

Diversity, Equity, and Inclusion in Physics

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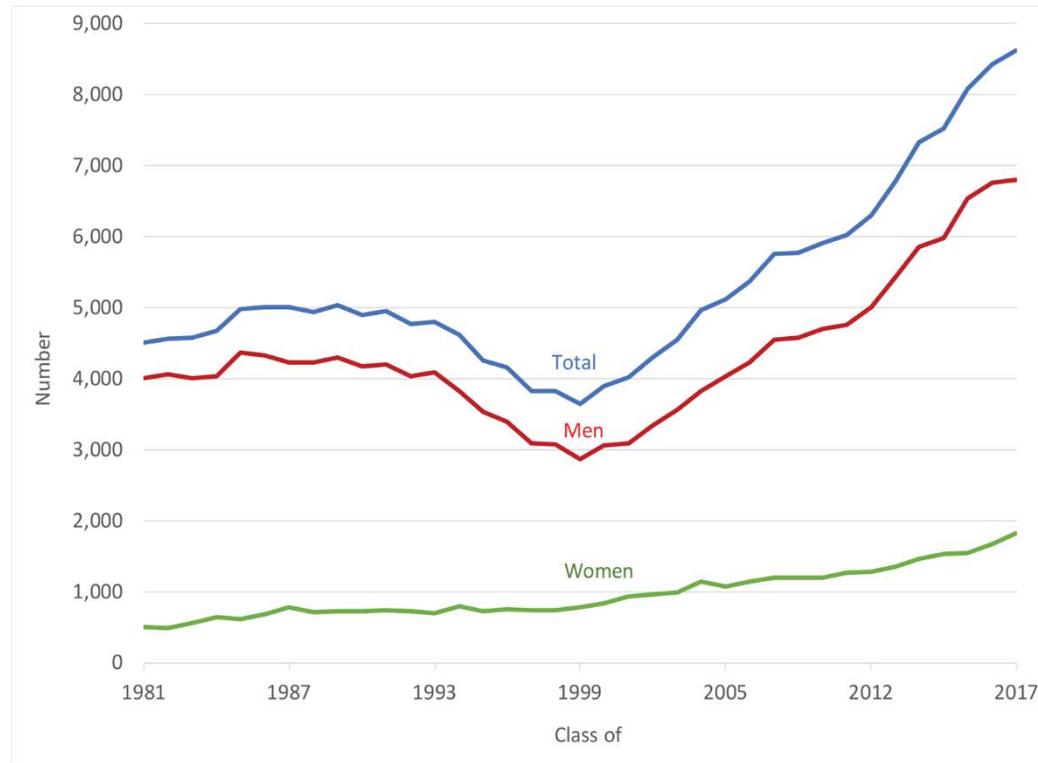
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Overview

- The Numbers
- Definitions
- Specific Suggested Actions
- Student Voices

The Physics Bachelor's Degree Landscape

Number of Bachelor's Degrees Earned in Physics,
Classes 1981 through 2017.



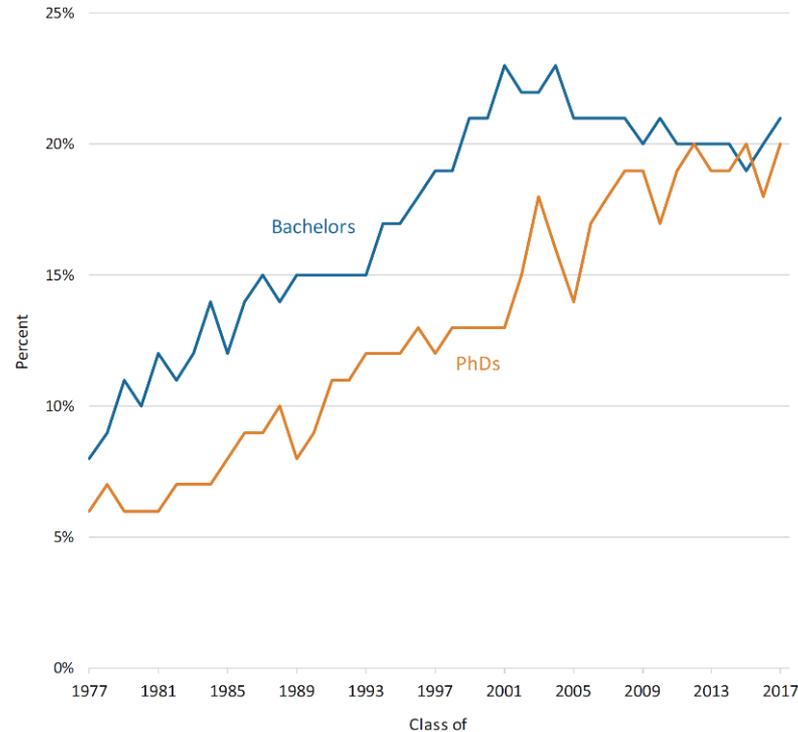
AIP | Statistics

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Women Physics Bachelors

Percent of Physics Bachelors and PhDs Earned by Women,
Classes of 1977 through 2017



Source: AIP Statistical Research Center, Enrollments and Degrees Survey.

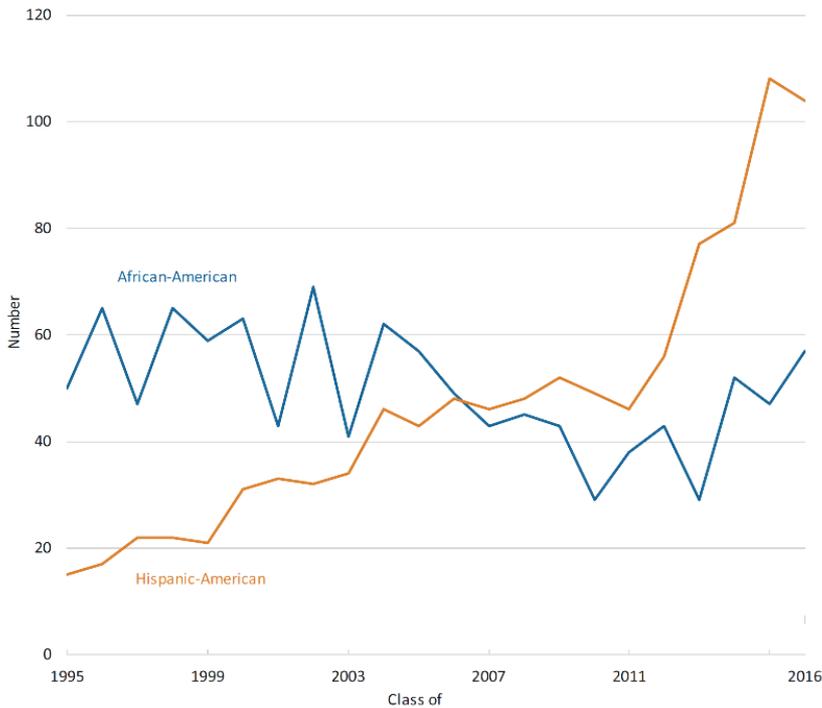
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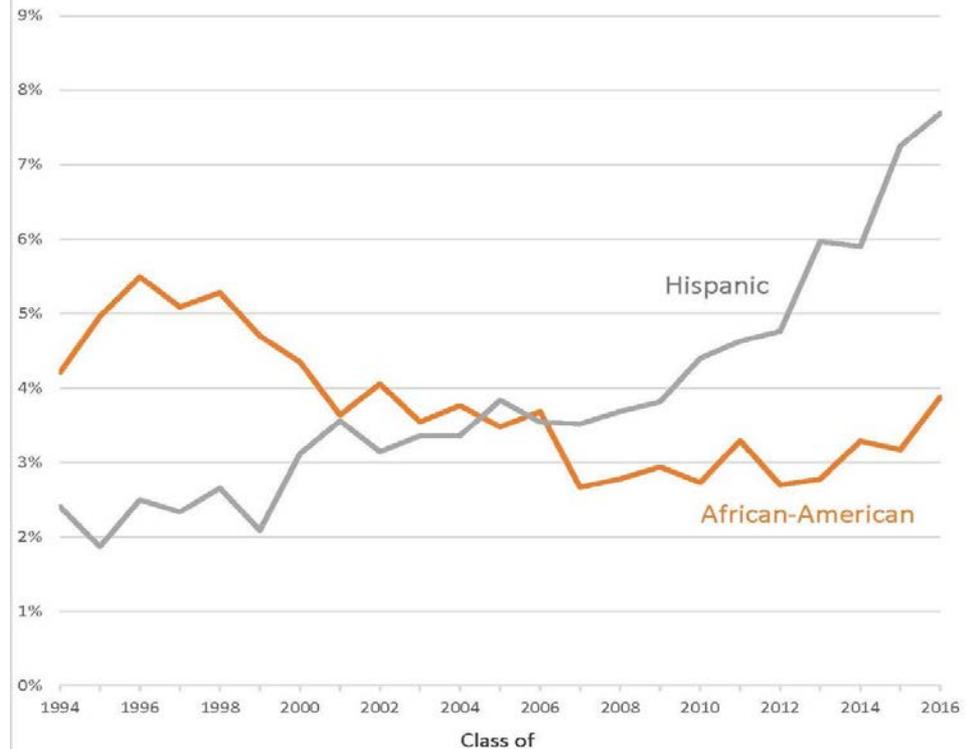
African Americans and Hispanics Among Physics Bachelor's Degrees

African Americans and Hispanic American Women Receiving Physics Bachelors Degrees, Classes of 1995 through 2016



Source: NCES IPEDS Completions Survey.

The Proportion of Physics Bachelor's Degrees Awarded to African-Americans and Hispanics.



Source: AIP Statistical Research Center

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TEAM-UP

The AIP National Task Force to Elevate African American Representation in Undergraduate Physics & Astronomy



AIP

For every 100 physics bachelor's degrees awarded at 742 physics departments in 2016, only **FOUR** went to African Americans ...



Follow us on Twitter:

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Twitter Chat series
#TEAMUPTalks

Mission

To examine and assess the reasons for the persistent underrepresentation of African Americans in physics and astronomy at the bachelor's level

Task Force Activities

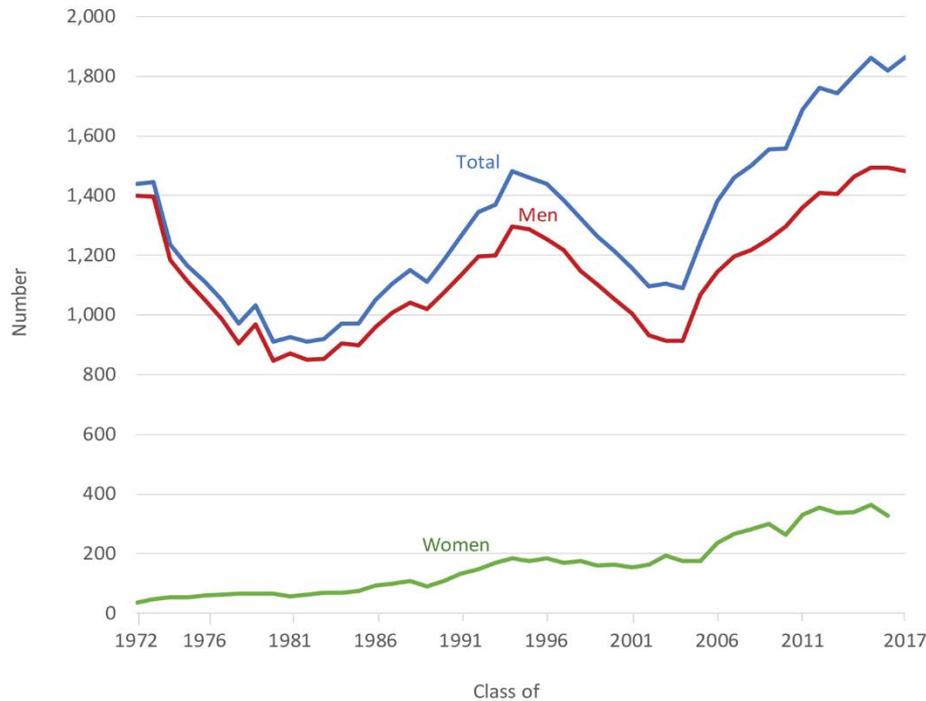
- Survey and interview African American undergraduates about their experiences
- Conduct site visits to higher-producing physics and astronomy programs
- Engage partner departments to inform and pilot Task Force recommendations
- Curate prior relevant research and initiatives to provide resources for broad-based community efforts
- Produce a detailed report of our findings and evidence-based recommendations for broad dissemination

To learn more contact TEAMUP Project Manager, Arlene Modeste Knowles, (aknowles@aip.org) or visit our website: www.aip.org/TEAMUP

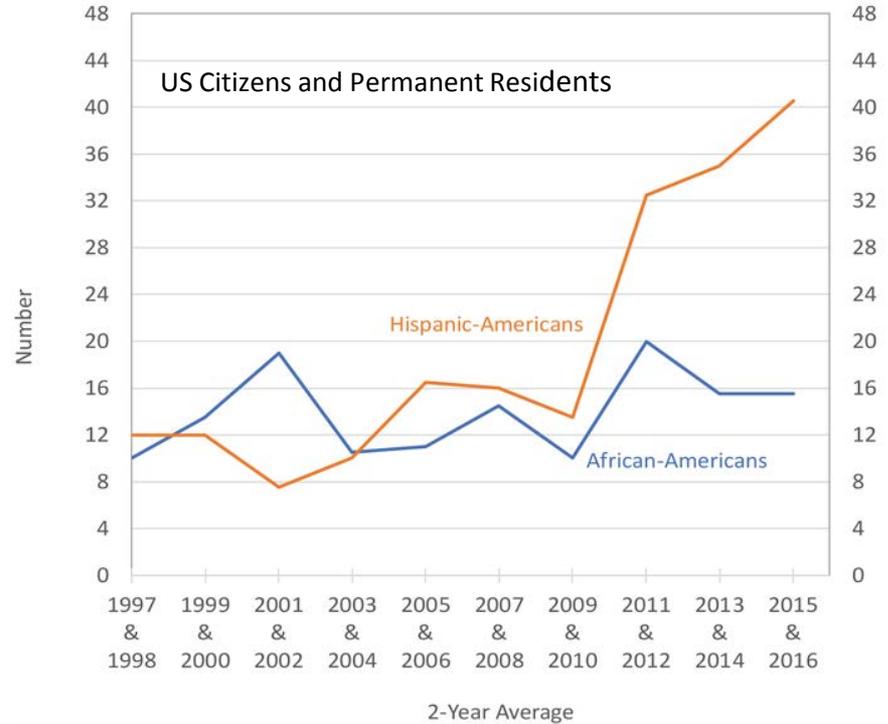
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PhDs in Physics

Number of Doctorates Earned in Physics, Classes 1972 through 2017.



Number of Physics Doctorates Earned by African-Americans and Hispanic-Americans, Classes 1997 through 2016.



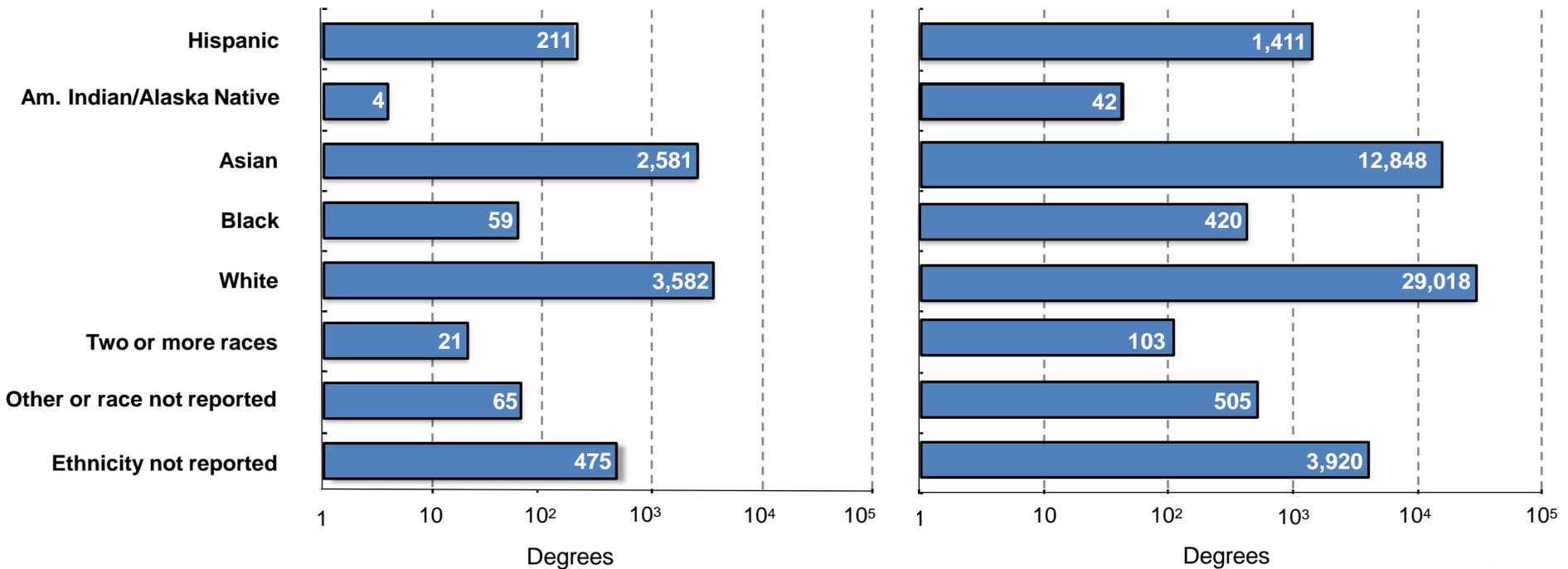
PhDs over time: Another perspective

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

Women who earned physics doctorates (1973-2015)

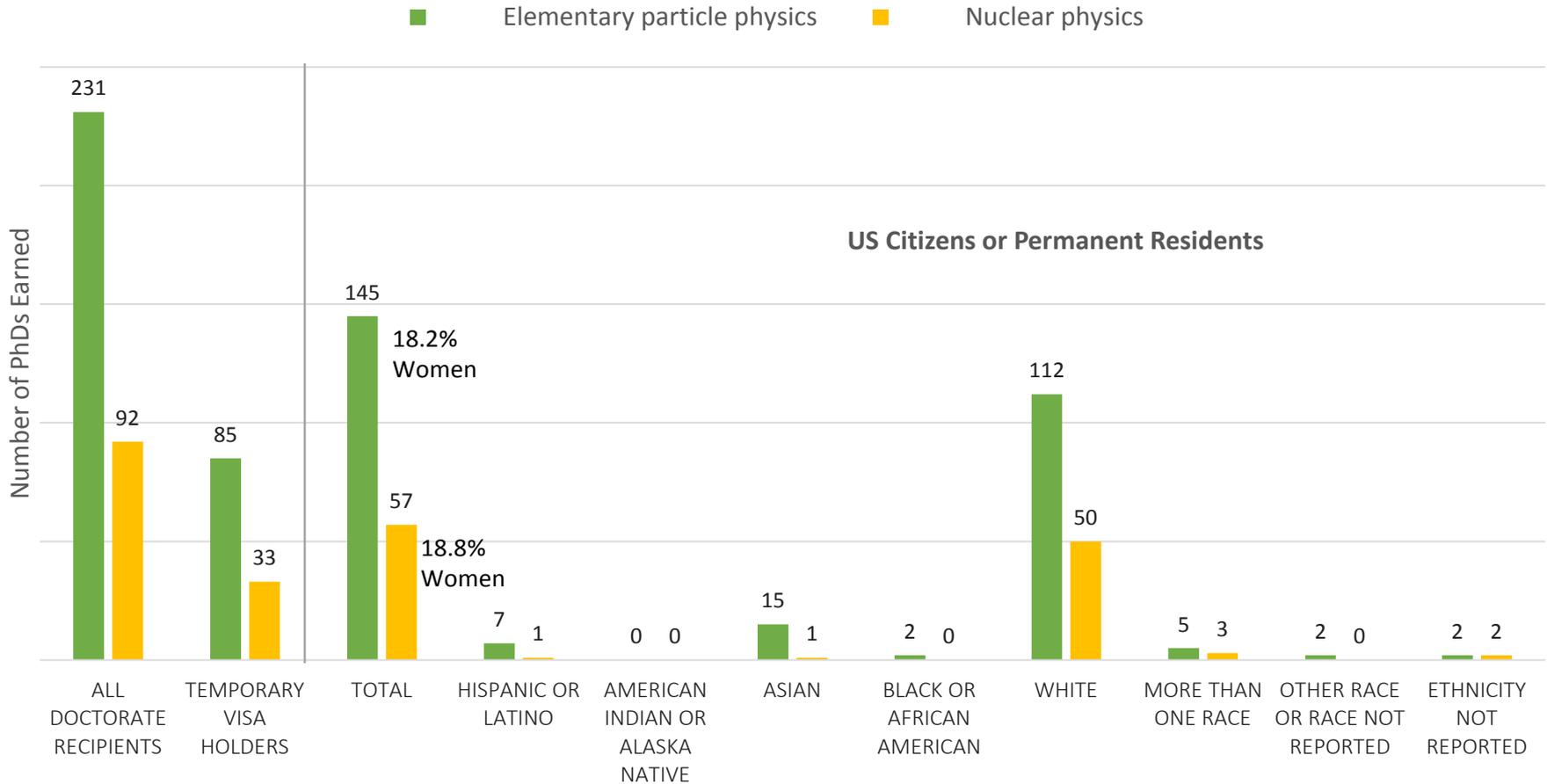
Men who earned physics doctorates (1973-2015)

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High Energy PhDs Earned By Race- 2016



NSF Survey of Earned Doctorates - 2016

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Presence of URM Faculty

Number of Physics Departments with African-American and Hispanic Faculty by Highest Degree Awarded, 2016

Number of Departments that have ...	PhD	Master's	Bachelor's	Total
<u>Both</u> African-American and Hispanic Faculty	25	7	3	45
African-American Faculty and <u>no</u> Hispanic Faculty	25	8	53	86
Hispanic Faculty and <u>no</u> African-American Faculty	75	20	61	156
<u>Neither</u> African-American nor Hispanic Faculty	76	22	365	463
Total	202	56	492	750

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A physics meeting in 2015



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DEI - Some Definitions

Diversity

All the ways in which people are different. Bringing together people of diverse identities and abilities along multiple axes

Equity

Recognizing that all people are not afforded the same access and opportunities as others and working to eradicate barriers to success

Inclusion

Creating an environment where differences are welcomed valued, respected, and all are invited to fully participate.

What's the Point of Diversity & Inclusion?

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"We need to focus on diversity. Your goal is to hire people who all look different, but think just like me."

← Less This

More This →



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So What Can You Do?

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So What Can You Do to Foster Diversity

- Don't use the Physics GRE to admit students

RESEARCH ARTICLE | SCIENTIFIC COMMUNITY

Typical physics Ph.D. admissions criteria limit access to underrepresented groups but fail to predict doctoral completion

Casey W. Miller^{1*}, Benjamin M. Zwickl², Julie R. Posselt³, Rachel T. Silvestrini⁴ and Theodore Hodapp⁵

+ See all authors and affiliations

Science Advances 23 Jan 2019:
Vol. 5, no. 1, eaat7550
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Article

Figures & Data

Info & Metrics

eLetters

PDF

Abstract

This study aims to understand the effectiveness of typical admissions criteria in identifying students who will complete the Physics Ph.D. Multivariate statistical analysis of roughly one in eight physics Ph.D. students from 2000 to 2010 indicates that the traditional admissions metrics of undergraduate grade point average (GPA) and the Graduate Record Examination (GRE) Quantitative, Verbal, and Physics Subject Tests do not predict completion as effectively admissions committees presume. Significant associations with completion were found for undergraduate GPA in all models and for GRE Quantitative in two of four studied models; GRE Physics and GRE Verbal were not significant in any model. It is notable that completion changed by less than 10% for U.S. physics major test takers scoring in the 10th versus 90th percentile on the Quantitative test. Aside from these limitations in predicting Ph.D. completion overall, overreliance on GRE scores in admissions processes also selects against underrepresented groups.

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So What Can You Do to Foster Diversity

- Recruit far and wide
 - Attend identity or affinity based scientific conferences
 - Build relationships with faculty and researchers in other institutions including MSIs
- Check for your biases - implicit.harvard.edu
- Employ Strategies that mitigate bias in selecting students, award recipients, prospective employees, etc.

So What Can You Do to Foster Diversity

- Understand that increasing diversity DOES NOT MEAN lowering standards!!

So What Can You Do to Foster Inclusion?

- Hire researchers or admit students for the culture you wish to create
- Speak up when lewd, rude, sexist, racist, or otherwise inappropriate behavior is witnessed
- Recognize exclusionary behavior from student peers
- Get some training to become a culturally aware mentor - nrmn.wpengine.com/research-mentor-training/
- Learn about microaggressions, unconscious bias, stereotype threat, and imposter syndrome

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So What Can You Do to Foster Inclusion?

- Share your struggles as a student with your students
- Acknowledge the work of others who are typically marginalized in physics spaces
- Recognize isolation in your students and colleagues and find resources to combat it

Student Voices

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Student Voices – Representation Matters

On attending an HBCU...

When you go to different institutions, sometimes you don't get that representation. You don't get that feeling of, "Oh yeah. This is exactly what I can do" because...sometimes the people don't look like you. Well, when they don't look like you it's like, "All right. Well, I'm in this community and I already know I'm underrepresented." It's sometimes overwhelming, and so I think at [HBCU], that's one of the great aspects of just being able to talk to your teachers and they're African American, being able to talk to the students and they're African American. Be able to go around and talk to people and you feel represented.

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Student Voices - Isolation

I go to a predominantly white institute. I'm a junior and I've only had two other black students in my classes. [In] only two classes I have had another black student. Not the same black student. Most of my classes I'm the only black person, the only black woman and you're surrounded by a lot of white men who think they know everything, who try to argue with the teacher and so when you try to make a point it is sort of hard to have your voice out there. To them it's not intentional because they are so used to being able to have their way. To me it's sort of difficult to make your way in there. I was lucky enough to have a white friend who introduced me to them, which...I really didn't appreciate, but I [came]to appreciate in the end because they started to connect with me more. But definitely [during my] freshman year it was just really daunting, because there was not anybody else to talk to.

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Student Voices – Bias Among Peers

Let's say the biggest obstacle that I had was directly after my summer REU. For context I went to [An Ivy League school]....Another student apparently who applied for the same REU...was convinced that I got in and he didn't because there was a racial bias in my favor. This student actually wasn't white, he was Indian. He wasn't the best student anyway, he even comes to me for help...So he had actively challenged me on this and that really bugged me because, for one, it's not true. Then for a couple of weeks, maybe even a couple of months after that I just started thinking. I started like really coming to terms [with what] if that were indeed the case and then I tried to make arguments in favor of and opposing that position. I think the conclusions I came to as a result, helped me more going forward.

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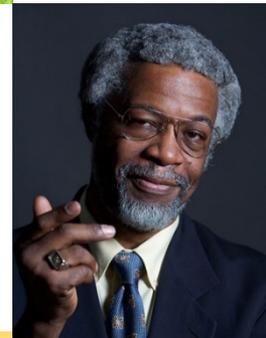
AIP TEAM-UP Members & Staff



AIP TEAM-UP Report

Coming in
January 2020!

www.aip.org/TEAMUP



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Questions?

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