Diversity and Excellence in Physics

Edmund Bertschinger
MIT Department of Physics and
Kavli Institute for Astrophysics and Space Research
Definitions

**Diversity**: Having or being composed of differing elements; variety. [Merriam-Webster]

**Inclusion**: A sense of belonging: feeling respected, valued for who you are; feeling a level of supportive energy and commitment from others so than you can do your best work. [Miller and Katz 2002]

**Excellence**: The quality of being excellent. [Merriam-Webster]
Turn a vicious cycle into a virtuous one

- Excellence
- Diversity
- Inclusion
Why Increase Diversity?
Broadening the talent pool increases the talent
Attracting more students keeps us vital

SB degrees in Physics, 1980-2010

Year

Degrees
2001: Introduced a flexible degree track

SB Degrees by Gender and Type of Degree

- Flexible males
- Focused males
- Flexible females
- Focused females


Number of Students

Year
Much of our growth is powered by women
Top producers of physics bachelor’s degrees (AIP)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Annual Average</th>
<th>Institution</th>
<th>Annual Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass. Inst. of Technology</td>
<td>82</td>
<td>Carnegie Mellon U (PA)</td>
<td>31</td>
</tr>
<tr>
<td>U of California, Berkeley</td>
<td>75</td>
<td>Cornell U-Applied (NY)</td>
<td>30</td>
</tr>
<tr>
<td>U of Washington</td>
<td>66</td>
<td>Purdue U, West Lafayette (PA)</td>
<td>30</td>
</tr>
<tr>
<td>Brigham Young U (UT)</td>
<td>55</td>
<td>Rensselaer Polytech Inst. (NY)</td>
<td>30</td>
</tr>
<tr>
<td>Colorado School of Mines</td>
<td>51</td>
<td>U of MN, Minneapolis</td>
<td>30</td>
</tr>
<tr>
<td>U of IL, Urbana/Champaign</td>
<td>49</td>
<td>U of California, Davis-Applied</td>
<td>29</td>
</tr>
<tr>
<td>U of California, Los Angeles</td>
<td>47</td>
<td>U of Florida</td>
<td>29</td>
</tr>
<tr>
<td>U of Maryland, College Park</td>
<td>42</td>
<td>U of California, Davis</td>
<td>28</td>
</tr>
<tr>
<td>U of California, San Diego</td>
<td>40</td>
<td>U of California, Santa Barbara</td>
<td>28</td>
</tr>
<tr>
<td>U of Colorado, Boulder</td>
<td>39</td>
<td>U of California, Santa Cruz</td>
<td>28</td>
</tr>
<tr>
<td>Ohio State U</td>
<td>37</td>
<td>Michigan State U</td>
<td>27</td>
</tr>
<tr>
<td>U of Michigan, Ann Arbor</td>
<td>37</td>
<td>Stanford U (CA)</td>
<td>27</td>
</tr>
<tr>
<td>U of Virginia</td>
<td>37</td>
<td>Yale U (CT)</td>
<td>26</td>
</tr>
<tr>
<td>U of Arizona</td>
<td>36</td>
<td>Princeton U (NJ)</td>
<td>24</td>
</tr>
<tr>
<td>Rutgers U, New Brunswick (NJ)</td>
<td>35</td>
<td>Columbia U (NY)</td>
<td>23</td>
</tr>
<tr>
<td>Cornell U (NY)</td>
<td>34</td>
<td>U of California, Irvine</td>
<td>23</td>
</tr>
<tr>
<td>Pennsylvania State U</td>
<td>34</td>
<td>Boston U (MA)</td>
<td>21</td>
</tr>
<tr>
<td>U of Texas, Austin</td>
<td>34</td>
<td>College of William &amp; Mary (VA)</td>
<td>21</td>
</tr>
<tr>
<td>U of Wisconsin, Madison</td>
<td>34</td>
<td>Florida State U</td>
<td>21</td>
</tr>
<tr>
<td>California Inst. of Technology</td>
<td>33</td>
<td>U of MA, Amherst</td>
<td>21</td>
</tr>
<tr>
<td>U of Chicago (IL)</td>
<td>33</td>
<td>U of Rochester (NY)</td>
<td>20</td>
</tr>
<tr>
<td>U of Utah</td>
<td>33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: List includes only those departments who contributed degree data for all 3 years.

http://www.aip.org/statistics
MIT now has more physics majors than biology majors.
Enrollment by Gender 2003 – 2010
Undergraduate and Graduate

Academic Year

Percentage of Women

- Undergraduate
- Graduate
### Competition for graduate students

(2007 compilation by MIT students)

<table>
<thead>
<tr>
<th>School</th>
<th>Percent women graduate students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Princeton</td>
<td>12.4</td>
</tr>
<tr>
<td>MIT</td>
<td>13.7</td>
</tr>
<tr>
<td>UIUC</td>
<td>13.7</td>
</tr>
<tr>
<td>U. Chicago</td>
<td>15.8</td>
</tr>
<tr>
<td>UCSB</td>
<td>16.4</td>
</tr>
<tr>
<td>Cornell</td>
<td>16.8</td>
</tr>
<tr>
<td>Stanford</td>
<td>18.2</td>
</tr>
<tr>
<td>Caltech</td>
<td>22.8</td>
</tr>
<tr>
<td>Columbia</td>
<td>35.8</td>
</tr>
<tr>
<td>Harvard</td>
<td>37.3</td>
</tr>
</tbody>
</table>
Increasing our diversity increases our contribution to the society that funds us

Shirley Jackson
PhD 1973

Ronald McNair
PhD 1976

Cherry Murray
PhD 1978
# Elements of a Diversity Initiative

<table>
<thead>
<tr>
<th>Undergraduates</th>
<th>Recruitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate students</td>
<td>Retention</td>
</tr>
<tr>
<td>Postdocs</td>
<td>Mentoring</td>
</tr>
<tr>
<td>Faculty</td>
<td>Promotion</td>
</tr>
<tr>
<td>Staff</td>
<td>Climate</td>
</tr>
</tbody>
</table>
How to increase diversity in physics?

Recruit more URM and female graduate students

Recruit and retain a more diverse faculty
  Search process and mentoring

Improve the climate and community

Share the value and excitement of physics
MIT Physics Strategy

Increase the number of physics students in MSRP (9 in 2010) (summer research, URM undergrads)

*Physics Dept. is aggressively recruiting & promoting*

Develop other relationships with URM undergraduates and Masters students

*Fisk students (Figueroa), local students (UMass Boston)*

*Recruit at NSBP/NSHP and SACNAS conferences*

Develop relationships with minority-serving institutions

*Howard U, Southern U, UPR, Fisk, FAMU, FIU, UTEP, Morehouse, Spelman, …*
APS Minority Bridge Program

- APS staff visited 10-15 URM schools producing many physics bachelors degrees
- Met with students and faculty
- Recruit ~6 top research universities to bring their resources to this problem (faculty and administration) ← MIT, Harvard, Stanford, …
- Understand existing bridge programs (e.g., Fisk-Vanderbilt)
- Gather data on why physics minority undergrads choose not to pursue PhDs
- June 2010 gathering of these groups
- Proposal in Fall 2010 to bootstrap programs at research universities
Our undergraduates help recruiting graduate women!

**Northeast Conference for Undergraduate Women in Physics**

**January 15-16, 2011 at MIT**

**About the Conference**

The Northeast Conference for Undergraduate Women in Physics (NCUWP) is a three-day conference for undergraduate physics majors in the northeastern United States. It will be held on January 15-16, 2011 simultaneously with conferences at the University of Southern California (USC), Purdue University, and the North Carolina Research Triangle (NCRT).

NCUWP’s goal is to help young women continue in physics by providing them with the opportunity to experience a professional conference, information about graduate school and professions in physics, and access to other women in physics of all ages with whom they can share experiences, advice, and ideas. Our program includes research talks by faculty, panel discussions about graduate school and careers in physics, presentations and discussions about women in physics, laboratory tours, student research talks, a student poster session, and several meals during which presenters and students interact with each other.
How to increase diversity in physics?

Recruit more URM and female graduate students

Recruit and retain a more diverse faculty

Search process and mentoring

Improve the climate and community

Share the excitement and value of physics
Faculty Search Process

“Open search” in any subfield of physics or astronomy

Search Committees – before application deadline – must:
• Meet with Department Head to review implicit bias, search process, etc.
• Assemble lists of potential Women candidates, Minority candidates, and Stars, and encourage applications from appropriate individuals

Be a search committee, not a sort committee.
Making “search” a verb

Pre-search visits:

Department provides up to $1000 for visits by promising women and underrepresented minorities before they are ready to apply.

FY09: 5 including one URM
FY10: 3, no URM
Mentoring

Junior faculty have three mentors (Senior faculty, Division Head, Department Head)

Thorough annual review for all junior faculty

All faculty now asked to report on mentoring activities in annual salary review
How to increase diversity in physics?

Recruit more URM and female graduate students

Recruit and retain a more diverse faculty

Search process and mentoring

Improve the climate and community

Share the excitement and value of physics
Site Visits

Improving the Climate for Women

The APS has had a long-standing interest in improving the climate in physics departments for underrepresented minorities and women. Toward that goal, the Committee on Minorities (COM) and the Committee on the Status of Women in Physics (CSWP) both sponsor site visit programs. In recent years, the visits have been expanded to include national labs as well as universities. The aims of these visits are three-fold:

1. Identify a set of generic problems commonly experienced by minority and/or women physicists.
2. Intervene to solve many of these generic problems.
3. Address problems arising in the particular physics department or lab visited and help improve the climate for minorities or women (both students and faculty) in the facility.

Site visits are conducted at the request of a department chair or lab director. Members of the site visit team meet with the physics department chair/lab director, groups of physics faculty members, minority or women...
Climate and Community

MIT Physics Diversity Summit 2010
January 25, 2010
MIT Green Center, Cosman Room 6C-442

Monthly Physics Diversity Lunches
Annual Physics Diversity Summit

URM physics conferences with students, staff and faculty

Join us in celebrating and advancing the cause of underrepresented minority physics students, postdocs, staff and faculty!

Program

Campus Advocacy:
Committee on Race and Diversity
Office of Minority Education
How to increase diversity in physics?

Recruit more URM and female graduate students

Recruit and retain a more diverse faculty

Search process and mentoring

Improve the climate and community

Share the excitement and value of physics
Marketing to students

Physics teaches you how to analyze and solve problems of all kinds

“I prefer to hire physics majors”
- Institute Professor John Little
  Sloan School of Management
  MIT Physics SB and PhD
A physics degree can help you address global problems

MIT SB Physics 2005
Cambridge PhD Astrophysics 2009

US Congressional Fellow
Senate Energy & Natural Resources Committee

Virginia Corless
Pursuing a career in energy policy
More than 100 non-physics MIT faculty (11%) have physics degrees

Eric Grimson
EECS

Anette Hosoi
MechE

Heather Lechtman
Archaeology

Tomaso Poggio
Brain Science

Mitchel Resnick
Media Lab
Vision

Make MIT the top-ranked university in science and the best place to work and study for everyone.
The MIT Physics Department is committed to increasing the diversity of its faculty and student populations to improve our excellence and to better serve the society that supports our work.