My Career in Physics: The Importance of Mentoring

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- My career path
- Statistics
- The importance of mentoring
- A few words of advice
My Life

I have been very fortunate:

• Supportive parents

• Supportive teachers – I was never told that women don’t do math or science; Women were the best students!!!!

• Research experience in high school and in college

• I was one of only a few women in my classes but I was friends with the guys and did not feel isolated

• Mentors (men and women) have supported and encouraged me to pursue the next step in my career

BUT – I lacked confidence. I did not see myself as successfully pursuing a career in academia.

The influence of mentors helped to counteract my self doubt.
Decisions along the way

• My career decisions have **not** been driven by passion to study a particular thing. I loved physics in high school, but also other subjects. I went to college planning to major in physics or political science.

• I went to grad school because it seemed like the most fun and clear-cut of my options. I knew something about what to expect. I wanted to go to California.

• I did a postdoc in Amsterdam because I wanted to live in Europe.

• I applied for faculty jobs because that seemed like the next step and I was encouraged to apply.

We have this model of a successful scientist as one with **single-minded focus and passion** for one particular problem. Works night and day. Completely driven. That is one model but not the only one. Not even the most common one! A career in science does not require that kind of devotion. Some women may have a hard time seeing themselves in that mold. We need all types of role models.

I wanted to have a life!
And finally, a faculty job!

Advantages of a career in academia:
• Variety – start new projects; teach new courses …
• Independence – set your own priorities and schedule
• Flexibility – you can leave in the middle of the day to pick up a sick child
• Value – education and science have intrinsic worth
• Impact – what you do makes a difference; opportunity to mentor young people

Disadvantages of a career in academia:
• Workload – it can feel like you have two full time jobs
• Funding for research is hard to obtain and maintain – takes a lot of time
• Stress of working toward tenure

I should have managed my time better!
Work-Life Balance

• Yes, you can have a life and a family and be a physicist.
• Involves some juggling, but that is true of most careers.
• Each person makes it work in a different way
• Flexibility at work is a BIG plus
• Ask for help

Sometimes women worry about when to have a family and how they will manage. It is hard to control the timing. You can make it work. A supportive spouse and department chair are a big help.
More recently...

- 6 years as department chair
  - Lots of students have problems at some point
  - Most can be resolved or mitigated
- 2 years at National Science Foundation (2012 – 2014)
- Teaching new courses; working on new experiments

One of the most satisfying aspects of my job is the chance to mentor students and colleagues.
Percent of Bachelor’s Degrees Earned by Women, by Major

- Biology
- Chemistry
- Math & Stats
- Earth Sciences
- Physics
- Engineering
- All Bachelor's Degrees

Fraction


SESAPS 2016

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## Faculty Women

### Percentage of Physics Faculty Members Who Are Women

<table>
<thead>
<tr>
<th>Year</th>
<th>1998 (%)</th>
<th>2002 (%)</th>
<th>2006 (%)</th>
<th>2010 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>by Academic Rank</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Professor</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>10</td>
<td>11</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>17</td>
<td>16</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Instructor / Adjunct</td>
<td>*</td>
<td>16</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Other ranks</td>
<td>13</td>
<td>15</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td><strong>by Highest Degree Offered by Department</strong></td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>PhD</td>
<td>6</td>
<td>7</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Master’s</td>
<td>9</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>11</td>
<td>14</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td><strong>OVERALL</strong></td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

The year in the table refers to the spring semester; for example, 2010 represents the 2009-10 academic year.

* These data were not collected in this survey year.

[http://www.aip.org/statistics](http://www.aip.org/statistics)

Faculty: Newly Hired Women

<table>
<thead>
<tr>
<th>by Academic Rank</th>
<th>2006 (%)</th>
<th>2008 (%)</th>
<th>2010 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Professor</td>
<td>9</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>8</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>25</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>Instructor / Adjunct</td>
<td>23</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>OVERALL</td>
<td>22</td>
<td>21</td>
<td>26</td>
</tr>
</tbody>
</table>

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http://www.aip.org/statistics

What is the Situation Now?

- Climate for women varies tremendously from field to field, school to school, department to department.
- The climate in a department can be very strongly influenced for good or bad by one or two individuals.
- Leaders are particularly important in influencing the climate.
- A few students in a particular year can make life difficult for other students in that cohort.

Important: speak up and say that certain comments or behavior are unacceptable; tell a faculty member or the chair of the department; challenge the bias; report it!

For many, bias takes another form: lack of encouragement; implicit bias; internal struggles (imposter syndrome).
What about Hiring?

• We hear a lot about bias against women in hiring, which has been seen as a contributor to the fact that there are still fewer women faculty

• Some studies have shown that men and women both prefer applicants with male names over female names

• One recent paper reported that hiring faculty were biased toward women
  ◦ This study is more relevant to scientists applying for assistant professor positions
  ◦ W. Williams and S. Ceci, PNAS 1418878112

Bias exists but any statistic is swamped by the details of your own situation applying for a particular position. There is a lot you can do to prepare and maximize your chances:
• Submit professional package
• Prepare for phone interview
• Prepare for campus interview
• UNDERSTAND what they are looking for!
• Get appropriate mentoring for your job search.
My Advice

- Do what interests you.
- Take advantage of opportunities – create your own “luck.”
  - For example: Conferences for Undergraduate Women in Physics
- Understand and acknowledge bias, but do NOT accept it or internalize it
- Connect with other women – don’t be isolated
- Get mentors!
- Resilience – dealing with failure; persistence despite challenging circumstances
  - Check out CareerWISE—Online Resilience Training at careerwise.asu.edu
- Brilliance is not the key. Hard work, character, personality all play a very large role in success.
More Advice

• If someone treats you badly he/she may just be a jerk. Don’t always assume bad treatment is because you are a woman.
• “Never attribute to malice that which is adequately explained by stupidity.” - Henlon’s razor
• If you encounter overt discrimination or sexual harassment, report it!
• Mentor those who come after you and support your colleagues

Opportunity

• Now is a great time to go into science
• Let’s create a critical mass in academic departments
• That will make it more likely that women follow after you
Thank you!
Women in Astronomy

Implicit Bias

“...implicit bias refers to the attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious manner. These biases, which encompass both favorable and unfavorable assessments, are activated involuntarily and without an individual’s awareness or intentional control. Residing deep in the subconscious, these biases are different from known biases that individuals may choose to conceal for the purposes of social and/or political correctness. Rather, implicit biases are not accessible through introspection.”

- A Few Key Characteristics of Implicit Biases
  - Implicit biases are pervasive. Everyone possesses them, even people with avowed commitments to impartiality such as judges.
  - Implicit and explicit biases are related but distinct mental constructs. They are not mutually exclusive and may even reinforce each other.
  - The implicit associations we hold do not necessarily align with our declared beliefs or even reflect stances we would explicitly endorse.
  - We generally tend to hold implicit biases that favor our own group, though research has shown that we can still hold implicit biases against our own group.
  - Implicit biases are malleable. Our brains are incredibly complex, and the implicit associations that we have formed can be gradually unlearned through a variety of debiasing techniques.

--http://kirwaninstitute.osu.edu/research/understanding-implicit-bias/

Take a test: https://implicit.harvard.edu/implicit/takeatest.html

Women can be biased against women. We were all brought up in society.
Imposter Syndrome

Men and women unable to internalize their accomplishments; they think they are overrated; particularly common among high achieving women

“Impostor syndrome can be defined as a collection of feelings of inadequacy that persist even in face of information that indicates that the opposite is true. It is experienced internally as chronic self-doubt, and feelings of intellectual fraudulence.”
  
• Feeling like a fake
• Attributing success to luck
• Discounting success

--https://counseling.caltech.edu/general/InfoandResources/Impostor