Let’s Talk EDI in Science

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Past Chair: DPS Prof. Culture & Climate Subcommittee

Preferred Pronouns: they, them, theirs
https://science.jpl.nasa.gov/people/Richey/

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Definitions

EDI?

• Improving **EQUITY** promotes justice, impartiality and fairness within the procedures, processes and distribution of resources by institutions and systems. Tackling equity issues requires an understanding of the underlying or root causes of outcome disparities within our society.

• **DIVERSITY** refers to a broad representation of a community’s demographic mix, taking into account elements of human difference focusing on racial and ethnic groups, sexual orientation, gender, gender identity, disabilities, religion, age and perspectives arising from different backgrounds.

• **INCLUSION** refers to the degree in which diverse individuals are able to participate fully in the decision-making processes within an organization or group. While a truly “inclusive” group is necessarily diverse, a “diverse” group may or may not be “inclusive.”

**But I thought the E was Equality, not Equity?**

Definitions

**Unconscious (Implicit) Bias**: the attitudes or stereotypes that affect our understanding, actions, & decisions in an unconscious manner.

This occurs regardless of the dominant group:
- Gender: Both men and women downplay women’s contributions
- Race: Both whites and minorities downplay minorities’ contributions

**Microaggressions**: subtle, indirect, or unintentional acts of discrimination

**Conscious (Explicit) Bias**: an intentional prejudice in favor of or against one thing, person, or group compared with another usually in a way that’s considered to be unfair.
- **Sexism**: a conscious bias: prejudice, stereotyping, or discrimination on the basis of sex.
- **Racism**: a conscious bias: prejudice, stereotyping, or discrimination on the basis of race.

**Harassment**: unwelcome conduct that is based on race, color, religion, sex, national origin, age, disability or genetic information.
STEM fields are shown to have implicit bias that is impactful (both gender & race based):

- Opportunities in mentorship [Milkman et al. 2015]
- Opportunities in the classroom [Eddy et al. 2014; 2015; Grunspan et al. 2016]
- Workplace conflict & stereotype issues [Williams et al. 2014; 2016; Rios & Stewart, 2015]

WOC Science faculty have decreased, even as white women faculty have increased [Armstrong & Javanovic, 2015]

WOC are more likely to be junior in rank [NSF, 2015]

In physics, women (and WOC specifically) are isolated & experience microaggressions in workplace [Barthelemy et al., 2015a; 2015b]

White women and POC are underrepresented in physical sciences to a far greater degree than the biological or social sciences [NSF, 2015]

Women and POC experience more workplace incivilities [Cortina et al., 2013; Kabat-Farr & Cortina, 2012]
Demographics in Planetary Science

Figure by Rathbun et al. (2017), with input from the 2011 Planetary Science Workforce Survey (White et al. 2011), the 2010 US Census, and the US Population predictions (Passel and Cohn, 2008).
Of 301 PI-led mission proposals from 2001-2017, only 30 had female PIs and 87% of those came through PSD solicitation -Michael New’s Diversity & Inclusion presentation to the Astrophysics Advisory Committee on April 12th, 2018

Figure by Rathbun et al. (2017).
In many disciplines, particularly the Physical Sciences, women are at single-digit percentages of full professors, and at or below 20% for assistant professors.

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**Gender Demographics in Academia**

<table>
<thead>
<tr>
<th>Discipline</th>
<th>FY2002*</th>
<th>FY2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assistant</td>
<td>Associate</td>
</tr>
<tr>
<td>Chemistry</td>
<td>21.5%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Math</td>
<td>19.6%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Computer Sci</td>
<td>10.8%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Electrical Engr</td>
<td>10.9%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Mechanical Engr</td>
<td>15.7%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Physics</td>
<td>11.2%</td>
<td>9.4%</td>
</tr>
<tr>
<td>Civil Engr</td>
<td>22.3%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Chemical Engr</td>
<td>21.4%</td>
<td>19.2%</td>
</tr>
<tr>
<td>Astronomy**</td>
<td>20.2%</td>
<td>15.7%</td>
</tr>
<tr>
<td>Economics</td>
<td>19.0%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Political Science</td>
<td>36.5%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Sociology</td>
<td>52.3%</td>
<td>42.7%</td>
</tr>
<tr>
<td>Psychology</td>
<td>45.4%</td>
<td>40.1%</td>
</tr>
<tr>
<td>Biological Sci</td>
<td>30.4%</td>
<td>24.7%</td>
</tr>
<tr>
<td>Earth Sciences</td>
<td>not available</td>
<td></td>
</tr>
</tbody>
</table>

*Chemistry and astronomy data are for FY2003. **Top 40 departments

Racial Demographics: Physics

Physics Degrees (3-yr avg 2013-2015)

Source: IPEDS, US Census, and APS
I. Disparity Between Representations of URMs in Academia versus the U.S. Population

A Person Like Me

Although the representation of Blacks, Hispanics, and Native Americans in the 2006 U.S. population was estimated [6] to be 12.8%, 14.8%, and 1.1%, respectively, their representation at almost each point in academia is lower. If the URM representation among U.S. professors is noticeably less than in the general population, especially at higher levels in academia, this can influence URM students' self-esteem [7] and the evaluation which URMs make of their own likelihood to receive appropriate rewards and reach higher levels in academia.

Our data (See Appendix.) reveal that few science and engineering departments have more than a single URM faculty member. As a result, minority faculty can feel isolated or marginalized, and attempts at change made by URMs can make little or no difference. [9] Some URM faculty have reported being overwhelmed with advising numerous minority student organizations and token assignments on multiple committees. [10] Some minority professors cite a hostile working environment as their biggest job-related concern. [10] It has been reported that negative office politics can have more detrimental impacts than outright acts of discrimination. [10] Students sample this environment while pursuing their degrees; if URM students' mentors and role models are struggling instead of thriving, then URM students perceive that they will struggle similarly if they continue to those same levels in academia. [8]

Glacial URM Faculty and Promotion Increases

As seen in Table 1, the few minority faculty members present in academia are usually concentrated in the lower ranks, chiefly as assistant professors. For example, in sociology all URMs combined represent 19.2% of assistant professors (newest hires), 11.1% of associate professors, and 10.8% of "full" professors in FY2007. In only 3 of the 15 disciplines surveyed in FY2007 are the majority of URM faculty at the rank of associate professor. In no discipline surveyed was the highest percentage of URMs at the rank of "full" professor. The opposite is true for White males. Consequently, a relatively large proportion of minority faculty members lack tenure. Without job security or a critical mass, most minority faculty members lack the capability or leverage to change the environment greatly within their discipline. [10] Many URM faculty feel they have worked too hard to reach their current position to risk losing their job, no matter how alienating or unfavorable their environment. [11] Tenure is given and denied by other faculty members, giving untenured faculty little incentive to challenge the status quo. [11]

The slow promotion rate of URM faculty has significant consequences. It results in consistently low numbers of tenured minority faculty members, and therefore it impedes progress in improving the environment of minority faculty members. [10] Moreover, only 5 of the 9 engineering and physical sciences disciplines increased their representations of URM professors from FY2002 [12] to FY2007.

URM Demographics in Academia

Table 1. URM Professors (Black, Hispanic, Native American) by Rank and Year at the Top 50

<table>
<thead>
<tr>
<th>Discipline</th>
<th>FY2002*</th>
<th>FY2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assistant</td>
<td>Associate</td>
</tr>
<tr>
<td>Chemistry</td>
<td>2.8%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Math</td>
<td>6.0%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Computer Science</td>
<td>2.1%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Astronomy**</td>
<td>5.5%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Physics</td>
<td>5.2%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Chemical Eng.</td>
<td>3.4%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Civil Eng.</td>
<td>9.3%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Electrical Eng.</td>
<td>5.4%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Mechanical Eng.</td>
<td>7.0%</td>
<td>5.4%</td>
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<td>Economics</td>
<td>6.6%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Political Science</td>
<td>8.0%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Sociology</td>
<td>14.8%</td>
<td>12.4%</td>
</tr>
<tr>
<td>Psychology</td>
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</tr>
<tr>
<td>Biological Sciences</td>
<td>5.7%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Earth Sciences</td>
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</tr>
</tbody>
</table>

*Chemistry and astronomy data are for FY2003. **Top 40 departments in FY2007

URM Profs, Top 50 Depts. [28]

DEMOGRAPHICS

• Collecting demographic information at ALL levels (both broadly and within individual fields and departments) is one way to gather and understand issues with DIVERSITY.
The CSWA Survey on Workplace Climate

Kathryn B. H. Clancy\textsuperscript{2}, Katharine M. N. Lee\textsuperscript{2}, Erica M. Rodgers\textsuperscript{3}, & Christina R. Richey\textsuperscript{1}

1. The AAS Committee of the Status of Women in Astronomy (CSWA), christina.richey.2@gmail.com.
2. University of Illinois, Urbana-Champaign, IRB approval (#15354, University of Illinois)
3. Space Science Institute, Boulder, Colorado

With Gracious Support from the American Astronomical Society!

Over 400 astronomers and planetary scientists responded to 39 questions administered via Survey Monkey website from January – March 2015.

Survey Construction and Recruitment

Adapted survey questions regarding workplace climate for LGBT+ physicists.

Recruitment:
- Women in Astronomy Blog
- Featured at 225th AAS Meeting
- AAS Division of Planetary Sciences
- The Planetary Exploration Newsletter
- The AAS Women Newsletter
- Multiple Facebook groups (in community)
- Several academic departments

Over 400 astronomers and planetary scientists responded.
Results

**Negative Language Heard**
- 88% heard from peers
- 51.9% heard from supervisors
- 88% from others

**Responses to Harassment**
- 39% report verbal harassment
- 9% report physical harassment

**Safety**
- 27% have felt unsafe
- 11% have skipped at least one professional event because felt unsafe

Regarding current position

Statistically significant associations

- hearing negative comments from peers and supervisors
- experiencing verbal and physical harassment
- feeling unsafe
Career Consequences to Climate

Women of Color face harassment in intersectional ways:

- 40% of women of color & 27% of white women in sample have felt unsafe due to gender.
- 28% of women of color have felt unsafe due to race

Loss of professional opportunities for women generally and men and women of color

- Negative climate keeps numbers low especially for women of color
  - increases the risk of stereotype threat [Steele, 1997; Steele and Aronson, 1998]
  - underestimation of performance [Keller and Dauenheimer, 2003; Nielsen, 2015; Shapiro and Williams, 2012]
  - lack of critical mass in job searches [Valian, 1998]

Findings:

• ~50% of women faculty and staff in academia experience sexual harassment.
• Between 20-50% of students in science, engineering, and medicine experience sexual harassment from faculty or staff.
• The cumulative effect of sexual harassment is significant damage to research integrity and a costly loss of talent in academic sciences, engineering, and medicine.
• The 2 characteristics most associated with higher rates of sexual harassment are (a) male-dominated gender ratios and leadership and (b) an organizational climate that communicates tolerance of sexual harassment.

• Organizational climate is, by far, the greatest predictor of the occurrence of sexual harassment, and ameliorating it can prevent people from sexually harassing others.
Findings:

• LGBT physicists have faced uneven protection & support from legislation and policies.

• The overall climate experienced by LGBT physicists was highly variable.

• In many physics environments, social norms established expectations of closeted behavior.

• Isolation was a common theme for many LGBT physicists.

• A significant fraction of LGBT physicists have experienced or observed exclusionary behavior.

• LGBT physicists with additional marginalized identities faced greater level of discrimination.

• Transgender and gender-nonconforming physicists encountered the most hostile environments.

• Many LGBT physicists were at risk for leaving their workplace or school.

• LGBT physicists reported trouble identifying allies to help mitigate isolation, exclusion, or marginalization.
Workplace Climate Surveys

• Collecting proper data from workplace climate surveys and using that data to analyze your workplace environment is one way to understand issues with Inclusion and Equity.

• Key Next STEP: Create recommendations, followed by policies, that actually impact EDI for the better.
CSWA Survey on Workplace Climate: Solutions

1. Education on appropriate workplace behavior required for all employees [Clancy et al., 2014; Cortina et al., 2013]

2. Diversity and cultural awareness training necessary to raise awareness and understanding of the problems faced by women of color and other underrepresented groups [Norman et al., 2013]

3. Leaders need to model inclusive behavior and define inclusive culture [Clancy et al., 2014; Cortina et al., 2013 Settles et al., 2006]

4. When abuses are reported, “instigators should be swiftly, justly, and consistently sanctioned” [Cortina et al., 2013, p. 1600]

Initiatives to increase numbers of women of color [Norman et al., 2013]
- Build cohorts of women of color to enable creation of peer networks
- Encourage fair hiring practices to minimize implicit bias
- Incentivize departments who support women of color
NASEM Report on Sexual Harassment: http://sites.nationalacademies.org/shstudy/index.htm

**Recommendations:**

- **Leaders in academic institutions and research and training sites must pay increased attention to and enact policies** that cover gender harassment as a means of addressing the most common form of sexual harassment and of preventing other types of sexually harassing behavior.

- **Move beyond legal compliance to address culture and climate.** Academic institutions, research and training sites, and federal agencies should move beyond interventions or policies that represent basic legal compliance and that rely solely on formal reports made by targets.

- Professional societies should accelerate their efforts to be viewed as organizations that are helping to create culture changes that reduce or prevent the occurrence of sexual harassment.

**Recommendations for Institutions:**

- Create diverse, inclusive, and respectful environments
- Diffuse the hierarchical and dependent relationship between trainees and faculty
- Provide support for targets
- Improve transparency and accountability
- Strive for strong and diverse leadership
- Make the entire academic community responsible for reducing and preventing sexual harassment
Recommendations:

• **Ensure a safe and welcoming environment** at meetings.
  - Establish written best practices
  - Implement Code of Conduct

• Address the need to systematically accommodate name changes in publication records.

• Develop advocacy efforts that support LGBT equity and inclusion

• Promote LGBT-inclusive practices in academia, national labs, and industry.
  - Disseminate Best Practice Guide developed by LGBT+ physicists
  - Develop training program on inclusive workplace and mentorship practices
  - Utilize Climate Site Visit Programs.

• Implement LGBT-inclusive mentoring programs.
  - Includes creating a professional network of LGBT mentors and mentees and hosting networking events.

• Support the establishment of a Forum on Diversity and Inclusion.
Recommendations:

• **Assess and address**: participate in or conduct a climate survey, collecting demographic information, carrying out classroom climate assessments. Establish a departmental climate committee and/or liaison and explicit LGBT+ supportive policies.

• **Break the silence and invisibility**: Initiate department-wide discussions of LGBT+ concerns, highlight the scientific contributions of LGBT+ department members at all levels, join an ”Out List“ as an ally or LGBT+ scientist, identify LGBT+ supportive mentors, invite LGBT+ speakers to campus.

• **Educate and advocate**: Participate in LGBT+ friendly climate and anti-bias training, work for campus-wide LGBT+ supportive practices such as supportive first responders and gender-inclusive restrooms and accompanying signage.

• **Set the example and expectations**: include preferred pronouns in your email signature, invite students and/or meeting participants to share their preferred pronouns, articulate classroom environment expectations on the first day of class, speak up in response to discriminatory behavior and report where appropriate.

• **Support and include**: Plan gender-neutral and inclusive social events, create LGBT+ safe spaces in your department, provide equal restroom access, include LGBT+ faculty in positions of authority, provide support for participation in LGBT+ networking events, ensure LGBT+ needs are considered in dual-career hires, family-friendly policies, and benefits.
Tips to do better

• Collect demographic information & use it to build policies
• Diversify your network & institution
  – Aim for 30% across all levels (proportionality matters!)
  – Make sure your department/institution seminars, committees, panels, etc. have a good diversity balance (race, gender, etc.)
  – Don’t reinforce stereotypes when diversifying
• Amplify minority voices in the room during discussions
• Foster and draw on mentorship roles & responsibilities
• Work with experts in the fields in demographic data collecting and social scientists who study workplace climates
• Make sure you’re aware of unconscious/implicit bias: https://implicit.harvard.edu/implicit/
• Discuss how Implicit Bias affects your daily work efforts:
  – Resumes, Job credentials, Fellowships, Hiring, Awards, Promotions, Proposal Reviews

Remember to account for ALL the components of EDI when building policies: Equity, Diversity, and Inclusion!
Tips to do better

• Avoid making sexual remarks when in the work environment
  – Also avoid trying to make sexual advancements at folks beneath you in the power dynamic.

• Offer and Take Bystander Intervention Training!
  – [http://stepupprogram.org](http://stepupprogram.org)

• **LEAN IN TO YOUR DISCOMFORT**
  – Learn about benevolent sexism, mansplaining, & tone arguments & avoid these behaviors
    • It’s **NOT** the job of marginalized community members to teach you these things. Instead, try
google, twitter, social science literature, talks like this, etc.
  – Know when to listen
  – Don’t belittle or dismiss someone
    – **Avoid victim blaming**

• **Don’t expect a cookie when you do all of these things**

• For those who have been an ally for a long time, or you are someone who has dealt
personally with being harassed or assaulted, it’s okay to take breaks. Remember Self
Care. Avoid Burnout.
Other EDI presentations this week

• Tuesday
  – Talk: 11:50 AM: 205.07 History of the Planetary Science Workforce: Why does the DPS need a subcommittee on Professional Culture and Climate?
  – Poster: 3:35 PM: 213.05 Introducing the DPS Professional Culture and Climate Subcommittee
http://www.cos.gatech.edu/facultyres/Diversity_Studies/Steinpreis_Impact%20of%20gender%20on%20review.pdf


Literature


Literature


