

Equity and Inclusion in Astronomy



Colette Salyk (Vassar) & Meredith Hughes (Wesleyan)

Demographics: Who are astronomers?

- 2013 AAS Demographics survey

Ethnicity of US AAS Members, 2013			Whole USA (%)
Ethnicity	%	N	
White	84	1290	77
Asian or Asian American	8	123	5
Hispanic or Latino	3	47	17
Black or African American	1	20	13
American Indian or Alaska Native	0	6	1
Native Hawaiian or other Pacific Islander	0	1	0.2
Other	2	37	2
Prefer not to respond	4	62	

Sum of percentages exceeds 100 because respondents were asked to check all that apply

Source: US Census Bureau

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Sexual Orientation and Transgender Status of US AAS Members, 2013		
	%	N
Heterosexual or straight	89	1351
Gay or lesbian	2	29
Bisexual	1	19
Transgender	0	3
Prefer not to respond	7	113

Demographics: Who are astronomers?

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Disabilities among US AAS Members, 2013			Whole USA (%)
Disability	%	N	
I am deaf or have serious difficulty hearing	1	21	3.5
I am blind or have serious difficulty seeing even when wearing glasses	0	2	2.3
I have serious difficulty walking or climbing stairs	1	14	7.1
None of the above	96	1472	
Prefer not to respond	2	26	

Demographics: Who are astronomers?

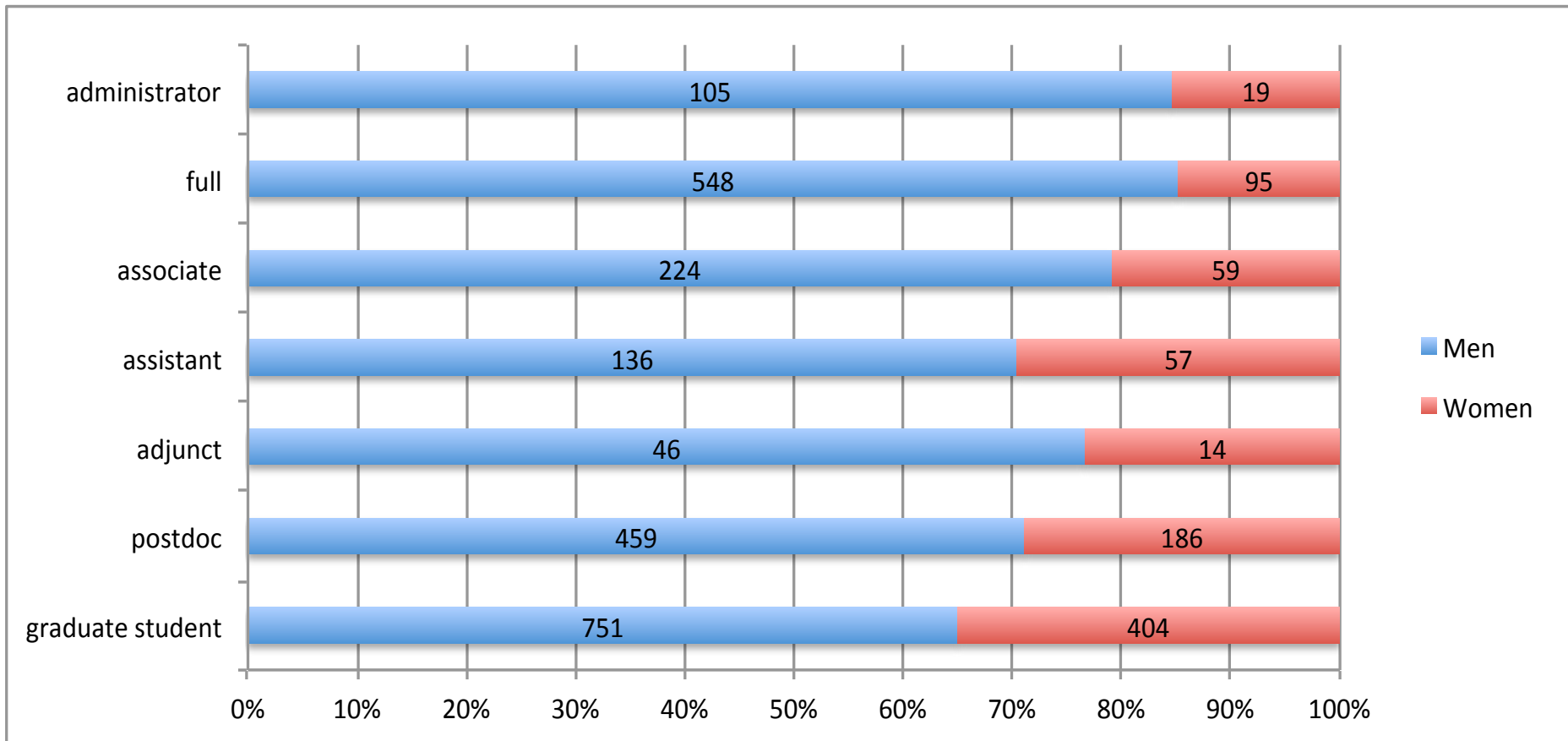
- 2013 AAS Demographics survey

Sex of US AAS Members by Age Group, 2013			
	Born before 1980 %	Born 1980 or after %	Total %
Male	79	60	73
Female	21	40	25
Other	-	-	-
Prefer not to respond	-	-	1
Total	1191	321	1512

US AAS Members with Children by Sex and Age Group, 2013			
Has children	Born before 1980 %	Born 1980 or after %	Total %
Male	70	12	60
Female	49	4	34
Total	1167	317	1484

More About Sex: CSWA demographics survey 2013

Snapshot: Where are we now?



Changes with time 1: Seniority

Rank	% Women 1992	% Women 1999	% Women 2003	% Women 2013
Grad student	22	26	30	34
Postdoc	17	20	22	28
Assistant Prof (total/faculty/research)	17/--/--	18/--/--	20/20/10	26/27/25
Associate Prof (total/faculty/research)	10/--/--	14/--/--	21/21/19	19/21/18
Full Prof (total/faculty/research)	5/--/--	7/--/--	9/9/9	14/16/11

Fraction of female assistant professors has nearly doubled in the past 20 years

Fraction of female associate professors has not budged in the last decade. Why?

Changes with time 2: Survival analysis

	1992 Grad students	2003 Assistant profs	% Advancement
# Men	602	182	(30±3)%
# Women	176	31	(18±3)%
% Women	(23±2)%	(15±3)%	

In the last decade, unlike the previous decade, women have advanced to the assistant professor level at rates approximately proportional to their representation at lower levels. On average, policies to retain junior women are working!

If current trends continue, associate professors will be ~30% women by 2023 (lots of postdocs)

Take-home Messages

Good news: In the last decade, universities have on average been recruiting and retaining women into assistant professor positions at rates approximately consistent with their representation at junior levels (with appropriate caveats).

Morally ambiguous news: In the last decade, there is some evidence that the currently highest-ranked (NRC) institutions have been slower to promote and retain women than mid- to lower-ranked institutions. Research track is still more male-dominated.

Unfortunate news: Departments appear to have become more polarized in their recruitment/retention of women. On which end of the spectrum does your department lie?

What are some reasons for lack of diversity in Astronomy?

Memory of overt past discrimination



Until recent times, men and women of color, and white women faced overt discrimination – being barred from working at or attending certain institutions, receiving significantly less pay and recognition for the same work, etc.

The crudely nicknamed “Pickering’s harem” – women hired to do field-changing astronomical work for little pay or recognition, at the Harvard College Observatory (photo from 1913)

Unconscious bias

“[Unconscious] biases, which encompass both favorable and unfavorable assessments, are activated involuntarily and without an individual’s awareness or intentional control.”

“The implicit associations we harbor in our subconscious cause us to have feelings and attitudes about other people based on characteristics such as race, ethnicity, age, and appearance. “

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

Unconscious bias – “logical” scientists aren’t immune!

- Rated student lab manager applicant
 - ▣ Identical materials attributed to male OR female student

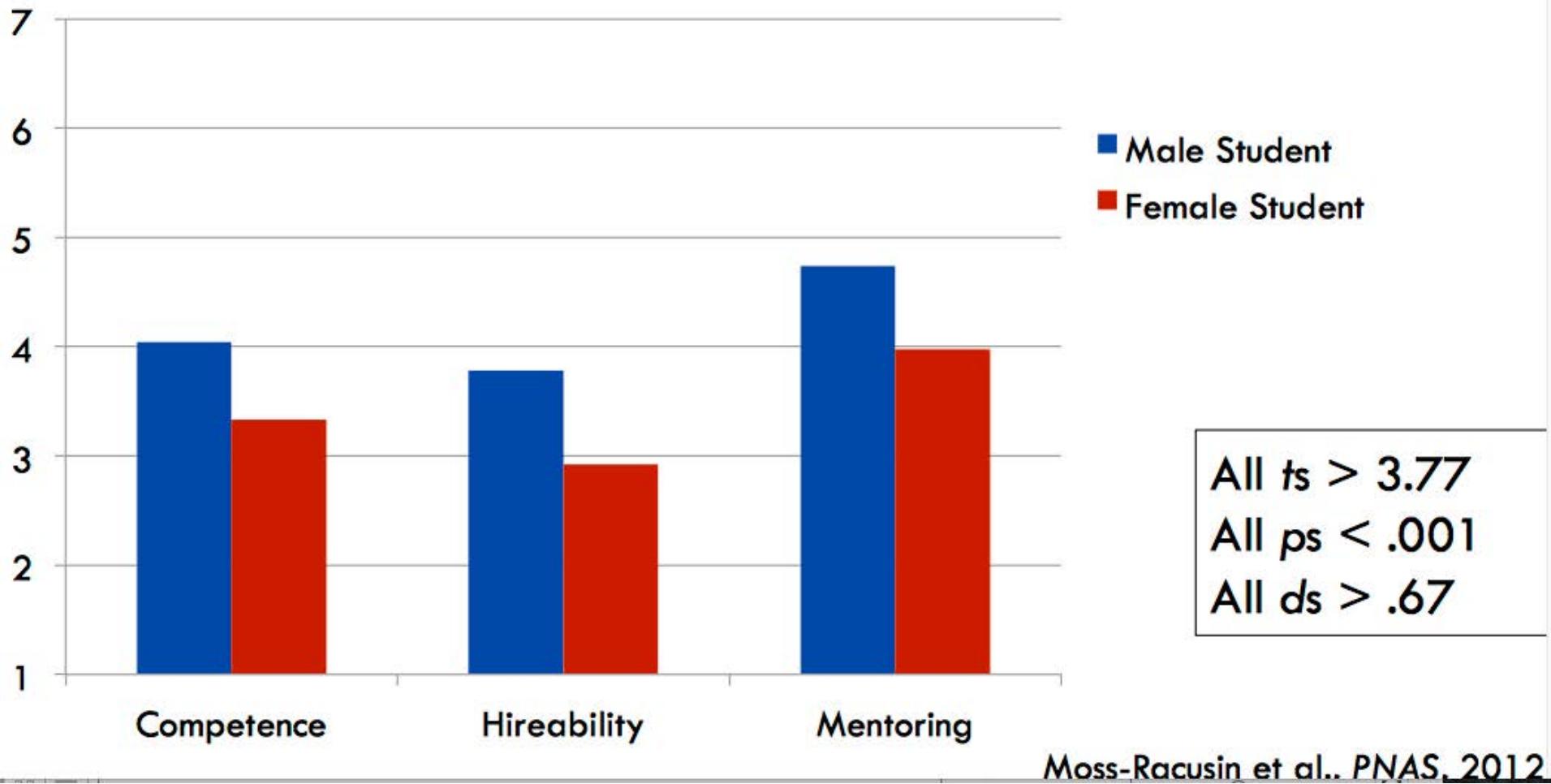


- ▣ Faculty gender, age, race, science field, rank → **No effects**

Dependent variables (Moss-Racusin & Rudman, 2010)

- ▣ Competence
- ▣ Hiring
- ▣ Salary conferral
- ▣ Mentoring

Unconscious bias – “logical” scientists aren’t immune!



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“In our experiment, professors were contacted by fictional prospective students seeking to discuss research opportunities prior to applying to a doctoral program. Names of students were randomly assigned to signal gender and race (White, Black, Hispanic, Indian, Chinese), but messages were otherwise identical.”

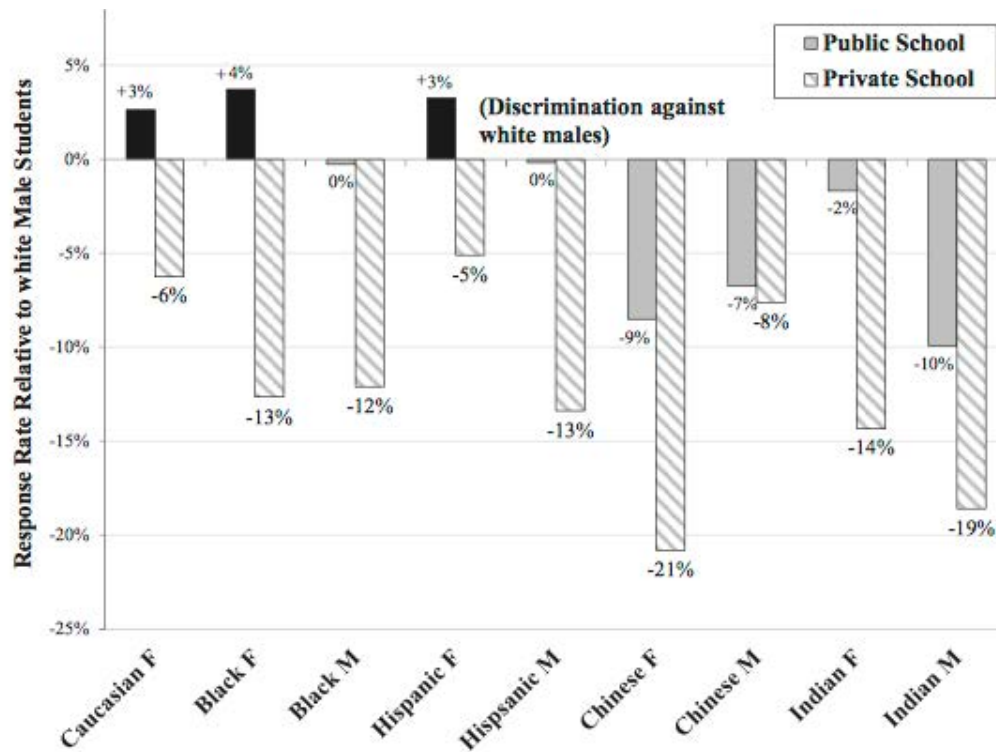


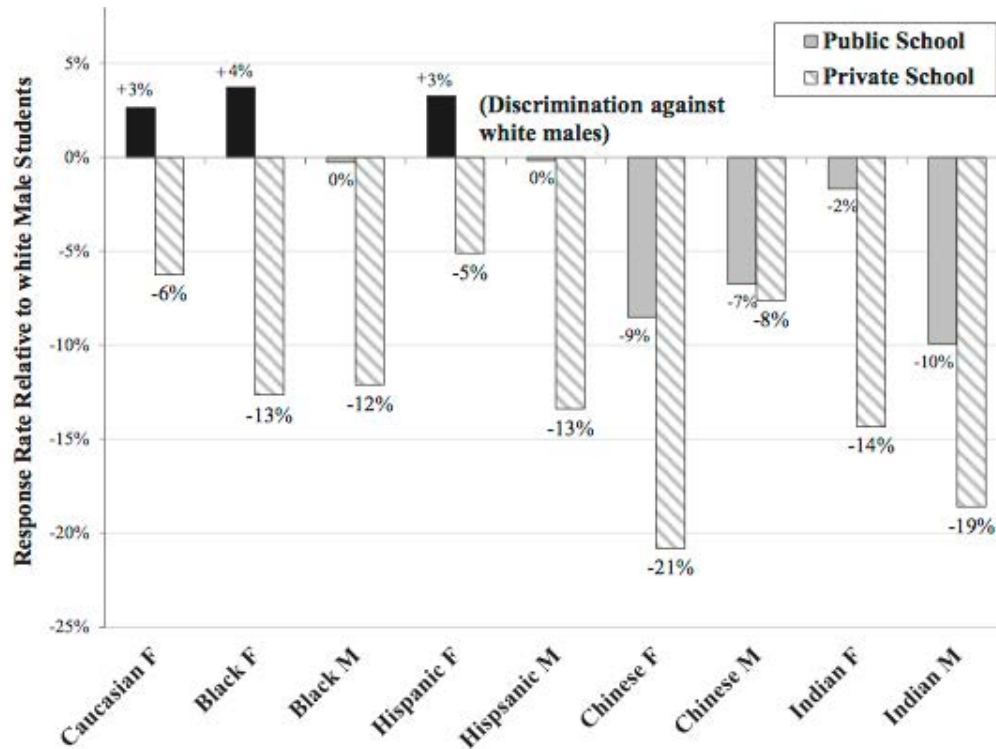
Figure 3. Raw, sample-weighted average size of the discriminatory gap faced by female and minority students at public versus private universities. Note: Discrimination against White males in black. Discrimination against women and minorities in gray.

Brad Anderson
 Steven Smith
 Meredith Roberts
 Claire Smith
 Lamar Washington
 Terell Jones
 Keisha Thomas
 Latoya Brown
 Carlos Lopez
 Juan Gonzalez
 Gabriella Rodriguez
 Juanita Martinez
 Raj Singh
 Deepak Patel
 Sonali Desai
 Indira Shah

Chang Huang
 Dong Lin
 Mei Chen
 Ling Wong

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Milkman et al. 2015

<https://www.apa.org/pubs/journals/releases/apl-0000022.pdf>

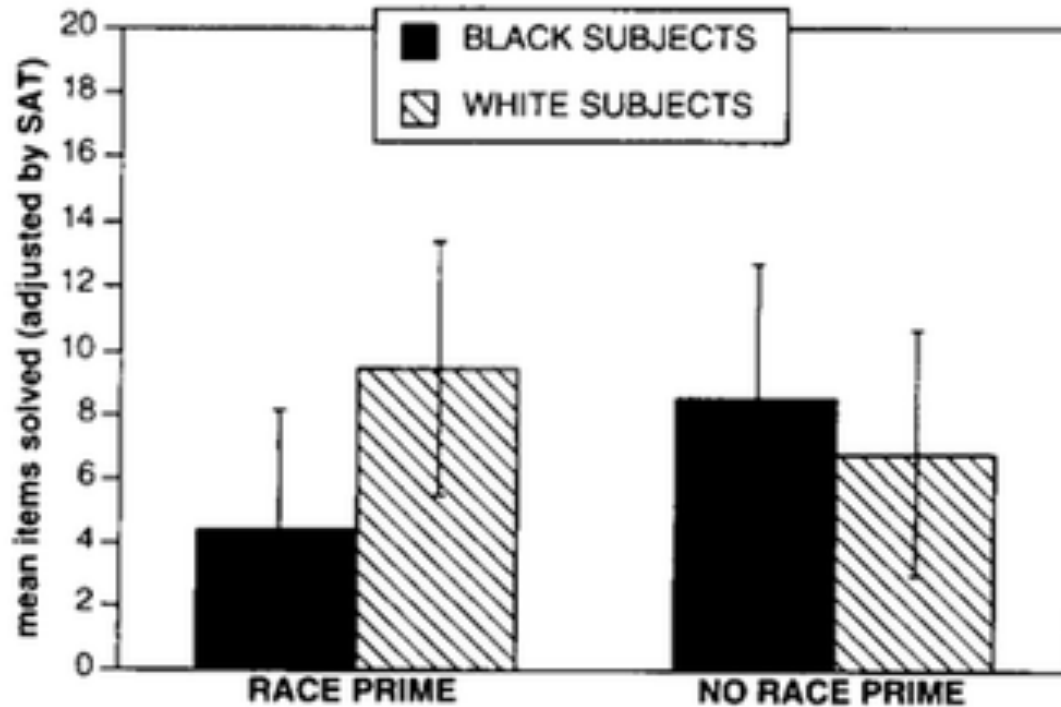
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Stereotype threat

“**Stereotype threat** is a situational predicament in which people are or feel themselves to be at risk of confirming negative **stereotypes** about their social group.” (Wikipedia)

Stereotype threat: one example of many studies on the topic

Asked to state their race before taking test



Not asked to state their race before taking test

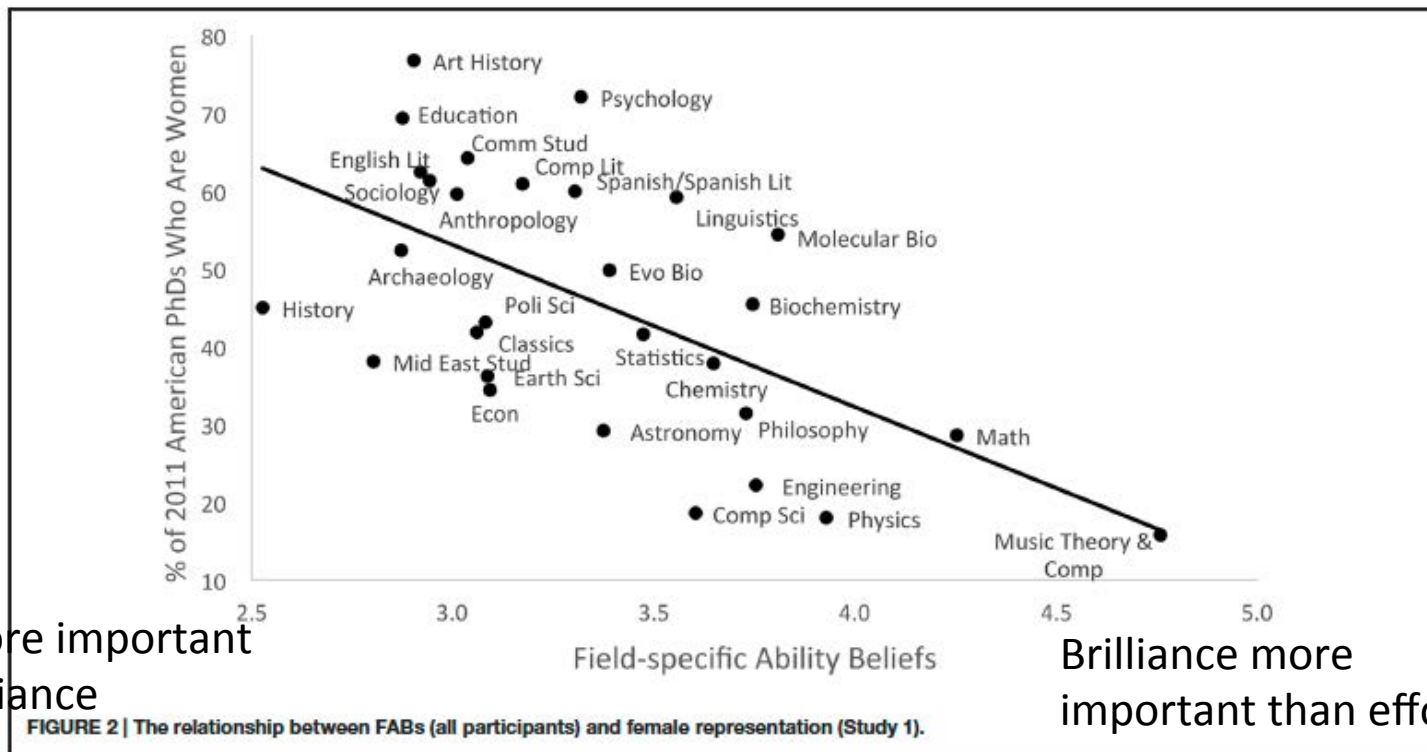
Figure 4. Mean test performance Study 4.

Steele & Aronson 1995

http://greatergood.berkeley.edu/images/uploads/Claude_Steele_and_Joshua_Aronson,_1995.pdf

Academic culture

“Women are underrepresented in fields where success is believed to require brilliance”



Bias in letters of recommendation

“recommenders used significantly more standout adjectives to describe male as compared to female candidates. Letters containing more standout words also included more ability words and fewer grindstone words.”

Standout words: excellen*, superb, outstanding, unique, exceptional, unparalleled, *est, most, wonderful, terrific*, fabulous, magnificent, remarkable, extraordinar*, amazing, supreme*, unmatched

Ability words: talent*, intell*, smart*, skill*, ability, genius, brilliant*, bright*, brain*, aptitude, gift*, capacity, propensity, innate, flair, knack, clever*, expert*, proficient*, capable, adept*, able, competent, natural*, inherent*, instinct*, adroit*, creative*, insight*, analytical

Grindstone words: hardworking, conscientious, depend*, meticulous, thorough, diligen*, dedicate, careful, reliab*, effort*, assiduous, trust*, responsib*, methodical, industrious, busy, work*, persist*, organiz*, disciplined

Sexual harassment

Survey of scientists who perform field work

Survey of Academic Field Experiences (SAFE): Trainees Report Harassment and Assault
Kathryn B. H. Clancy, Robin G. Nelson, Julienne N. Rutherford, Katie Hinde

Experienced	Gender	All % (N)
Harassment	Women	71% (361/512)
	Men	41% (56/138)
Assault	Women	26% (131/504)
	Men	6% (8/133)

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Famous Berkeley Astronomer Violated Sexual Harassment Policies Over Many Years

A university investigation into astronomer Geoff Marcy, exclusively obtained by BuzzFeed News, has determined that he violated sexual harassment policies at UC Berkeley. Marcy has written a public apology, though he denies some of the investigation's findings.

posted on Oct. 9, 2015, at 1:40 p.m.



Azeen Ghorayshi
BuzzFeed News Reporter

But astronomy is not immune

Ways that astronomy as a field is working to support ALL astronomers

- AAS Committees
 - Committee on the Status of Women in Astronomy (CSWA)
 - Committee on the Status of Minorities in Astronomy (CSMA)
 - Committee for Sexual-Orientation and Gender Minorities in Astronomy (SGMA)
 - Working Group on Accessibility in the process of forming!

Ways that astronomy as a field is working to support ALL astronomers

- First-Ever Inclusive Astronomy Conference, June 2015
 - Over 160 astronomers from US and Europe
 - Intersectional approach to equity and inclusion
 - Barriers to Access
 - Creating Inclusive Environments
 - Community of Inclusive Practice
 - Power, Policy, and Leadership
 - Many recommendations, including removing PGRE and GRE as grad school admission criteria and other ways to reduce bias in admissions

Ways that astronomy as a field is working to support ALL astronomers

- Women in Astronomy Blog (womeninastronomy.blogspot.com)

Women In Astronomy

Thursday, October 15, 2015

A Culture of Silence

Posted by Jessica Kirkpatrick

This week the Astronomy community was rocked by the news that Geoff Marcy was found to have violated campus sexual harassment policies after a six-month investigation by Berkeley's Office for the Prevention of Harassment and Discrimination.

Until [Buzzfeed News](#) broke the story last week, Marcy's habit of making women uncomfortable was an "open secret" in the Astronomy community. Yet many people are reacting with frustration, saying: "If everyone knew, why didn't we do something sooner?" or "I am a woman in astronomy, how come no one told me?" The Marcy situation highlights a larger problem we have within the structures of academia: a culture of silence.



Contributors



Joan Schmelz



Ed Bertschinger



Laura Trouille



David Charbonnet



Jessica Kirkpatrick



John Johnson



Christina Richey

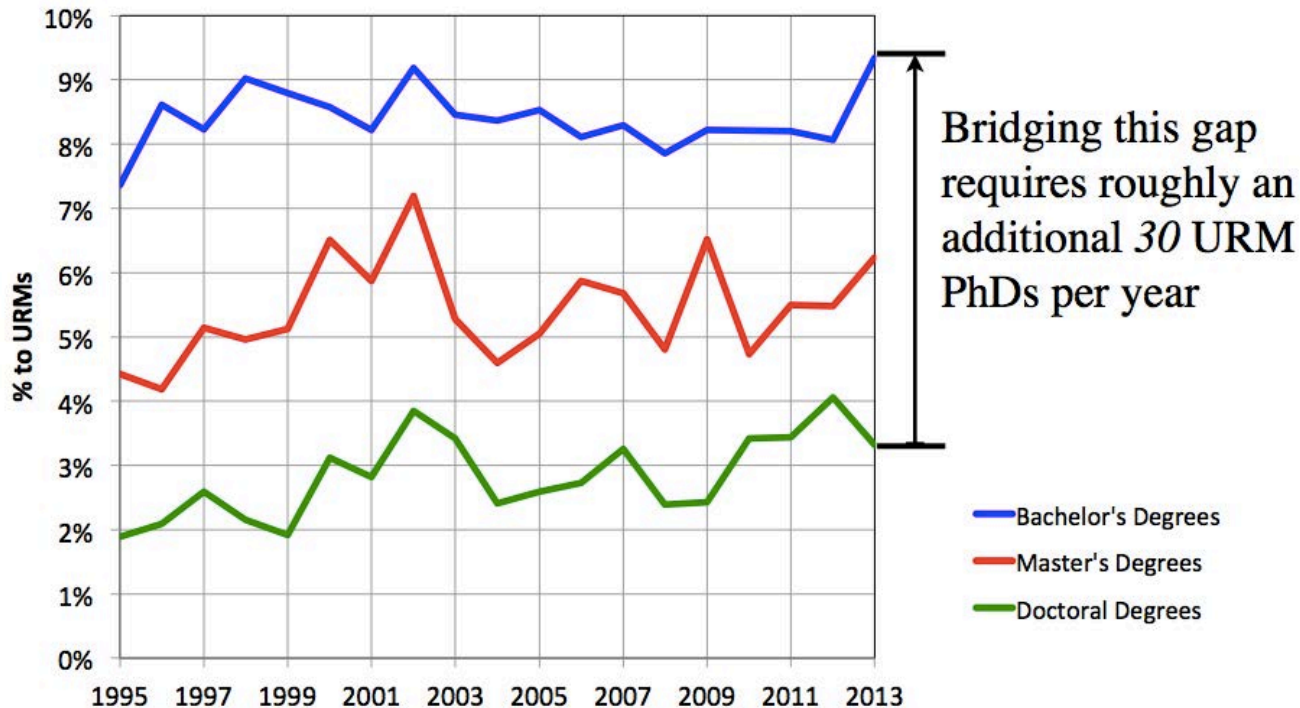
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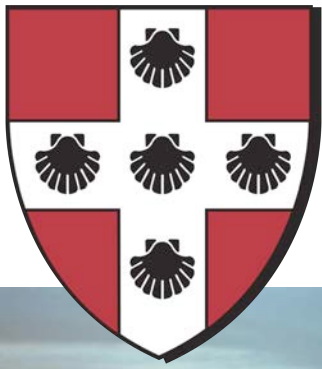
- Women in Astronomy Blog
(womeninastronomy.blogspot.com)
- AASWOMEN Newsletter
(<http://www.aas.org/cswa/AASWOMEN.html>)
- SPECTRUM and STATUS
- Astronomy In Color Blog
(<http://astronomyincolor.blogspot.com/>)
- Astronomy Allies



Ways that astronomy as a field is working to support ALL astronomers

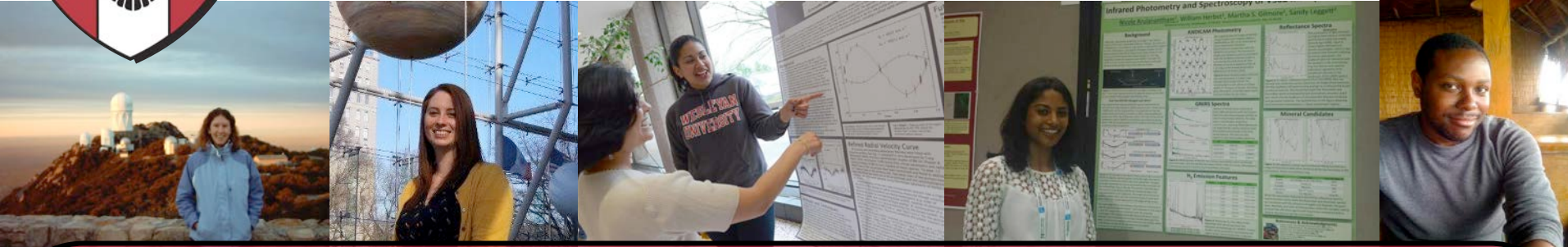
- APS Bridge programs have placed 70 students in PhD programs in the last 3 years





Masters in Astronomy at Wesleyan

A Path to the PhD for Non-Traditional Students



A “Mini-PhD”

Tuition remission, stipend, no Physics GRE required
Coursework tailored to student needs

Students from a wide range of backgrounds

81% female, 76% from state schools or PUIs, 60% PoC over last 5 years

High placement rate

~60% go on to PhDs in astronomy, others pursue science EPO, teaching, etc.



Here are some ideas that can help *you* achieve your goals

If you experience sexual harassment, know

-it is NOT your fault

-there are a LOT of resources to support you

AAS Committee on the Status of Women in Astronomy

Your school's Title IX office

Your mentors, professors

Connect with supportive peer networks

“Mentoring up, down and sideways”

Mentors can serve many different purposes:

- Peers, to discuss classwork, collaborate on projects
- Peers, for emotional support

- Family, for emotional support

- Counselors, for emotional, health support

- Professors, for advice about careers, graduate school, research, coursework

- Committees, student groups, to find peer networks with shared experiences

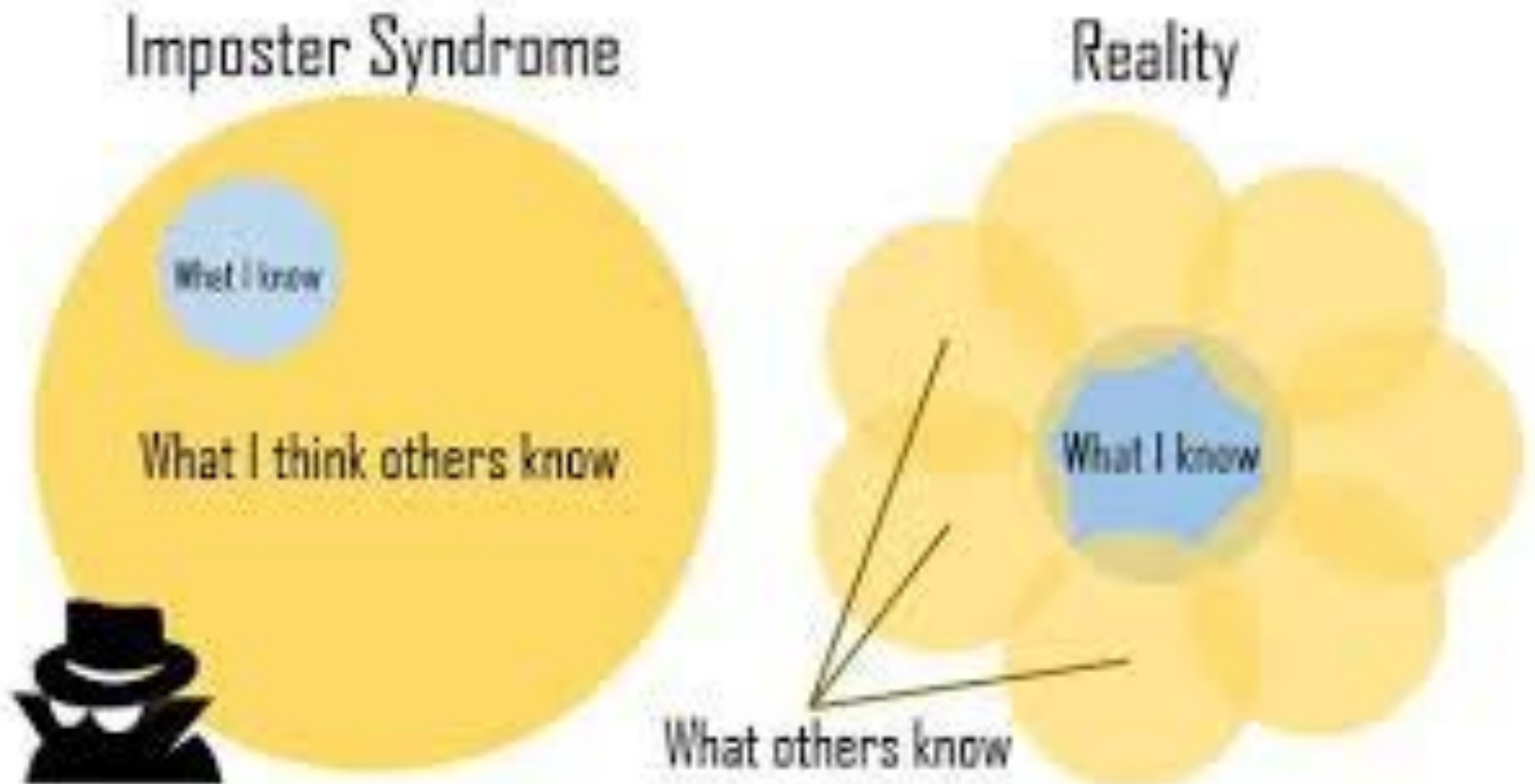
Understand that “genius” is not predictor of success. Instead “grit” (a stick-to-it-ness) and support networks (emotional support from family and friends, academic support from professors, tutors, classmates) are key.

Often, those viewed as “geniuses” simply have more experience.

Understand and counteract imposter syndrome

- Understand that you're not alone
- Understand that imposter syndrome is common amongst high achievers. (Your training makes you ever more aware of what you don't know!)
- Try writing down your achievements so that you can objectively appreciate them
- Request clear feedback from your mentors and professors

Understand and counteract imposter syndrome



Cultivate a growth mindset: the idea that our intelligence is learned, not intrinsic

“Becoming is better than being”

“Test scores and measures of achievement tell you where a student is, but they don’t tell you where a student could end up. “

“Picture your brain forming new connections as you meet the challenge and learn. Keep on going.”

“More and more research is suggesting that, far from being simply encoded in the genes, much of personality is a flexible and dynamic thing that changes over the life span and is shaped by experience.”

“Just because some people can do something with little or no training, it doesn’t mean that others can’t do it (and sometimes do it even better) with training. ”

-Quotes from Dr. Carol Dweck, who studies the “growth mindset”

Cultivate a growth mindset: the idea that our intelligence is learned, not intrinsic

My personal thoughts:

-I NEVER judge my students based on their grades.

-I can see the effects of hard work.

-Students have different levels of experience, and this affects their performance in coursework and research. But hang in there, and you will have that same experience, too.

-The best researchers I know of have a growth mindset.

-I haven't always had a growth mindset, but I am working on it.

Connect with professors at your institution to learn scientific “soft skills”

-Writing

-Speaking

-Teaching

-Building collaborations and scientific relationships