

Strategies to improve diversity and inclusion in physics

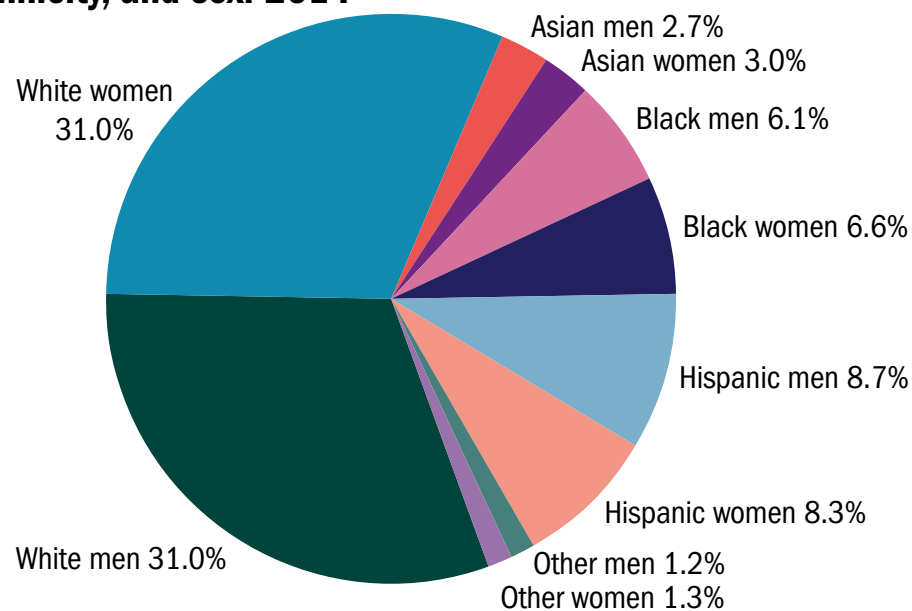
Brian Beckford
University of Michigan

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July 7, 2018

Representation in physical sciences

- Women and racial/ethnic minorities make up a substantial portion of the US population
 - Women (50%), Hispanic (17%), Black (13%), Asian, 6%, (American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, and those who reported more than one race (2%).
 - Racial ethnic minority ~ 35%
- Underrepresented Minority (URM)
 - Statistically underrepresented group in a field/discipline that is not representative of population. For this talk, the URM is Hispanic-, African-, and American Indian, Alaskan Native, Native Hawaiian, and Pacific Islander

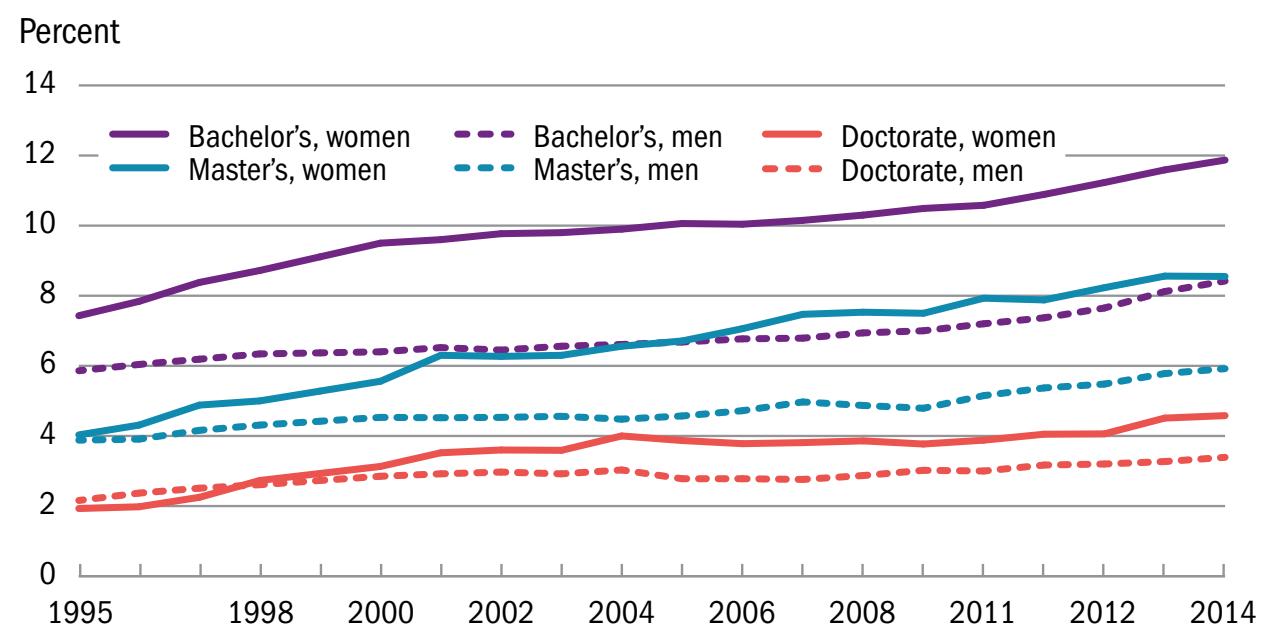
Noninstitutionalized resident population of the United States ages 18–64, by race, ethnicity, and sex: 2014



NOTES: Hispanic may be any race. Other includes individuals not of Hispanic ethnicity who reported more than one race or a race not listed separately.

www.nsf.gov/statistics/wmpd/

Science and engineering degrees earned by underrepresented minority women and men: 1995–2014

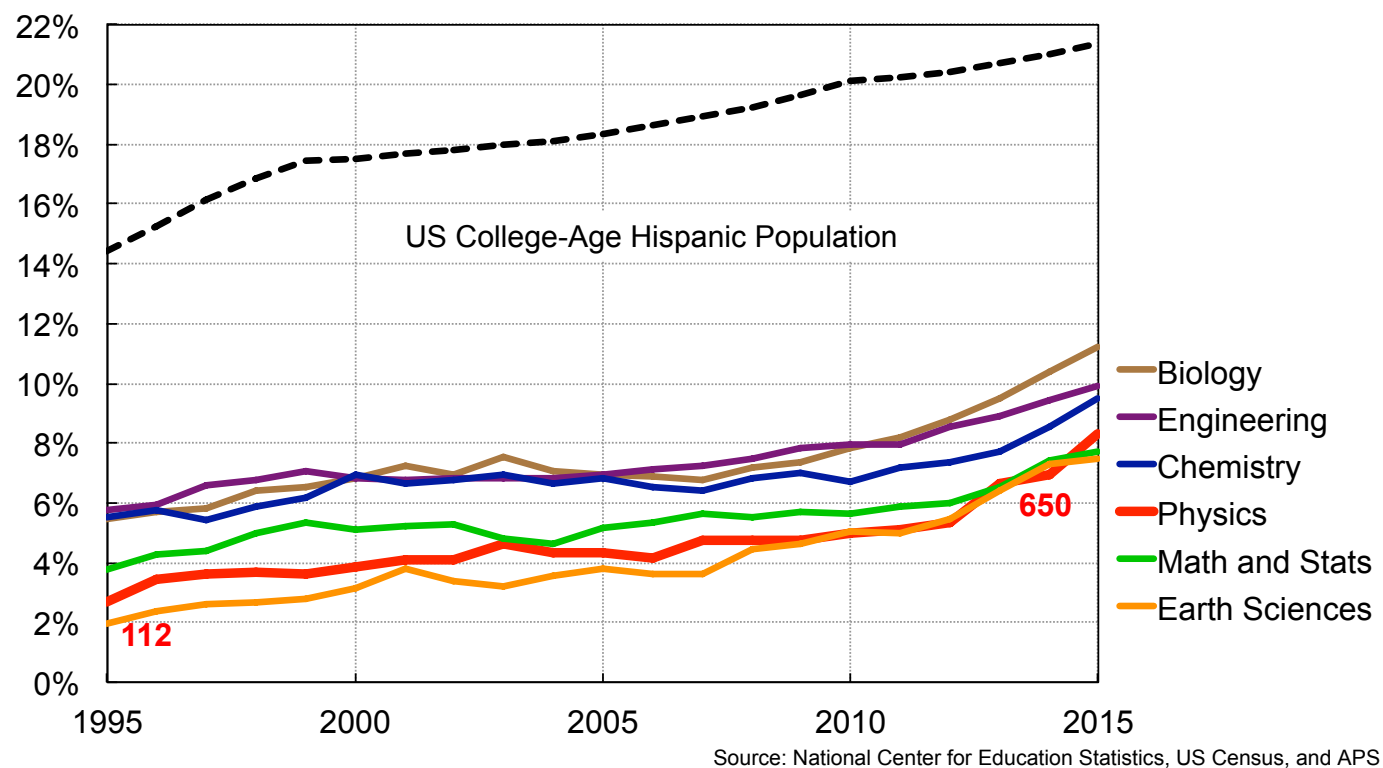


NOTE: Data not available for 1999.

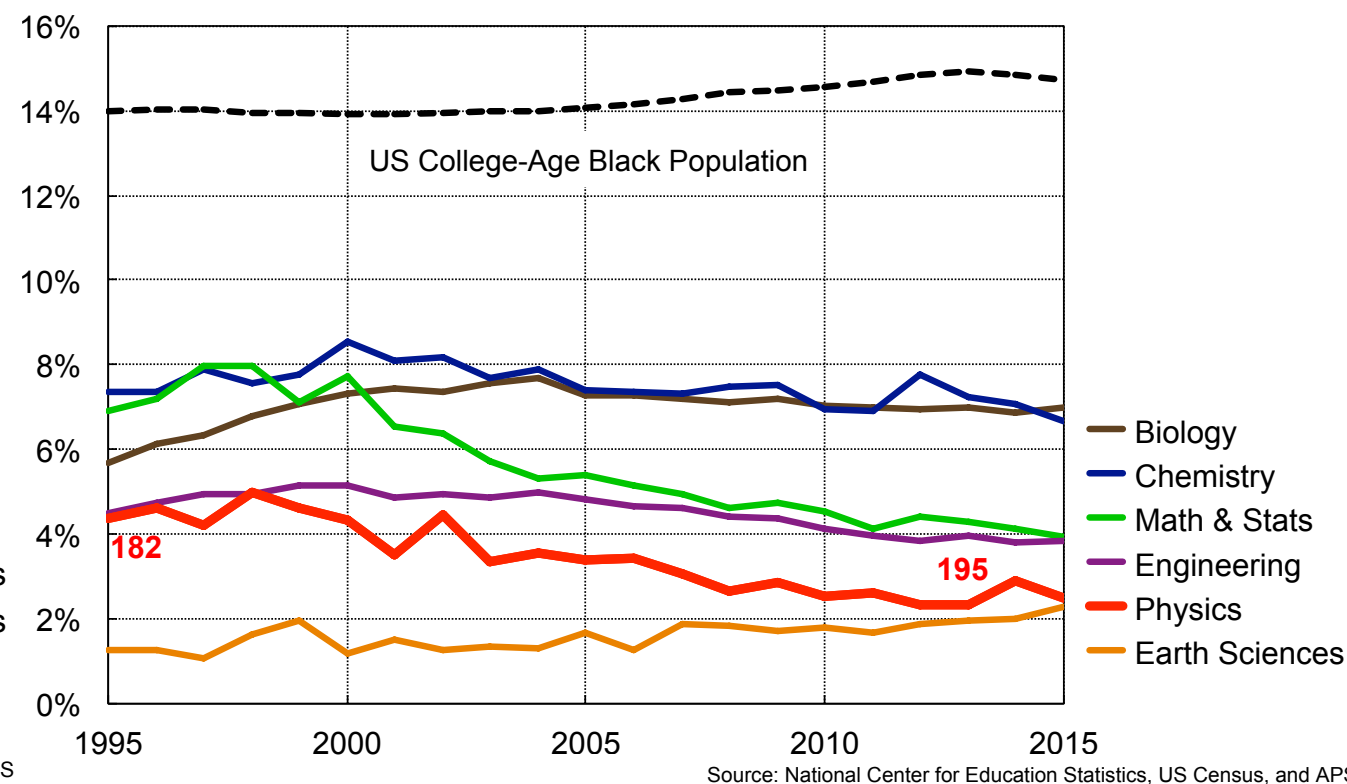
BS earned by URM student

- Hispanic American and African American physics BS accounts for 2-3% of earned degrees, respectively.
- Native American physics BS is roughly 0.5%.

Percentage of BS degrees earned by Hispanic Americans by major



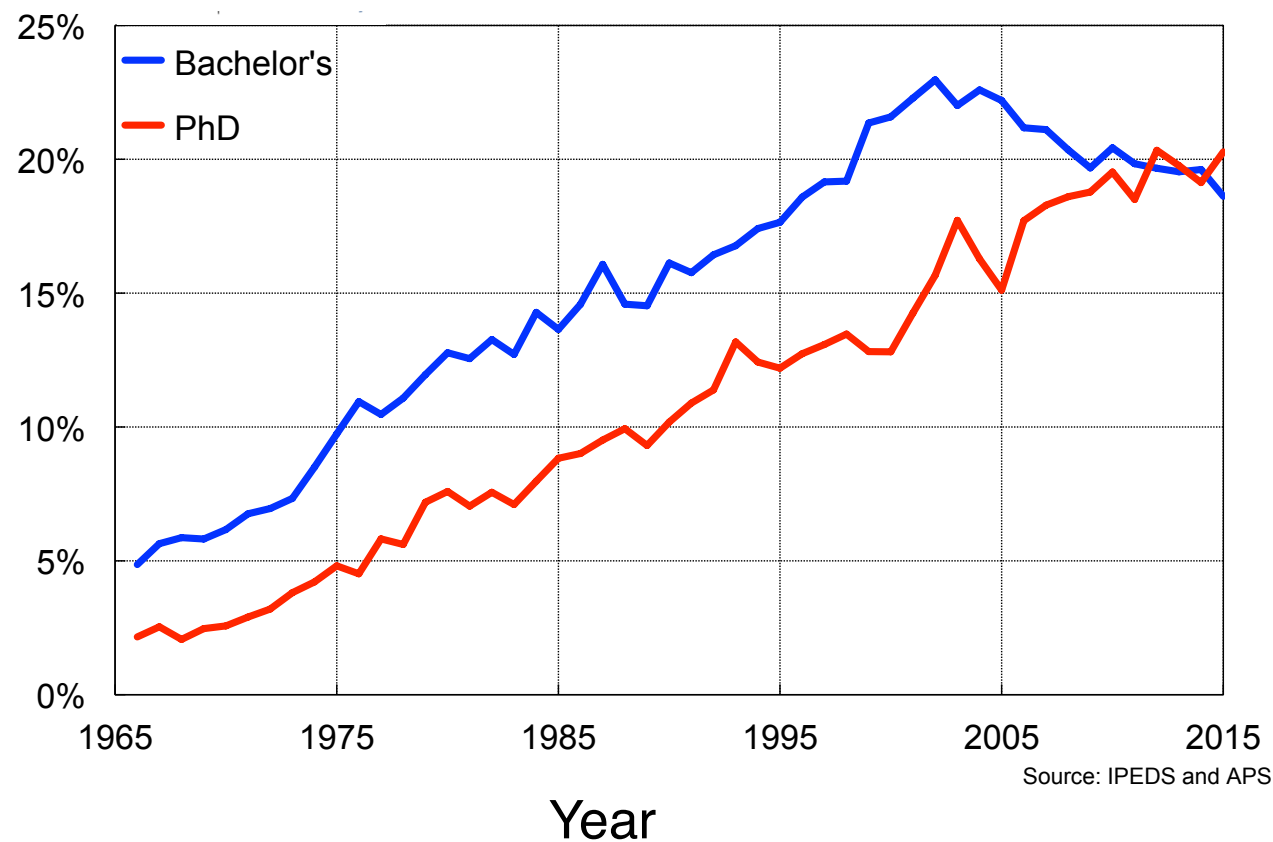
Percentage of BS degrees earned by African Americans by major



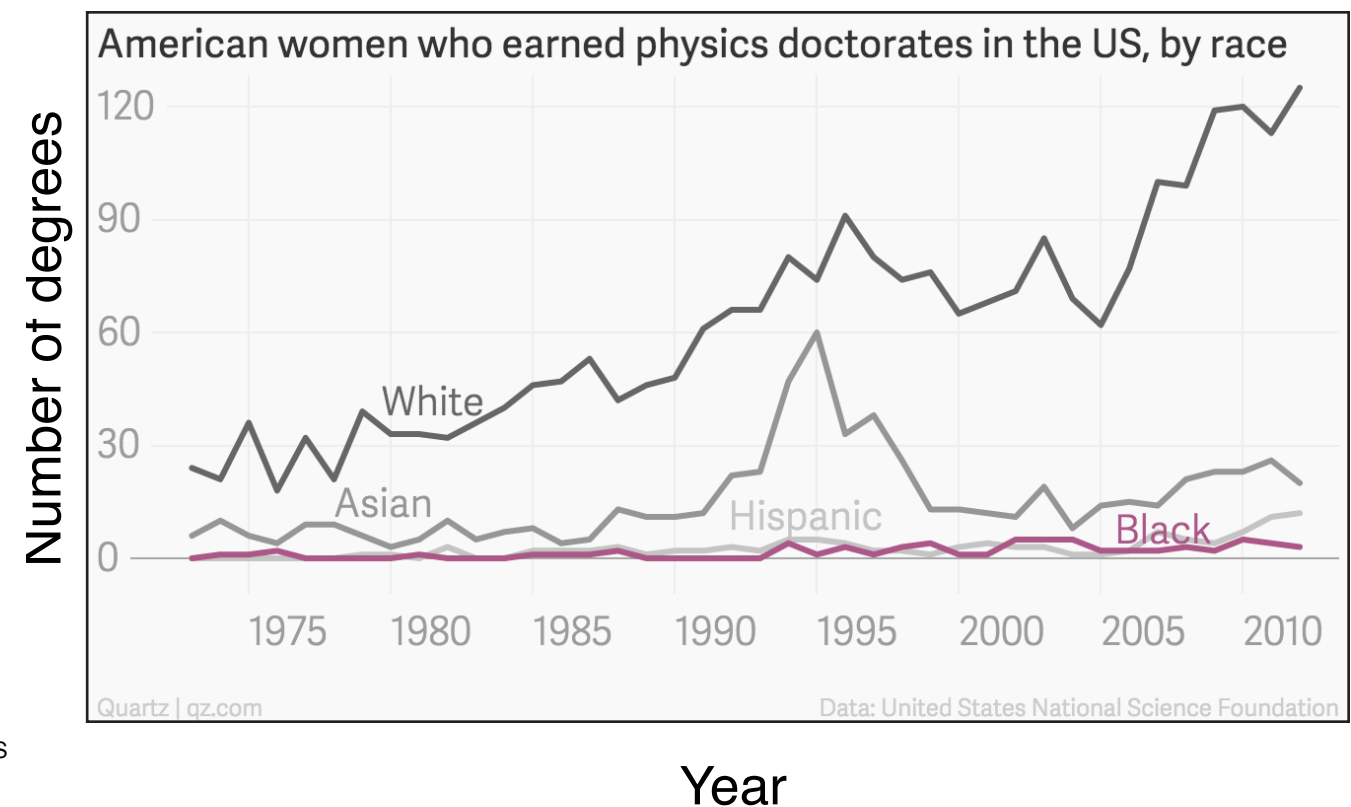
Participation of women

- Physics continues to be the least diverse of the sciences
 - Initiatives to increase the participation of women in physics has yielded positive results
- The increase of women in physics is mostly attributed degrees earned by white women

Percentage of women in physics



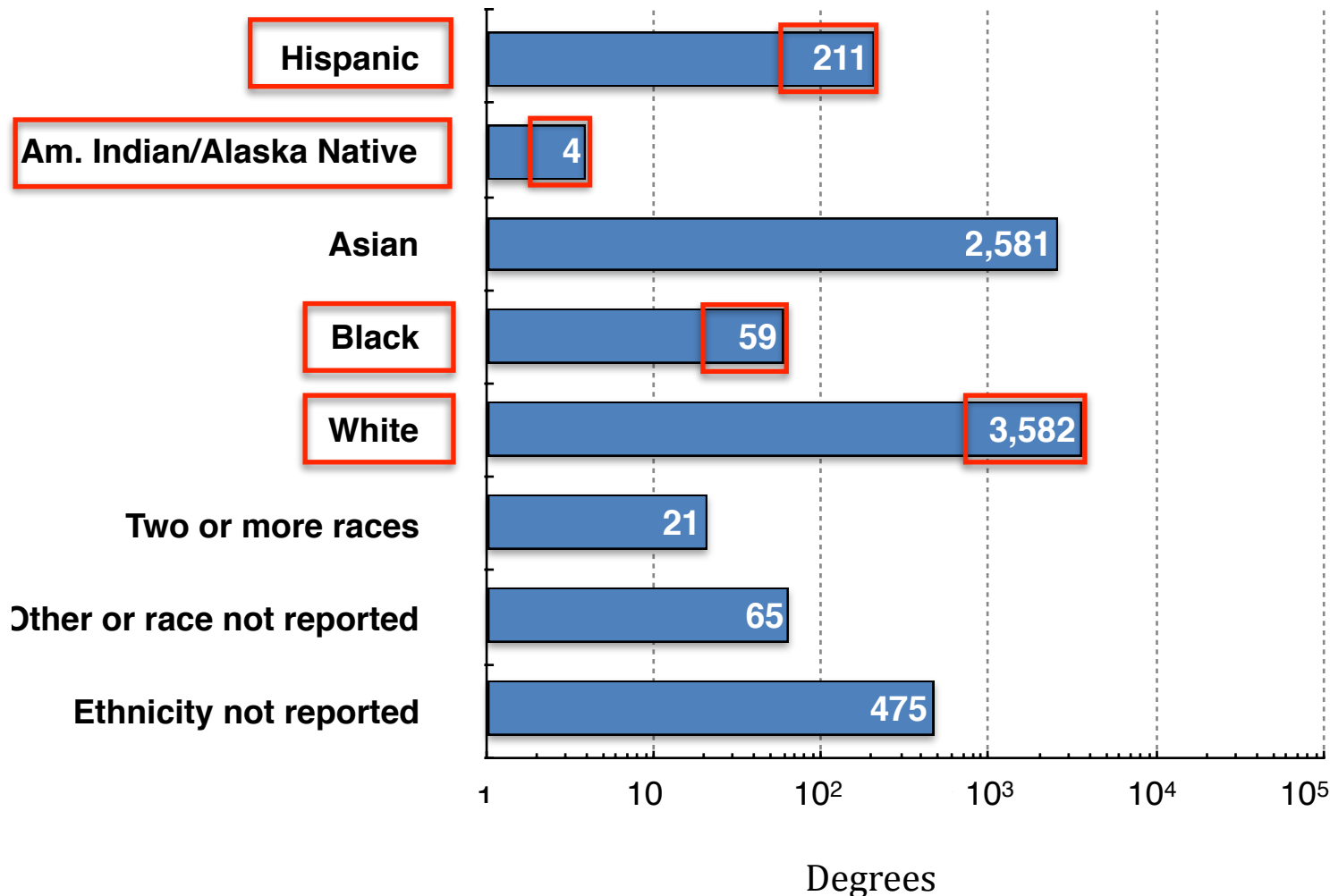
PhD degrees earned by women in physics by race



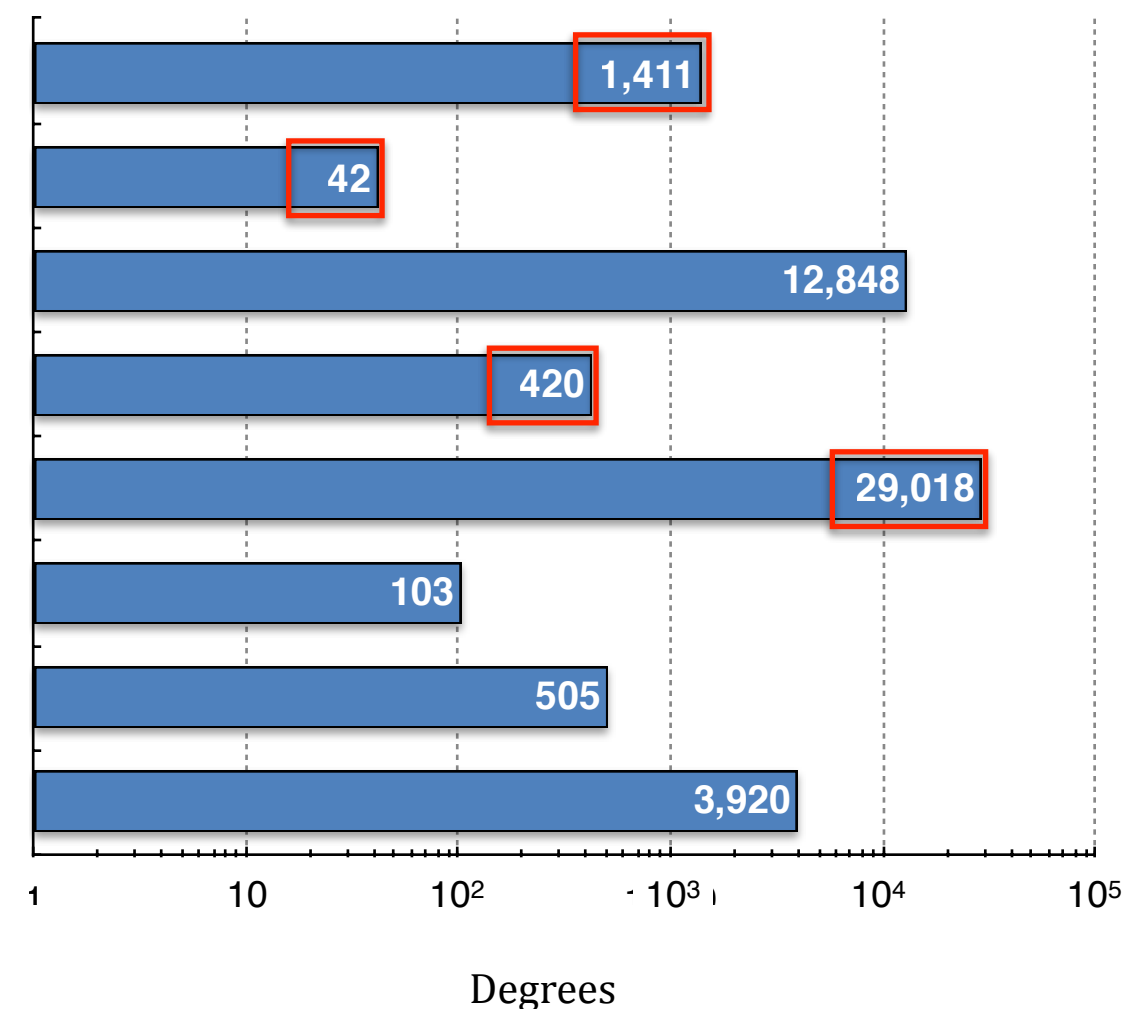
Put it in perspective

- Physics degrees earned in physics since 1973 can demonstrate the point
- Degrees earned by URM men and women of color are orders of magnitude below those of white men and women

Women who earned physics doctorates (1973-2015)



Men who earned physics doctorates (1973-2015)



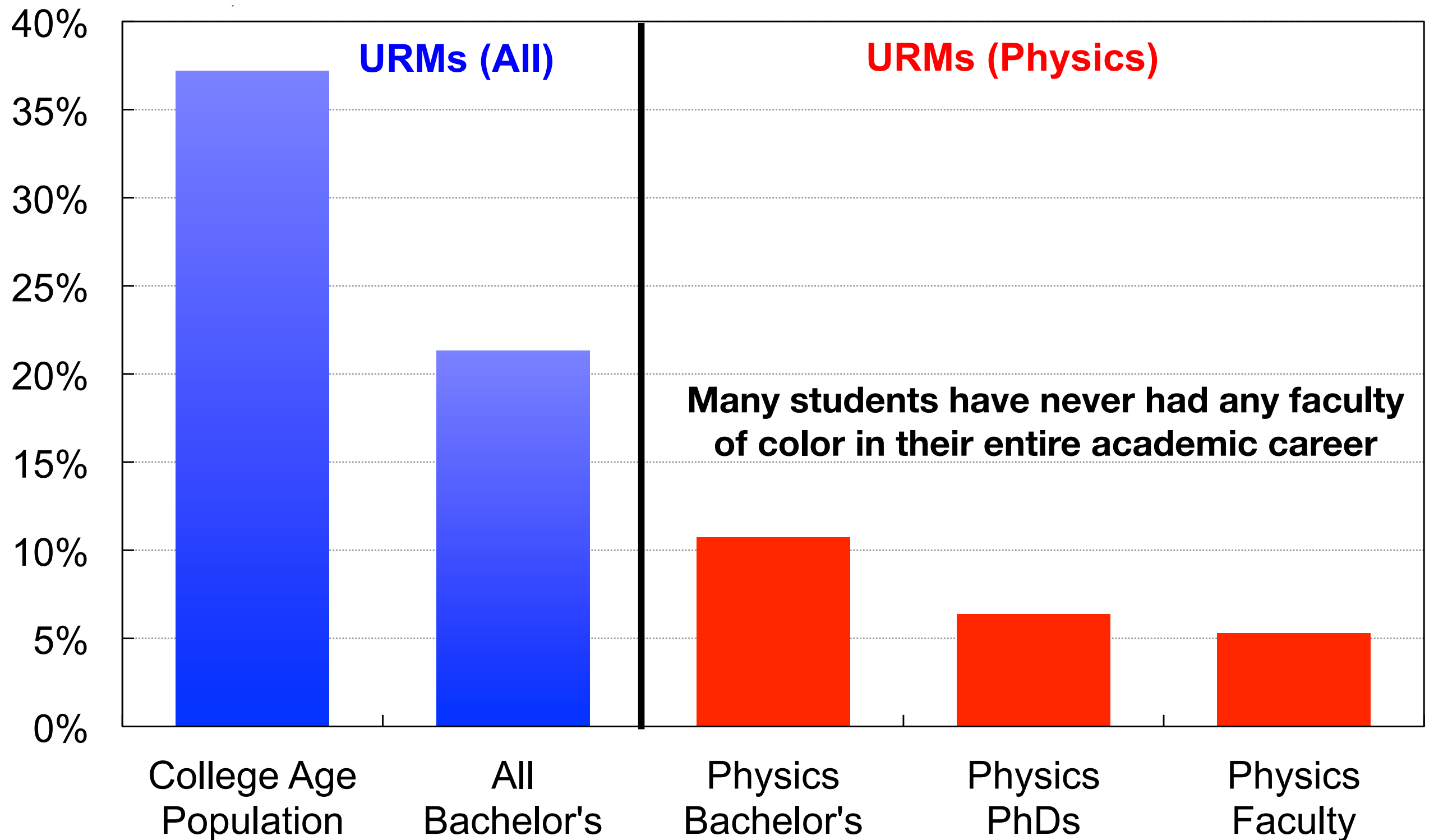
Put it in perspective

- Number of physics PhDs earned by black men is roughly 500 in US History
- Number of physics/astronomy/physics related PhDs earned by black women is roughly 100

This image highlights about 20% of ALL black women with a PhD in physics/astronomy in the US



Put it in perspective



Source: US Census, IPEDS, AIP, and APS

Guiding questions?

- Is the current level of representation for people from diverse backgrounds acceptable?
- *Hint: NO!*
- What can we as a community do to address it and make the change sustainable?

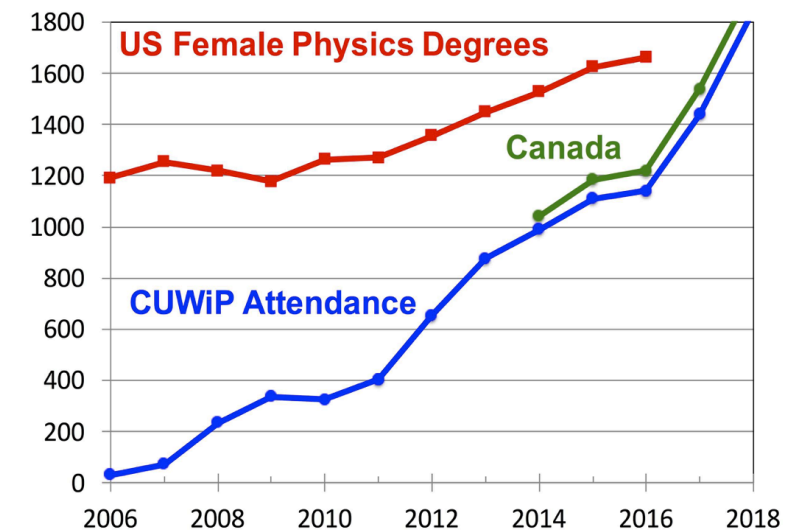
Strategies

- Broad community wide effort
 - *Individuals from marginalized groups are always tasked with fixing everything while doing their science.*
- What can you do to help?
 - *Stop sexual harassment in STEM*
 - *Learn and be involved; don't only care when its convenient*
 - *Advocate*
 - *Mentor*
 - *Recruit more diverse people*
 - *Implement policies that support inclusion and equity*

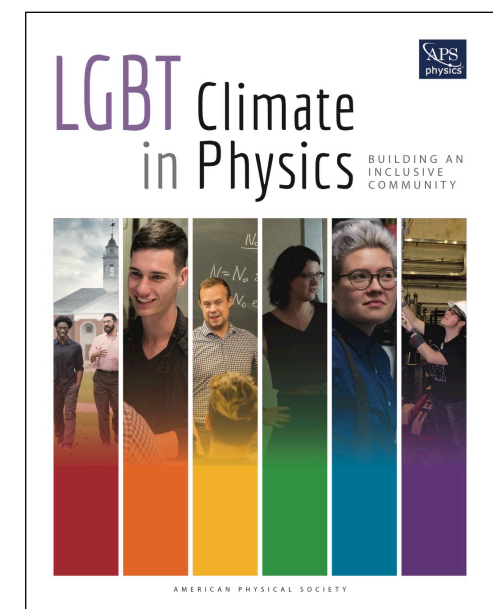
APS Education and Diversity programs



- Conference for Undergraduate Women in Physics (CUWiP)
- New faculty workshop, Professional skills workshop, Physics Chair meeting, and Graduate Education conference
- Joint Task Force on Undergraduate Physics Program report. (JTUPP)
- National Mentoring Community (NMC)
- LGBTQ+: Ad Hoc Committee on LGBT Issues (C-LGBT)
 - LGBT Climate in Physics report recommendations endorsed by APS council
- APS Bridge Program



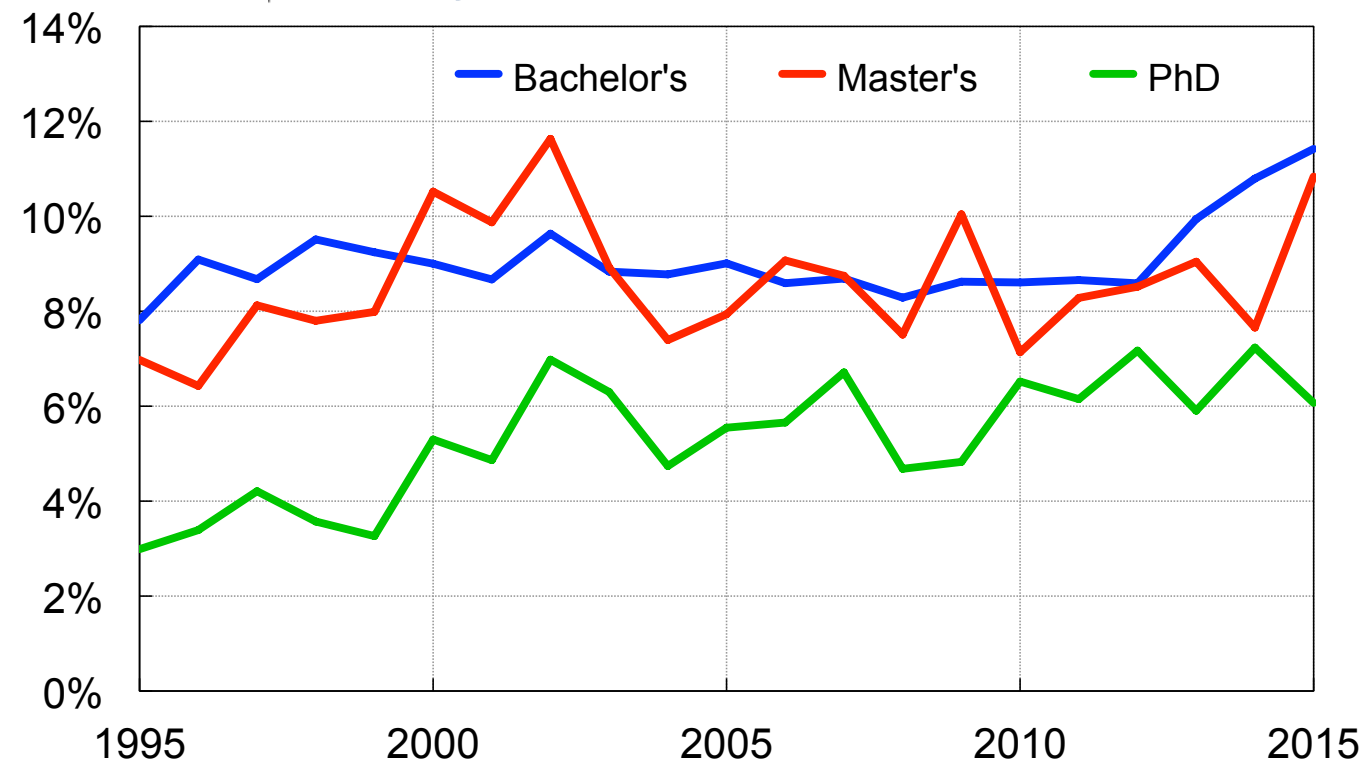
- Participation tripled since APS became administrative home



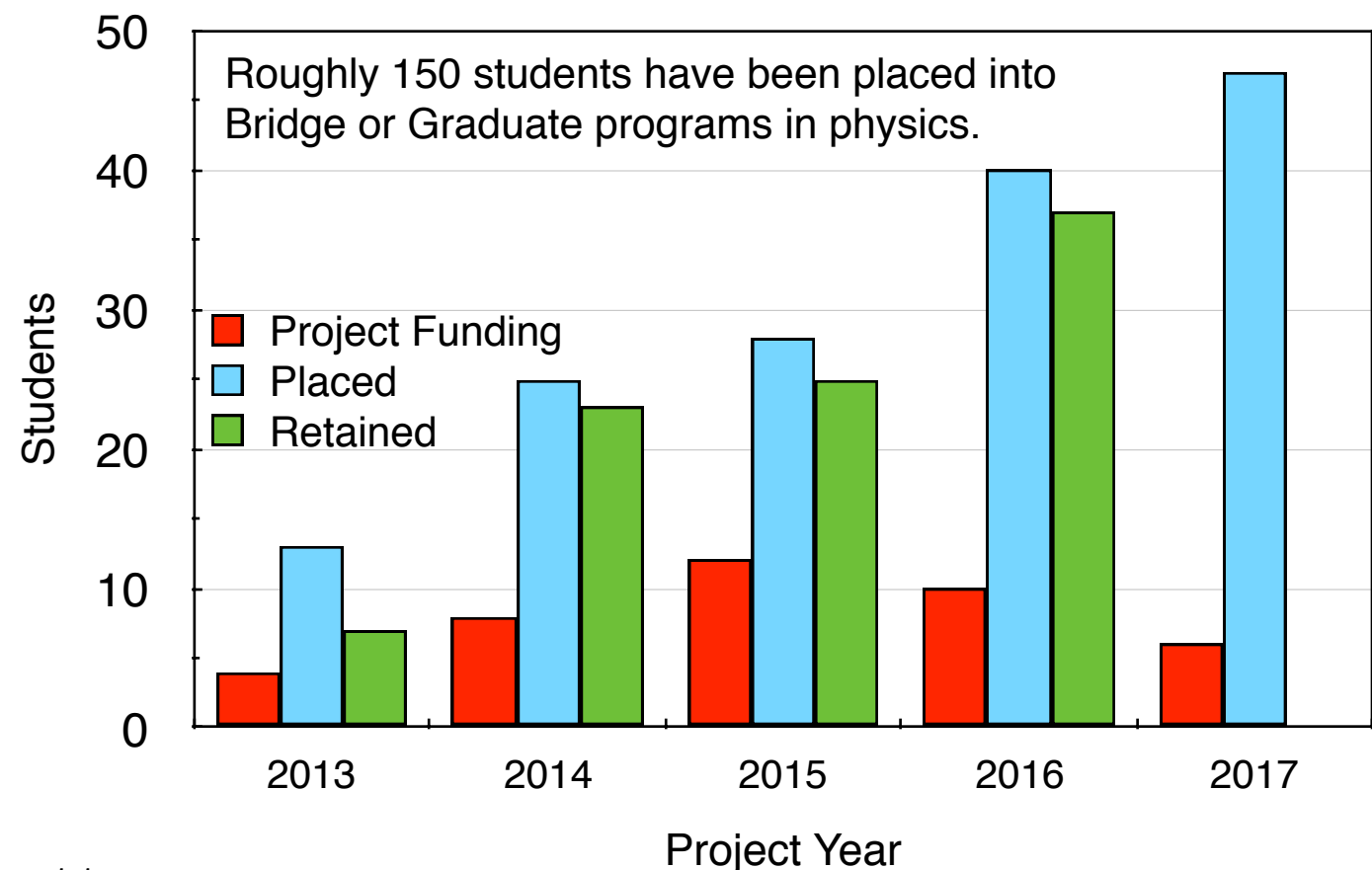
www.aps.org/programs/lgbt

APS Bridge Program

- Increase the fraction of PhDs earned by (URM) students to match the fraction of BS degrees
- Bridge Sites: 6 funded sites
- Student recruitment and selections
 - **Eligibility:**
 - *Must have a bachelor's degree in physics or closely related discipline*
 - *Be a U.S. citizen or permanent resident*
 - ***Applied to a physics graduate program but did not gain admission***
 - *Did not apply to graduate program*



Source: IPEDS and APS



Roughly 150 students have been placed into Bridge or Graduate programs in physics.

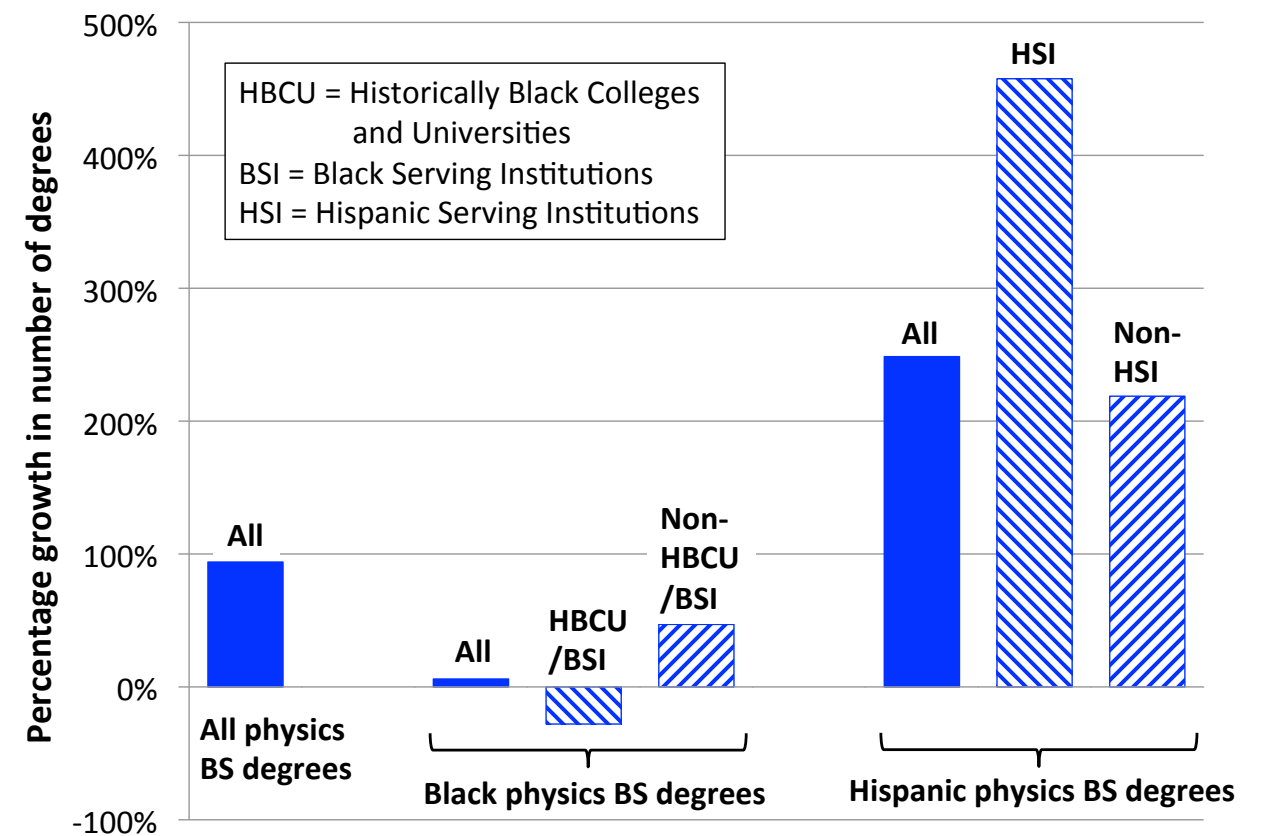
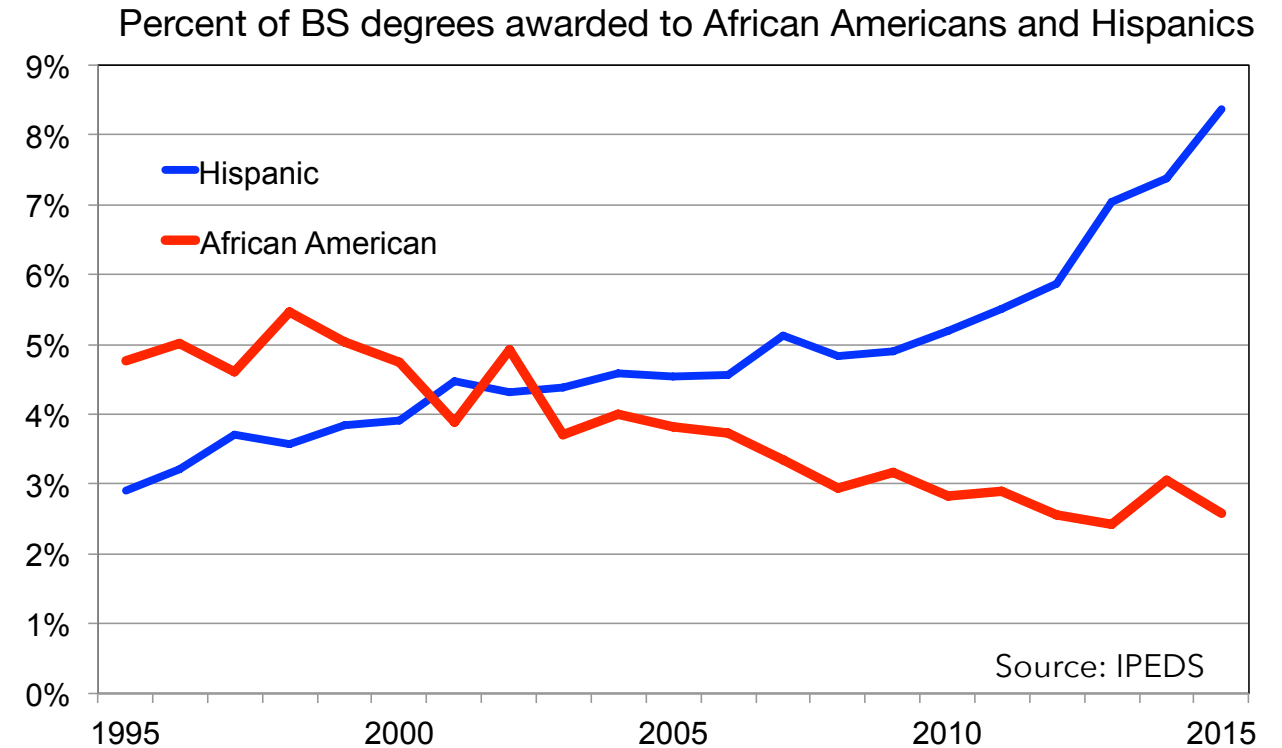
- Liaison Committee on Underrepresented Minorities (LCURM)
 - Composed of a designee from nine of the ten AIP member societies and from NSBP, NHSP, and SPS
 - It recommended that AIP take action to address low African American physics degrees
 - AIP formed a two-year funded Task Force to address this issue
- **TEAM-UP: Taskforce to Elevate the African AMerican Representation in Undergraduate Physics and Astronomy**

TEAM-UP

- **TEAM-UP: Taskforce to Elevate the African AMerican Representation in Undergraduate Physics and Astronomy**
 - *Formed fall 2017 to examine and assess the reasons for the persistent underrepresentation of African Americans in physics and astronomy (BS level)*
- Long term goal:
 - *Through broad community based efforts we aim to bring the percentage of African American physics & astronomy BS to parity with their overall graduation rate (from 4%—>9%)*
- Produce a report that will include (~fall 2019)
 - *Findings from our study*
 - *Institutional case studies featuring innovative programs and student narrative*
 - *Evidence based, actionable recommendations*

TEAM-UP Motivation

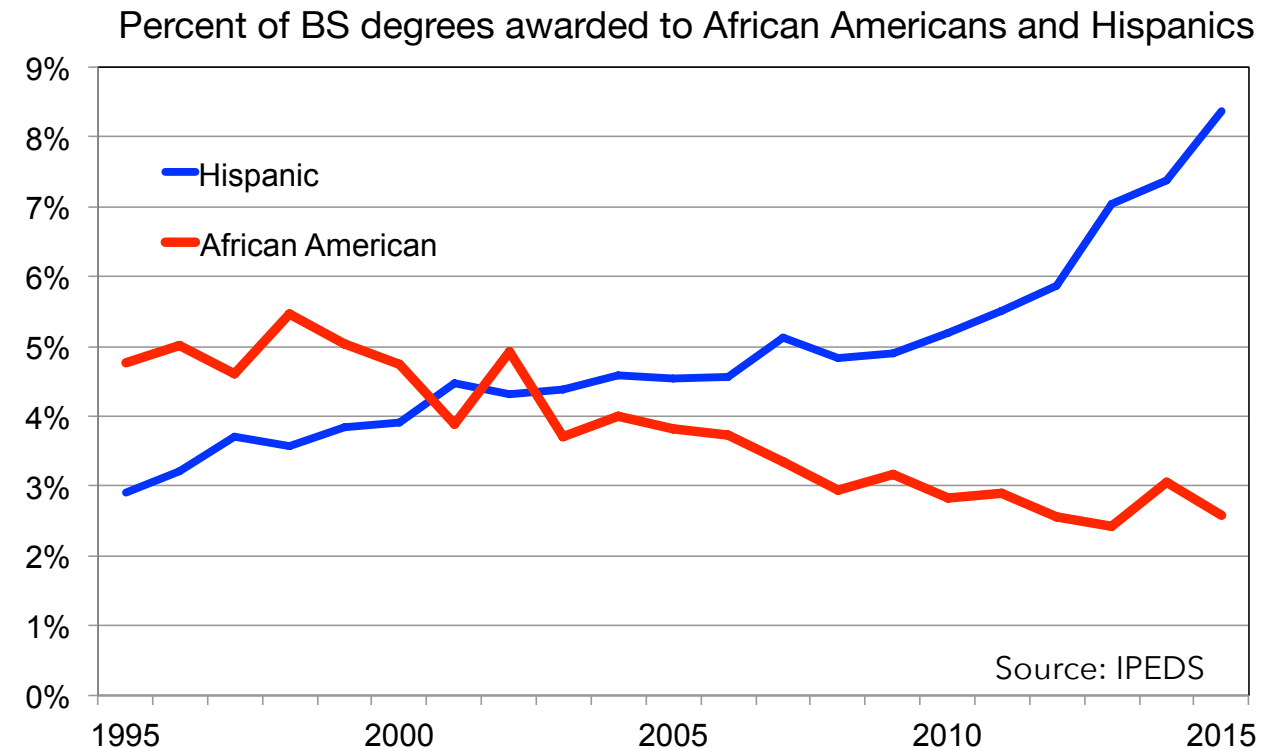
- Number of physics BS earned continues to increase
- 130 % increase since 1999 low
- African Americans are 15% of college students, and there was ~10% increase in overall BS (2003-2013)
- Percentage of physics African Americans BS continues to be low (2-4%)
- Physics and astronomy is not benefitting from growth in African American degrees



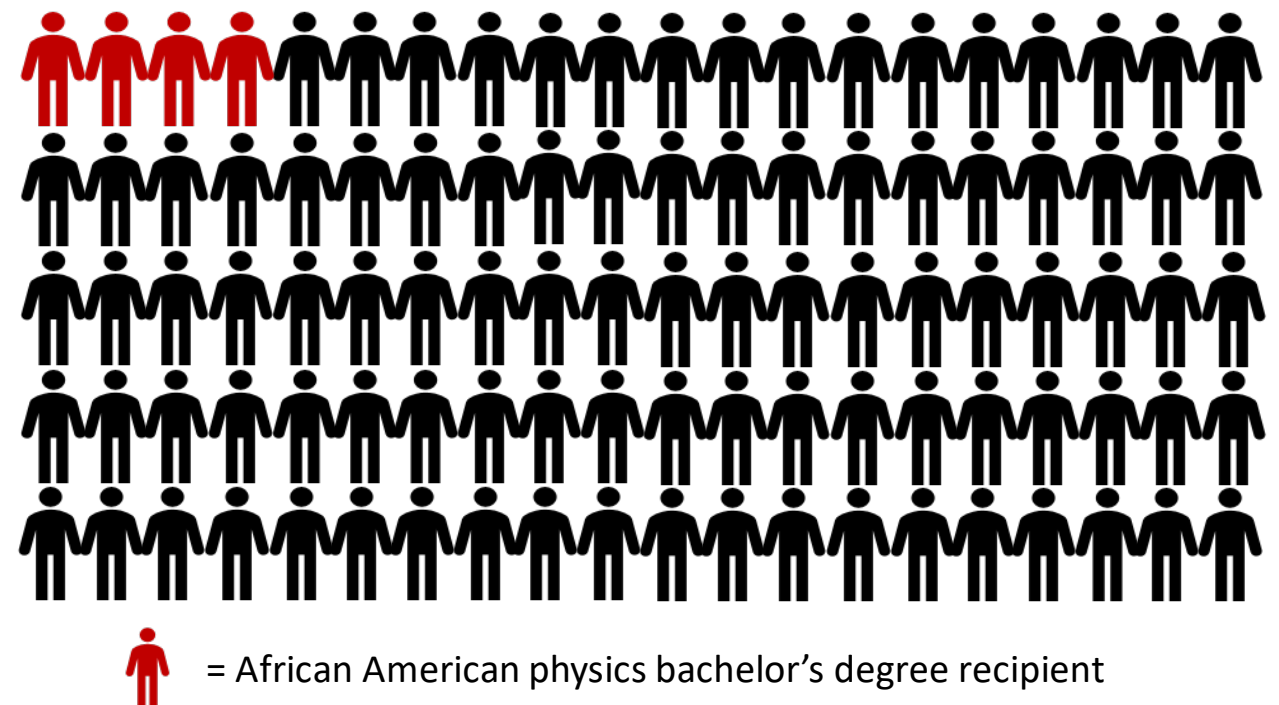
Source: IPEDS, APS

TEAM-UP Motivation

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Fraction of African American physics bachelor's degrees awarded in 2016 from 742 physics departments



TEAM-UP Members



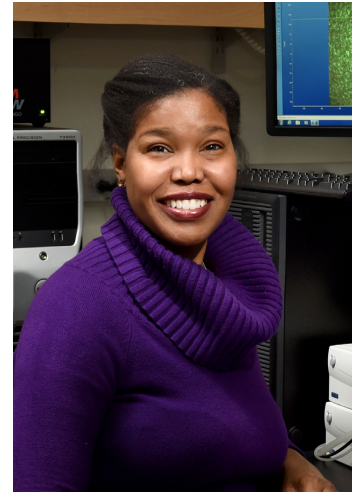
Chair: Mary James
Reed College



Brian Beckford
Univ. of Michigan



Ed Bertschinger
MIT



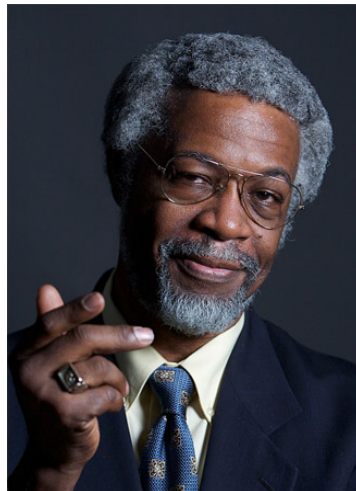
Tabbetha Dobbins
Rowan Univ.



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Arlene Modeste-
Knowles
Project Manger



S. Jim Gates
Brown Univ. .



Jedidah Isler
Dartmouth College.



Mia Ong
TERC



Arlisa Richardson,
Chandler-Gilbert
Community College



Quinton Williams
Howard Univ.



"Bo" Hammer
AIP Senior Director

Activities

- Learn from prior research
- Student experience
 - [Survey](#) and interview African Americans that persisted to BS
 - *90/117 survey respondents identified as African American*
- Department survey
 - Survey departments from which large number African Americans have graduated
- Site visits (~5-9 departments)
 - Conduct site visit to “high-producing” physics & astronomy programs
- Engage pilot departments to implement Task Force recommendations

How can you help?

- Distribute [survey](#) to African American students
- Share information with Task Force on innovative programs that have increased African Americans undergraduate participation
- Share with us your ideas for solving this problem

Resources

- AIP TEAM UP: www.aip.org/TEAMUP
- AIP Statistical Research Center: aip.org/statistics
- APS Bridge Program: www.apsbridgeprogram.org
- [National Academies of Science report on Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine \(2018\)](#)
- LGBT+ Inclusivity in Physics and Astronomy: [A Best Practices Guide](#)

AIP TEAM-UP Project Staff:

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Philip “Bo” Hammer, AIP Senior Director

Contact us: TEAMUP@aip.org, 301-209-3164

More Information: www.aip.org/TEAMUP

Change will not come if we wait for some other person or some other time. We are the ones we've been waiting for. We are the change we seek.

-Barack Obama

Supplemental

American Physical Society (APS)

- Committees

- Committee on Status of Women in Physics (CSWIP)

- Committed to encouraging the recruitment, retention, and career development of women physicists at all levels.*

- Committee on Minorities (COM)

- Committed to addressing the production, retention, and career development of minority physicists and gathers and maintains data on minorities in physics in support of these objectives*

- Committee on Education (COE)

- Units

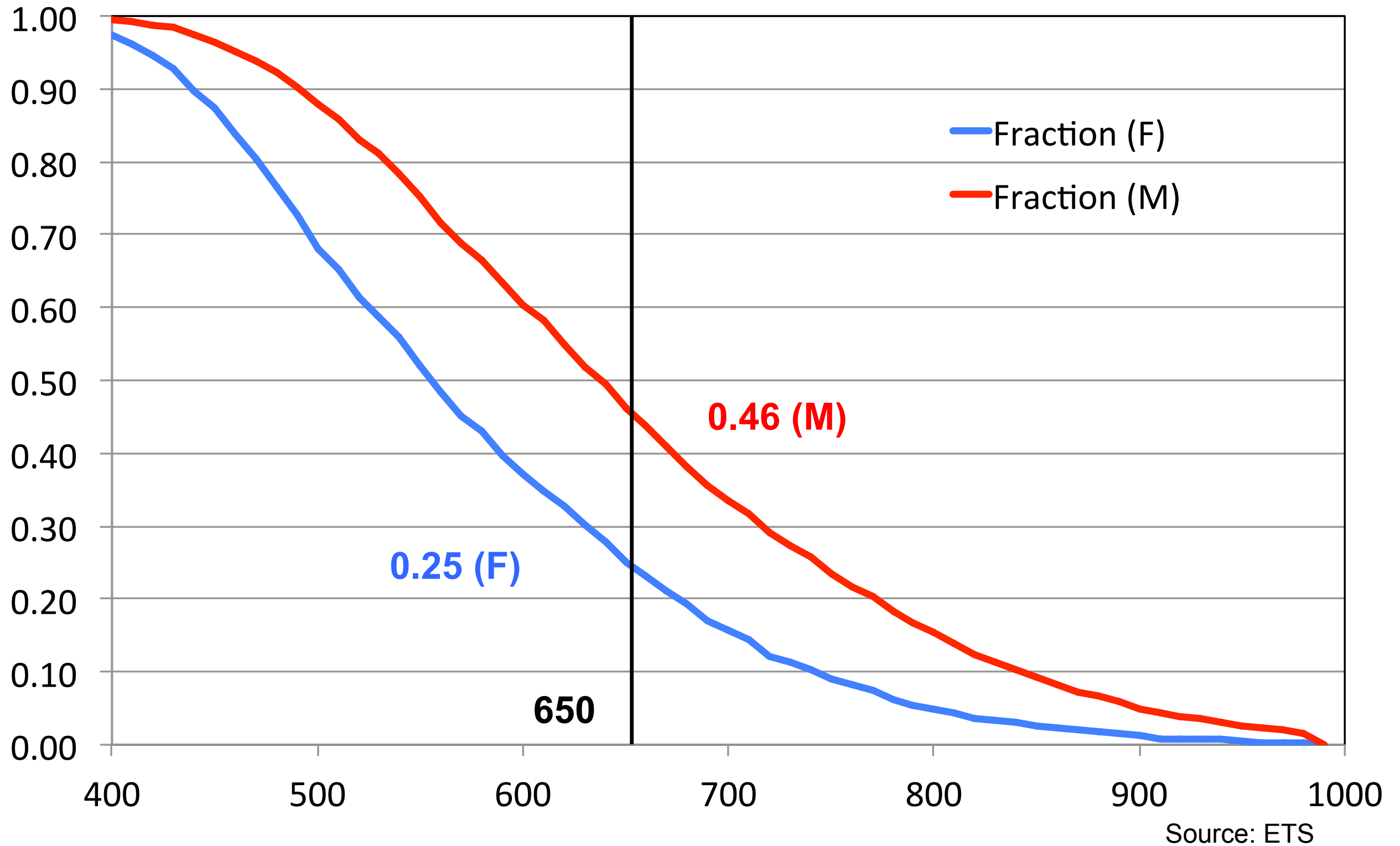
- Forum on Education (FED)

- Forum on Graduate Student Affairs (FGSA)

- Forum on Diversity and Inclusion

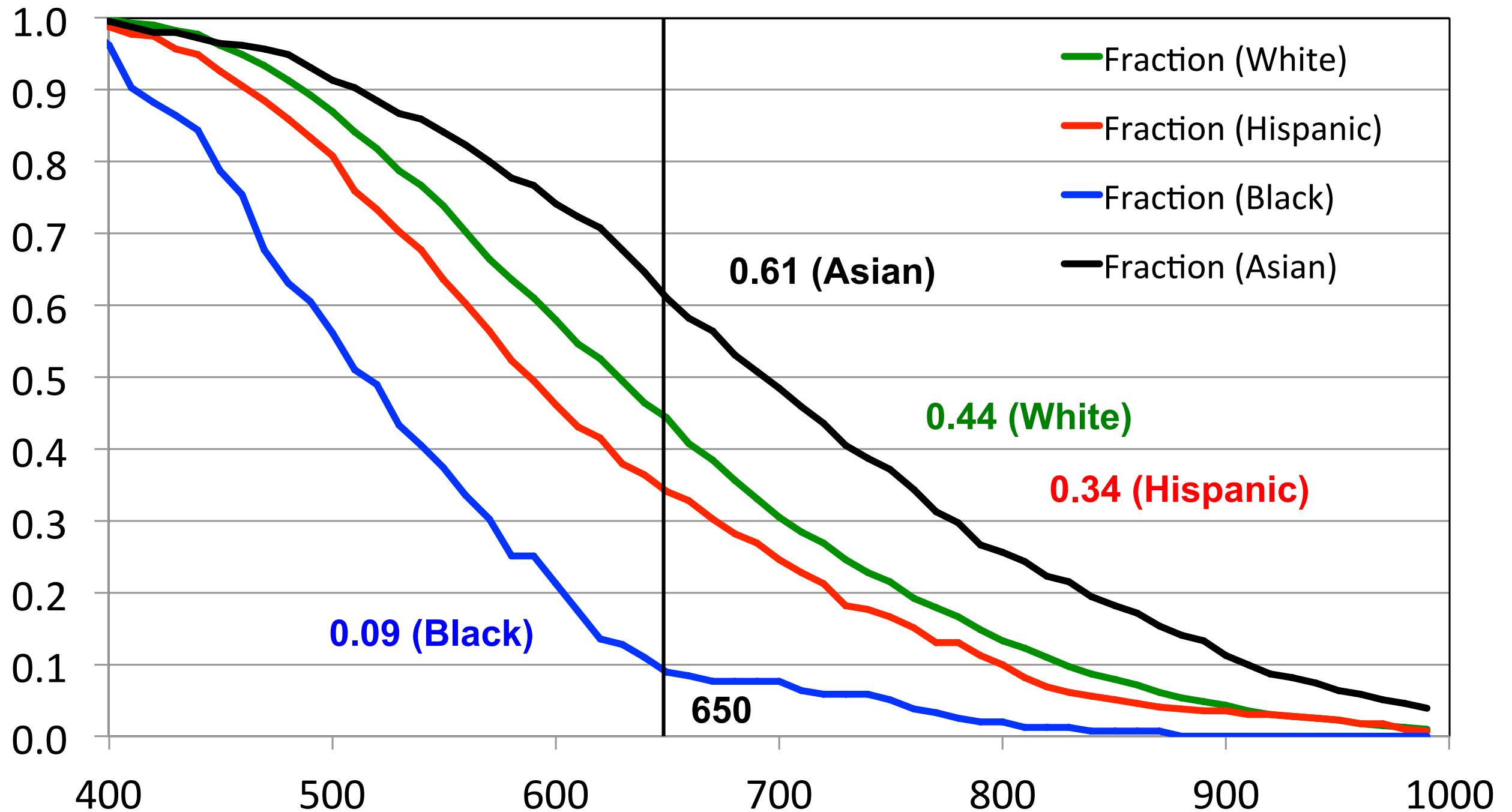
- Topical Group on Physics Education Research (GPER)

Physics GRE cutoff on admissions



Miller, C. & Stassun, K.G. (2014). A test that fails: A standard test for admission to graduate school misses potential winners, *Nature Careers* 510, 303 [http://www.nature.com/nature/journal/v5 ... -303a.html](http://www.nature.com/nature/journal/v5...-303a.html)

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