting Salary: $57,000

- Almost entirely full time, STEM occupations
- Median Starting Salary: $60,000

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Not surprisingly, physics master’s degree holders working in the private sector earned considerable more than their colleagues at colleges and universities.

Private Sector MS grads who earned their degree while working earned considerably higher (~$83K).

A physics master’s degree will open the door to more advanced positions in a variety of technical fields, with higher salaries.
Sam Wurzel, Physics MS  
Co-Founder and CEO  
Octopart, Inc. - New York, NY

Educational Background  
BS – Engineering and Physics, Brown University  
MS – Physics, University of Colorado, Boulder

Sam’s inspiration arose out of frustration as a physics grad student searching for parts in huge paper catalogs!  
Fortunately he was able to focus his frustration into the creation of Octopart, an online parts search engine which today serves over 700,000 users.

Ginger Kerrick, Physics MS  
Flight Director  
NASA Johnson Space Center - Houston, TX

Educational Background  
BS – Physics, Texas Tech University  
MS – Physics, Texas Tech University

Though her original goal was either to become an astronaut or a basketball player, life circumstances sent her down a different path.  
As flight director for NASA, Ginger uses her Physics training every day to solve problems creatively and quickly, to help get astronauts home safely.
PhD Job Force: Supply

At the time of the 2014 report, the AIP Statistical Research center found the number of physics PhDs conferred in the US to be the highest in the past century: 1,762.

Based on current enrollments, we should expect PhD degree production to level off at around 1,700/year in the next four years.

Bottom line: the US can expect to continue putting large numbers of Physics PhDs into the workforce.
What are PhDs doing with their degrees?

The largest percentage of Physics PhDs found initial employment in Postdoctoral and other temporary positions...

...but the vast majority of permanent jobs were in the private sector.

<table>
<thead>
<tr>
<th>Sector of Employment</th>
<th>Postdoc %</th>
<th>Potentially Permanent %</th>
<th>Other Temporary %</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic*</td>
<td>74</td>
<td>22</td>
<td>78</td>
<td>57</td>
</tr>
<tr>
<td>Private</td>
<td>1</td>
<td>64</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>Government</td>
<td>21</td>
<td>11</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

100% 100% 100% 100%

Note: Data only include US-educated physics PhDs who remained in the US after earning their degrees.

*Includes university affiliated research institutes.

http://www.aip.org/statistics
PhD Job Force: 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.

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

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 are graduating more than 1,700 PhDs/yr, with more than half of them going into postdocs with an intention of continuing as physics faculty, supply will continue to outweigh demand for the tenure-track academic career path.

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PhD Employment in the Private Sector

Recall that the majority (64%) of graduates who initially went into permanent employment positions were in the private sector.

According to the NSF Survey of Doctoral Recipients, in 2010 the private sector was the largest single employment base of Physics PhDs: about 47% (the next highest was 4 year colleges, at 38%).

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.

Industry has been the largest employment base for Physics PhDs for decades.

¹NSF Survey of Doctoral Recipients, 2001
²NSF Integrated Survey Data, 1993
Physics Workforce: Summary

- Faculty positions are NOT the most common career path for physicists!
- Industry is the largest employment base for Physics PhDs...
  ...and for Physics Masters
  ....and Physics Bachelors.

Your career path will not be a straight line...

Smart planning requires being aware of—and prepared for—all possibilities.

There is a lot of great science to be done—and opportunity to be found—in a lot of places!
Ways APS Can Help

APS Online Professional Development Guide

• Features 5-minute “webinette” clips from the top APS careers webinars
  – APS webinar “Putting Your Science to Work,” with Peter Fiske
  – APS webinar “Career Self-Advocacy: How I Got A Six Figure Job in the Private Sector,” with Meghan Anzelc

• Each chapter provides comprehensive guidance on key aspects of a successful job search.

• Topics include self-assessment, networking, interviewing and negotiation strategies, and more.

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APS Careers Website

• Library of Physicist Profiles
  – Advice from physicists representing a diversity of degree paths and careers

• Job Prospects Pages
  – Profiles feature the most common career paths for physicists.
  – Include descriptions of day to day activities, additional skills and training needed, salary information, job outlooks, and links to other relevant resources

• Physics Employment and Salary Information
  – Clearing house for most recent physics employment data from AIP SRC
  – Thumbnails and links to full reports for more information

• APS Webinars Archive
  – On-demand viewing for all webinar presentations
APS Job Board

Shared database (Physics Today, IEEE Computing, AVS, and others) means that there are hundreds of jobs available on the site right now.

Job Seekers can:

• Search for jobs on the Job Center (totally free).
• Store your resume, cover letters, and other materials in your profile on the site.
• Apply for positions directly through the Job Center.

Panels and Networking Opportunities at APS Meetings

• Industrial Careers Workshop at APS March Meeting
• Panels and Networking Receptions
• “Lunch with the Experts”
• Job Fairs at APS March and DPP

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Future of Physics Days 2015
Each year APS offer a number of special events just for undergraduate students.

Typical events include:

• **Career Workshops** – activities which are specifically designed for undergraduate attendees
• **Graduate School Fair**—meet face-to-face with representatives from graduate programs
• **Student Research Sessions**—an opportunity for students to present their research
• **Awards reception**—all presenters are recognized and top presenters receive prizes from ThinkGeek™

**Other Fun FPD Stuff**

• **Official FPD T-shirts**—FREE to all undergraduates. And you get to choose the caption in the FPD Caption Contest!
• **Undergraduate Epitome**—a special publication highlighting meeting events of interest to undergraduate students.

The FPD 2015 winning caption

www.aps.org KEYWORD: Future Physics
APS Local Links

• Locally based, grassroots gatherings of students and physicists
• Focus on students and physicists working in academia, industry, and national labs.
• Groups meet about every 6-8 weeks, usually in a pub or restaurant (“neutral ground”).
• Goal is to build mutually beneficial relationships, raise awareness of non-academic careers, and promote recruitment of student and postdocs into industries.
• Current sites include:
  — Austin
  — Boston
  — DC - Baltimore
  — Denver - Boulder
  — Silicon Valley
  — St. Louis
  — Tampa Bay - Orlando

http://go.aps.org/local_links
THANKS!!

Questions? Email: bailey@aps.org