What Do Physicists do with a Bachelor’s Degree?

Steve Turley
October 31, 2002
Introduction

- Education Choices
- Career
  - choice
  - change
- Continuing Education
- Job Responsibilities
  - skills
  - activities
- Advice
Background of AIP Study

- Physics Bachelors 5-8 years from degree
- Conducted in 1998-99
- Degrees received in 1991-93
  - recession
  - explosion of IT industry and internet
- 50% response rate from sample
Highest Degree

National

BYU
• Employment (30%)
• Graduate School (70%)
Degree Choices

- 40% intended to get graduate degree
- Another 15% went to some additional schooling
- 25% are in school, but not primarily students
- Only about 15% of this group never attended school after bachelor’s degree
Continued Education

- ~55% attended grad/prof school
  - 40% with intention of degree (but didn’t)
  - ~15% no intention of degree
- ~25% in school, but not primarily student
- 15% never attended school after receiving their bachelor’s degree
- Those dropping out of graduate school did so for reasons other than poor preparation.
Employment

- 96% currently employed
- Most of the unemployed are stay-at-home mothers
- One two were unemployed and looking for word

<table>
<thead>
<tr>
<th>Type of Job</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software</td>
<td>24</td>
</tr>
<tr>
<td>Engineering</td>
<td>19</td>
</tr>
<tr>
<td>Science &amp; Lab Technician</td>
<td>9</td>
</tr>
<tr>
<td>Management, Owner &amp; Finance</td>
<td>20</td>
</tr>
<tr>
<td>Education</td>
<td>12</td>
</tr>
<tr>
<td>Active Military</td>
<td>6</td>
</tr>
<tr>
<td>Service and Other Non-Technical</td>
<td>10</td>
</tr>
</tbody>
</table>

Based on physics bachelors with no additional degrees who are not primarily students.

AIP Statistical Research Center, 1998-99 Bachelors Plus Five Study
Table 2. Change To and From Science-Related Jobs for Physics Bachelors

<table>
<thead>
<tr>
<th>First Career Path Job</th>
<th>Current Job*</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Science 76%</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Science 24%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Science 7%</td>
<td>246</td>
</tr>
<tr>
<td></td>
<td>Non-Science 93%</td>
<td></td>
</tr>
</tbody>
</table>

*Current job is job at time of survey, 5 to 8 years after graduation.

Based on physics bachelors with no additional degrees who are not primarily students.

AIP Statistical Research Center, 1998-99 Bachelors Plus Five Study
Figure 2. Knowledge and Skills Rated as Important by Physics Bachelors 5 to 8 Years After Graduation

Primary Field of Employment

<table>
<thead>
<tr>
<th>Scientific problem solving</th>
<th>Engineering, Math &amp; Science</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthesizing information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematical skills*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics principles*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab or instrumentation skills*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific software*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of physics*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeling or simulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer programming*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software development*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent "Very Important"

These data reflect the percentage who chose 4 or 5 on a 5-point scale where 1 = completely unimportant and 5 = essential. Based on physics bachelors with no additional degrees who are not teachers or primarily students.

* Differences between the two fields of employment are significant at $\alpha \leq .05$

AIP Statistical Research Center, 1998-99 Bachelors Plus Five Study
Job Activities

- Supervisory Roles
  - SME more likely in management
  - Software just as likely to hire others (mostly CS)
  - SME most like to hire engineers w/ physics as a close second (many more engineers in market than physicists)

Figure 3. Time Spent on Job Activities by Physics Bachelors 5 to 8 Years After Graduation

- Engineering, Math & Science Jobs
- Software Jobs

These data reflect the percentage who chose 4 or 5 on a 5-point scale where 1 = none and 5 = extensive. Based on physics bachelors with no additional degrees who are not teachers or primarily students.

* Differences between the two fields of employment are significant at $\alpha \leq .05$.

AIP Statistical Research Center, 1998-99 Bachelors Plus Five Study
## Difference with a PhD

<table>
<thead>
<tr>
<th>Skill</th>
<th>Low</th>
<th>Med</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Presentation</td>
<td>8%</td>
<td>12%</td>
<td>80%</td>
</tr>
<tr>
<td>Writing reports/articles</td>
<td>13%</td>
<td>16%</td>
<td>72%</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>2%</td>
<td>7%</td>
<td>90%</td>
</tr>
<tr>
<td>Analyzing data</td>
<td>10%</td>
<td>13%</td>
<td>76%</td>
</tr>
<tr>
<td>Designing research projects</td>
<td>20%</td>
<td>16%</td>
<td>63%</td>
</tr>
<tr>
<td>Work in interdisciplinary context</td>
<td>14%</td>
<td>18%</td>
<td>62%</td>
</tr>
<tr>
<td>Grant writing</td>
<td>52%</td>
<td>14%</td>
<td>33%</td>
</tr>
<tr>
<td>Management responsibilities</td>
<td>20%</td>
<td>18%</td>
<td>62%</td>
</tr>
<tr>
<td>Financial management</td>
<td>42%</td>
<td>26%</td>
<td>32%</td>
</tr>
<tr>
<td>Classroom teaching</td>
<td>64%</td>
<td>9%</td>
<td>27%</td>
</tr>
</tbody>
</table>
Education Advice

- Seek opportunities to develop communication skills
  - Writing
  - Presentations
  - Group projects
- Management skills are helpful
  - Leadership opportunities
  - Finance/project management
- General scientific skills are important beyond specific knowledge
Job Seeking Advice

- Choose first job carefully, you’ll usually stay there.
- Emphasize unique skills
  - Breadth and flexibility
  - Problem solving abilities
  - Non-technical skills (church/extra-curricular)
    - Group work
    - Writing
    - Presentation
On the Job Advice

- Networking
- Learning non-technical skills
- Continuing education
  - For improving current job and maintaining flexibility in opportunities
  - Expecting to go back and get a graduate or professional degree later is probably unrealistic
  - Mentoring is critical
Summary

- A terminal bachelors degree in physics qualifies you for a good job.
  - Interesting
  - Uses training well
  - Secure (low unemployment)
- Continuing education should be an expectation.
- Non-major classes provide important preparation in job skills.
- Don’t forget teaching as a career
More Information

- AIP Pub. Number R-433
- www.aip.org/statistics
- Am. J. Phys., Vol. 70, No. 11, November 2002