Toward Gender Equity in Physics

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Context
Percent of PhDs earned by women in selected fields, 1958-2006

AIP Statistical Research Center. Compiled from data collected by National Science Foundation.
The “scissors plot” summarizing related results reveals a “leaky pipeline” for women physicists. This is a problem for Physics!
THE FUNDING GAP
Women are earning an increasing share of research grants from the US National Institutes of Health (NIH) but the average size of their awards has consistently lagged behind what men receive.

2002
NUMBER OF NIH RESEARCH GRANTS
24%
Proportion going to women
31,801
10,199
2002
AVERAGE SIZE OF GRANT
$403,047
$330,169

2012
NUMBER OF NIH RESEARCH GRANTS
30%
Proportion going to women
30,768
13,025
2012
AVERAGE SIZE OF GRANT
$507,279
$421,385

THE SALARY GAP
Female scientists in the United States earn much less than men, on average, with the difference varying strongly by field.

BIOLOGY
2008 median salaries
$65,000
$50,000

CHEMISTRY
2008 median salaries
$79,000
$62,000

PHYSICS AND ASTRONOMY
2008 median salaries
$89,000
$54,000

18% AVERAGE PAY GAP ALL POSITIONS
There are 189 such departments and the median number of faculty is 25.

What is it like to be 1 woman in a faculty of 25?
As the NSF ADVANCE website notes:

...women’s representation and advancement in academic STEM positions are affected by many external factors that are unrelated to their ability, interest, and technical skills...
Implicit Bias

The Gender Equity Project, Virginia Valian

• We are all (women and men) prone to unintentional bias

  Think not? try the Implicit Associations Test at
  https://implicit.harvard.edu/implicit/demo

• This affects many decisions we make in the course of our professional duties

• Relevant concepts include:
  – gender schemas
  – stereotype threat
  – accumulation of disadvantage
We are all biased...

Related results in Moss-Racusin et al., PNAS 12111286109 (2012).
• solutions include:
  ✴ leaders emphasize importance of diversity for achieving institutional goals
  ✴ institutions make criteria and processes for hiring, tenure, promotion, awards clear and easily available to all
  ✴ departments frame faculty searches broadly
  ✴ hiring/award committees
    ✴ are trained to recognize and minimize implicit bias
    ✴ explicitly use multiple dimensions to evaluate candidates’ qualifications (e.g. # publications, research impact, teaching accomplishments, funding potential)
    ✴ have women interviewees meet women faculty
  ✴ departments and professional societies offer professional development opportunities for women at all levels
Family Responsibilities


Mason, Stacy, and Goulden, 2004; Data from NSF Survey of Doctorate Recipients 1981-1995
POSTGRADUATE POSITIONS
A 2009 survey of postdoctoral fellows at the University of California showed that women who had children or planned to have them were more likely to consider leaving research.

POSTDOCS WHO DECIDED AGAINST CAREERS AS RESEARCH FACULTY MEMBERS (2009)

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No children or plans to have them</td>
<td>19%</td>
</tr>
<tr>
<td>No children, but plan to have them</td>
<td>28%</td>
</tr>
<tr>
<td>Children previous to postdoc</td>
<td>19%</td>
</tr>
<tr>
<td>New children since start of postdoc</td>
<td>20%</td>
</tr>
</tbody>
</table>

““The plan to have children in the future, or already having them, is responsible for an enormous drop-off in the women who apply for tenure-track jobs.”
Wendy Williams, Cornell University

EARLY CAREER
Female representation among science and engineering faculty members in the United States has lagged behind gains in graduate education, in part because many women do not apply for tenure-track jobs. But women who do apply are more likely than men to receive interviews and offers.

““At least part of the lack of applications is due to the fact that women look at these careers and don’t see people like themselves.”
Hannah Valantine, Stanford University

<table>
<thead>
<tr>
<th>Field</th>
<th>Female PhDs (1999–2003)</th>
<th>Female applicants for academic jobs</th>
<th>Female interviewees for academic jobs</th>
<th>First job offers that went to women</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOLOGY</td>
<td>45%</td>
<td>26%</td>
<td>28%</td>
<td>34%</td>
</tr>
<tr>
<td>CHEMISTRY</td>
<td>32%</td>
<td>18%</td>
<td>25%</td>
<td>29%</td>
</tr>
<tr>
<td>PHYSICS</td>
<td>14%</td>
<td>12%</td>
<td>19%</td>
<td>20%</td>
</tr>
</tbody>
</table>

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solutions include:

✴ employers provide parental leave, tenure-clock adjustment, modified duties for parental or elder care and ensure these will not impact evaluation for promotion or tenure

✴ employers ensure policies are clear, well-advertised, and framed as entitlements, not exceptions [to minimize “bias avoidance” behavior]

✴ department heads and mentors openly offer support and advice on work-life balance to all new faculty, so this is seen as a normal aspect of professional life

✴ departments schedule all meetings during business hours

✴ departments and professional societies offer childcare grants for faculty attending conferences
Dual-Career Couples

• a pervasive issue in physics

(Dual-Science-Couple Survey, McNeil & Sher, 1998; 1990 APS Survey)
  - 68% (18%) of married physicists have scientist spouses
  - 31% (6%) of all physicists < 31yrs have scientist spouses
  - In 85% of couples, man is older [thus, more senior in job]
  - Dual-science-couples seeking first faculty jobs reported

  • short-term career goals affected by these issues (86%)
  • one partner (usually woman) was under-employed (60%)

• solutions include:

  ✴ Employers offer clear, well-advertised spousal hire policies
  ✴ Employers support 2nd partner’s career success
  ✴ Employers reframe dual-career assistance as recruitment tool
  ✴ Employers form Higher-Education Recruitment Consortia
  ✴ Senior job candidates raise dual-career issues early [model]
Negotiation

Women Don’t Ask: Negotiation and the Gender Divide (Linda Babcock & Sarah Laschever, 2003)

• Women avoid negotiation because they are
  - unsure what they “deserve”; fear asking too much
  - worried about harm to relationships
  - less optimistic about benefits of negotiation
  - not confident of their negotiation skills
  - relatively risk-averse

• In negotiations, women tend to
  ✴ ask for less -- and therefore receive less
  ✴ use “interest-based” negotiation approach, focused on underlying needs/motives rather than narrow concrete goals
  (Getting to Yes: Negotiating Agreement Without Giving In, Roger Fisher & William Ury, 1990)
• **Solutions include**
  
  ✴ **Professional organizations** offer workshops on negotiation skills e.g. APS Professional Skills Development Workshops offered annually at major physics meetings (sponsored by NSF); has impacted > 250 women physicists since 2005
  
  http://www.aps.org/programs/women/workshops/skills/

  ✴ **Mentors** teach women (and men) that interest-based negotiation is very effective and improves professional relationships

  ✴ **Mentors** recommend targeted readings such as *Ask For It* (Babcock & Laschever, 2009) and *Getting to Yes* (Fisher & Ury, 1990)

  ✴ **Employers** offer clear directions to job finalists to avoid unintended bias in discussions of salary and start-up packages
Further Challenges

Intersecting Identities
Race and Gender

Number of Hispanic and African-American female PhDs in Physics, 1979-2006.

African-American
- 1979 - 1985: 2
- 1992 - 1996: 3
- 1999 - 1993: 16
- 2000 - 2006: 21

Hispanic-American
- 1979 - 1985: 7
- 1999 - 1993: 21
- 2000 - 2006: 18

AIP Statistical Research Center compiled from data collected by the National Science Foundation.
Recent survey of LGBQ faculty (N=389) finds

- LGBQ women are significantly **less** likely to be out professionally than LGBQ men
- LGBQ women are significantly **more** likely to observe and experience exclusionary behavior (i.e. being ignored, shunned, or harassed)
- LGBQ women were significantly **less** likely to report being very comfortable or comfortable in their classrooms or on campus

Rankin, S., Barthelemy, R., Patridge E.  
The Experiences and Persistence of LGBQ Faculty.  
In preparation for The Journal of Diversity in Higher Education
Welcome, LGBTIQAP+ and Friendly Physicists!

Welcome to the first website for lesbian, gay, bisexual, transgender, intersex, queer, questioning, asexual, pansexual, not-cisgender and not-straight (as well as friendly cis and straight) physicists. This resource website has come out of a need for resources for LGBTIQAP+ physicists. It is our hope that it expands into a networking resource for young TIQQAPB/LG+ physicists and students to find mentors, a place to find resources for laboratories and universities to make their physics departments more BTIQAPL/G+ friendly, as well as a hosting of information of get togethers of GLBTIQAP+ physicists and friends.

If you would like to join our mailing list, please join the the Google Group below. If you are an out physicist, please consider e-mailing us so that we can add you our Out Physicists List that will help other physicists network with you. If you would like to offer your skills and talents towards this cause, please contact us.

We look forward to meeting you and continuing to build this community!

Subscribe to LGBTIQAP+ Physicists
Email:  [ ] Subscribe

Visit this group

E-mail us at info@lobtphysicists.org

facebook
FOR FURTHER INFORMATION

American Institute of Physics Statistical Research Center:  www.aip.org/statistics/

American Physical Society

Univ. of California Faculty Family Friendly Edge:  ucfamilyedge.berkeley.edu/

The Gender Equity Project:  www.hunter.cuny.edu/genderequity/

Women Don’t Ask [Negotiation and the Gender Divide]:  www.womendontask.com/
Ask for It [How Women can Use the Power of Negotiation...]

NSF ADVANCE Portal Website:  www.portal.advance.vt.edu/
Michigan State’s ADAPP-ADVANCE Project:  www.adapp-advance.msu.edu/


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