

AIP

American Institute
of Physics



THE TIME IS NOW

Systemic Changes to Increase African Americans with Bachelor's Degrees in Physics and Astronomy: Mentoring Matters

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Community Conference 2020

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TEAM-UP Members (and Contributors)

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Photo taken at AIP Building. Not all TEAM UP members were present.

- University/College Faculty Member
- AIP Personnel
- Contributor (not AIP or university/college)

NMC and TEAM-UP have a lot in common

- Focus on creating successes for students from underrepresented minority groups at the Bachelor's degree level in Physics
- Takes an approach which is student-centered and strength-based
- Uses Social Science methodology and perspectives
 - Survey conducted in late spring/early summer of 2018 issued via



Mentor, Dean & Prof Mary James, Reed College (m.) pictured with NMC Mentees, Grayson Perez (l.) and Elizabeth Arellano (r.)

Image and Caption is from the NMC website

TEAM-UP Charge

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

Produce a **report** with evidence based recommendations for AIP Member Societies, physics and astronomy departments, and other stakeholders to increase the number and percentage of African American students obtaining bachelor's degrees in physics and astronomy

Mentoring Matters



TEAM-UP and NMC complementarity

TEAM-UP REPORT: 5 Factors

1. **Belonging** is essential for persistence and success
2. **Physics identity** increases persistence
3. **Effective teaching, Mentoring, and student-centered support (Academic Support)**
4. **Support** is needed to offset financial burdens and stress
5. **Sustainability** requires **leaders** to prioritize creating supportive environments, policies, and **structures**

NMC ACTIONS: Paired to 5 Factors

1. Pairs mentors in physics with mentees from Underrepresented groups
2. Provides resources for effective mentorship
3. Training on how to provide effective feedback to mentees (asset vs. deficit approach)
4. BEAM fund provides emergency support
5. Leadership Involvement (e.g. Chairs, Prof. Societies)

TEAM-UP brings...



- New excitement around this topic to the physics community– and hence, the opportunities for new Mentors and Mentees to join NMC.
- Topics for targeted mentor training¹
 - **asset-based approach** to mentoring
 - mentoring for student **support across cultures**
 - Critical Race Theory
 - developing new or utilizing existing **”Counterspaces”** for mentoring networks (peer to peer; faculty to student)

1. <https://www.nap.edu/resource/25568/interactive/>



My Journey as a Mentor

<http://users.rowan.edu/~dobbins/>



More Ideas-- Support for Mentors

- *Recommendation 3b* – “Departments should adopt policies and practices that encourage multiple faculty, including those who are not members of marginalized groups, to engage in formal and informal mentoring” (pg. 41)
- *Recommendation 5d* - “Lone champions can make a big difference for students, but their effort is unsustainable, making this an ineffective long-term strategy.” (pg. 51)
- *Recommendation 6d* – professional societies support of mentorship will help the faculty member by helping to shape the reward system (pg. 60)

CASE STUDY:

Using the TEAM-UP Report

I am a second year Assistant Professor at a PWI and have one Black (African-American) undergraduate student in my department. She is a freshman. I see her only during class periods and never outside of the classroom the way that I see other students, especially the juniors and seniors. During my class, she seems to always work alone (not with a group). She hands in assignments that are, most of the time, worth 60-70%. I see that she has potential to become a really good physicist, but she needs to connect with others and access departmental resources. What can I do to help?

CASE STUDY: Using the TEAM-UP Report

About the Student
(potential mentee)

I am a second year Assistant Professor at a PWI and have one Black (African-American) undergraduate student in my department. She is a freshman. I see her only during class periods and never outside of the classroom the way that I see other students, especially the juniors and seniors. During my class, she seems to always work alone (not with a group). She hands in assignments that are, most of the time, worth 60-70%. I see that she has potential to become a really good physicist, but she needs to connect with others and access departmental resources. What can I do to help?

CASE STUDY: Using the TEAM-UP Report

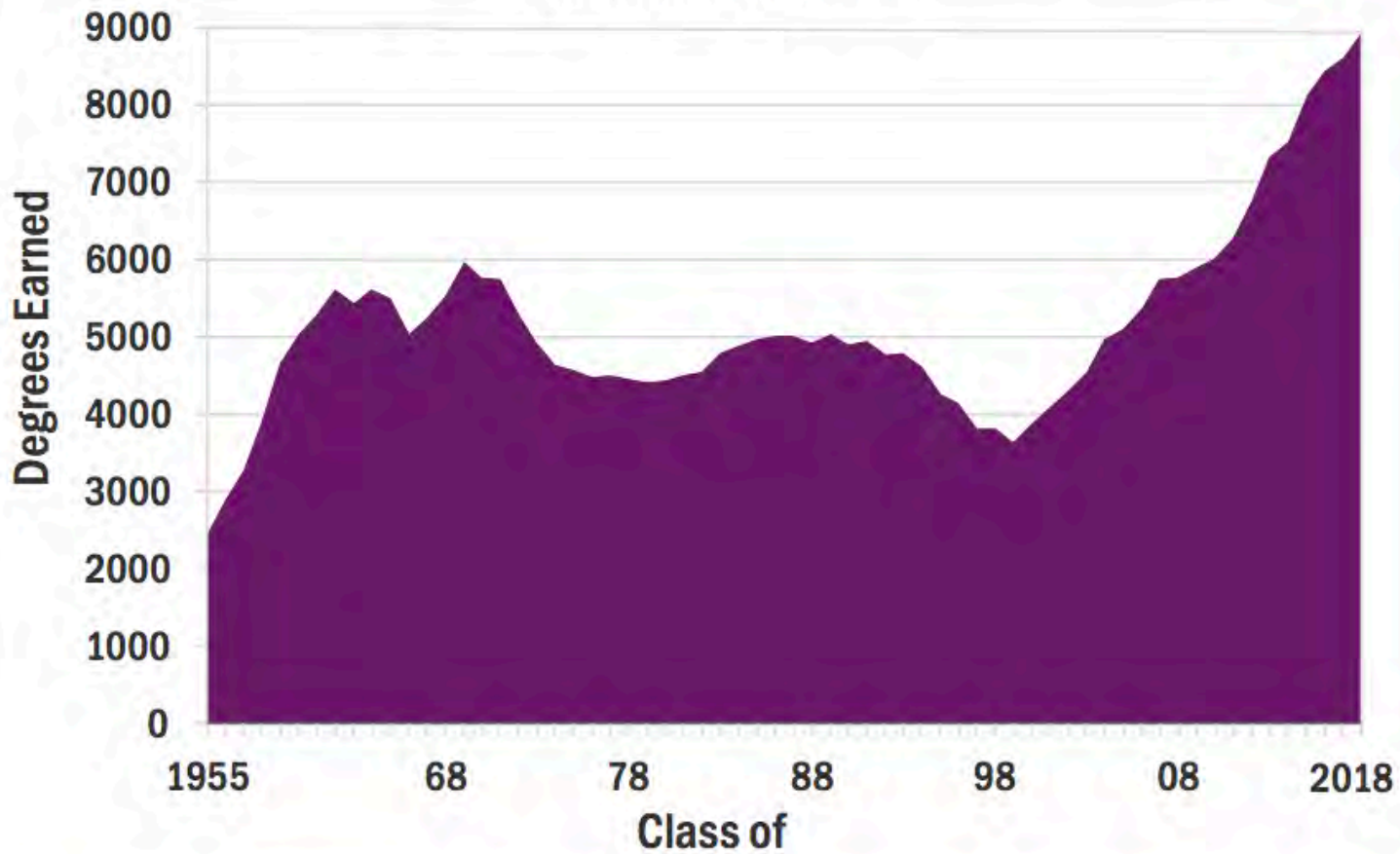
About the Professor
(potential mentor)

I am a second year Assistant Professor at a PWI and have one Black (African-American) undergraduate student in my department. She is a freshman. I see her only during class periods and never outside of the classroom the way that I see other students, especially the juniors and seniors. During my class, she seems to always work alone (not with a group). She hands in assignments that are, most of the time, worth 60-70%. I see that she has potential to become a really good physicist, but she needs to connect with others and access departmental resources. What can I do to help?

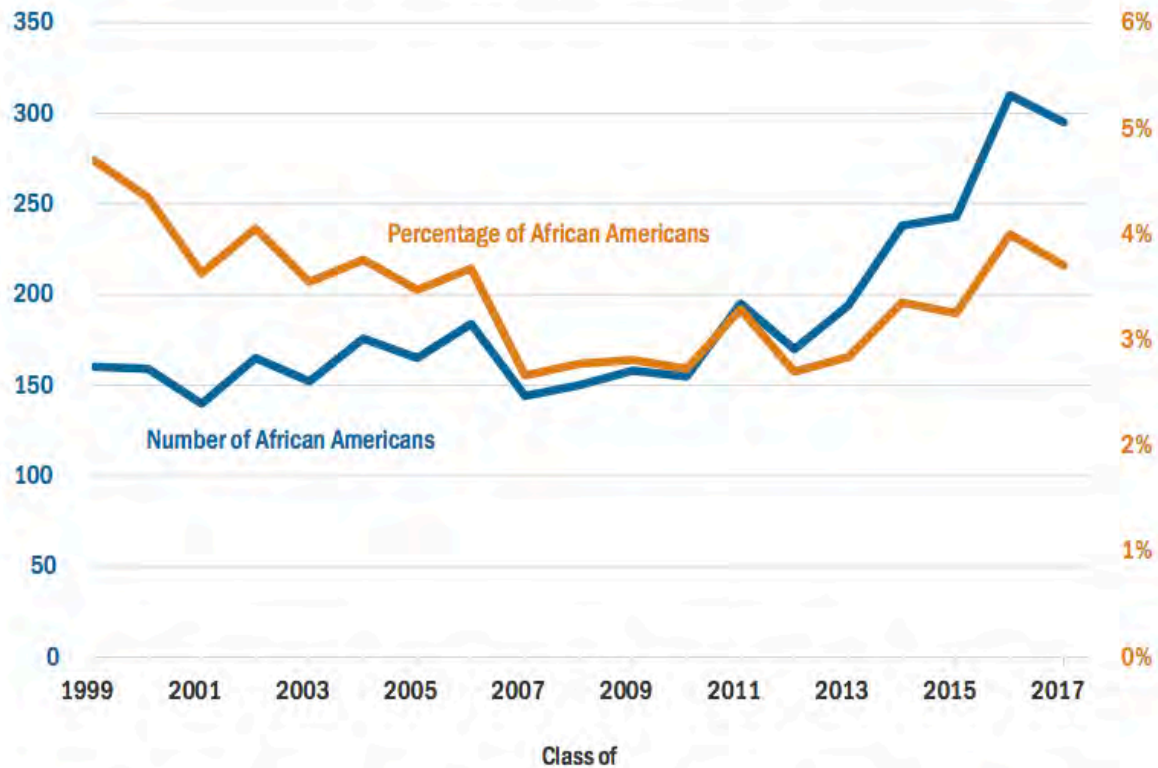
Guide to the Report

- Thematic Structure
 - (Research-based) Findings and Recommendations for...
 - Individual Faculty members
 - Departments
 - Professional Societies

Number of Bachelor's Degrees Earned in Physics 1955 through 2018



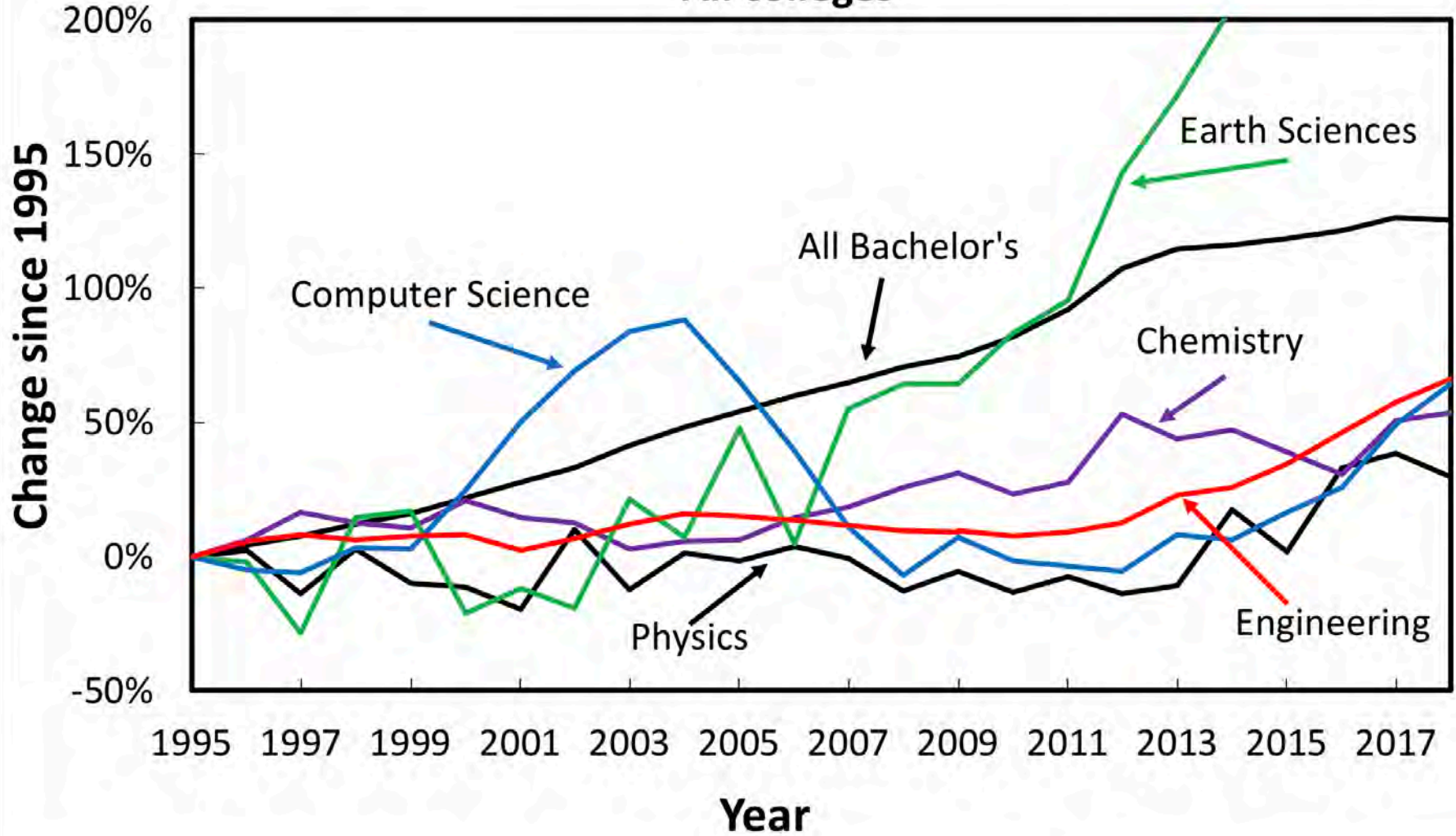
Number and Percentage of Physics Bachelor's Degrees Earned by African Americans

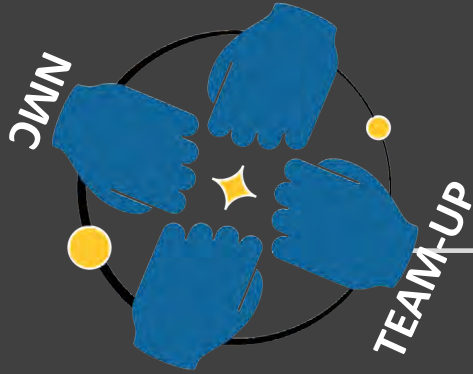


The percentage of degrees awarded to African-Americans is based on US citizens only. Typically between 5% and 8% of physics bachelors are awarded to non-US citizens.



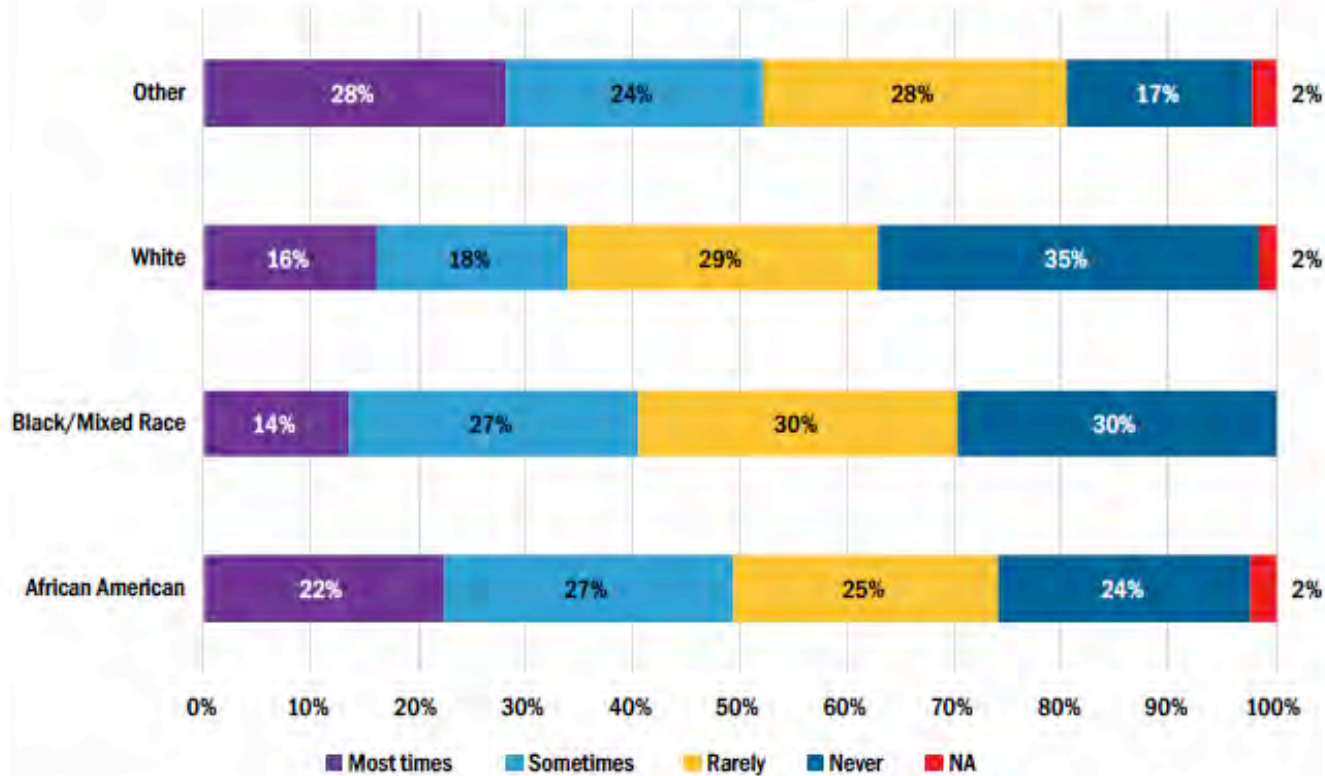
Growth in bachelor's degrees awarded to African Americans All colleges

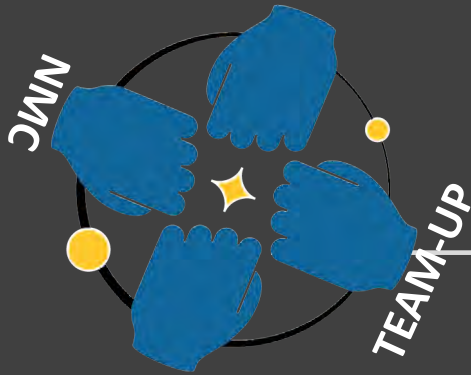




Reflection on Experiences

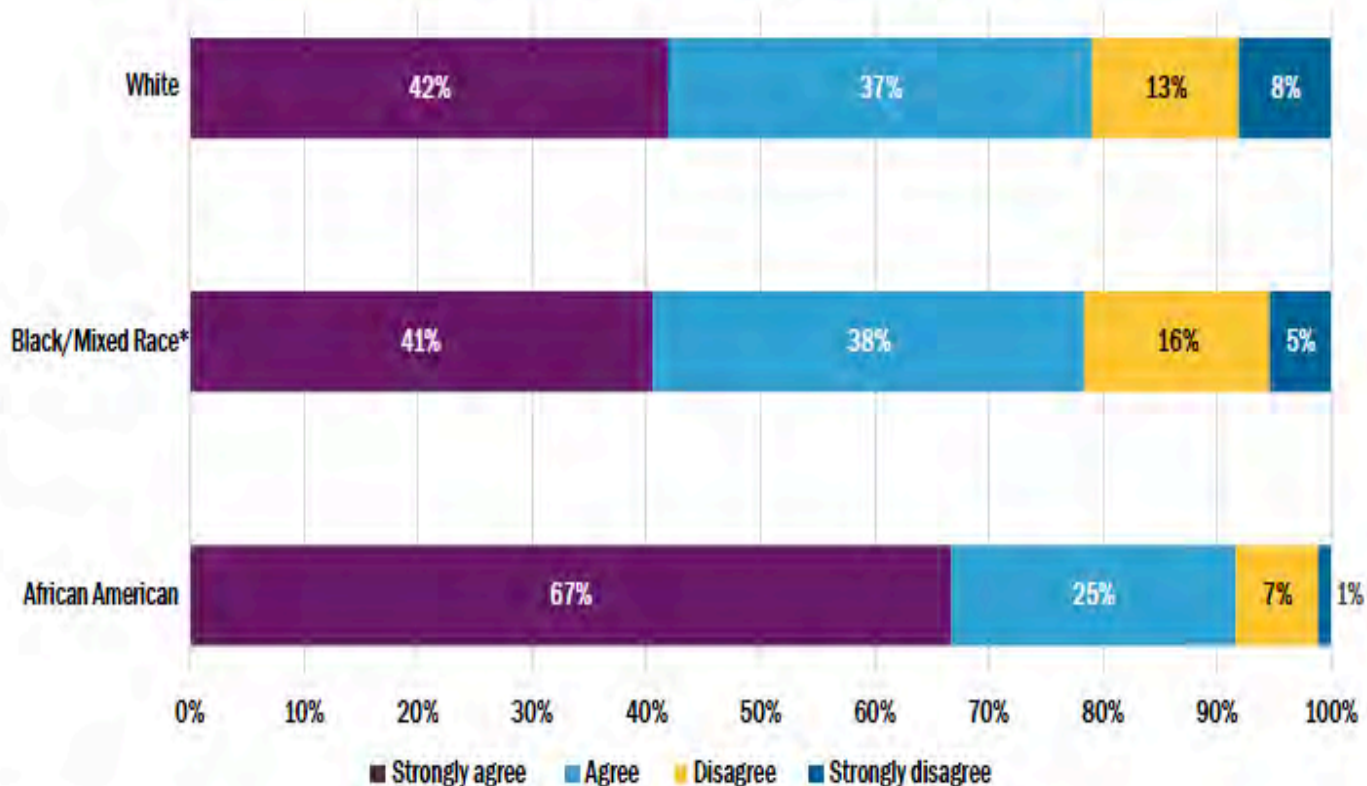
"I have felt socially isolated in my physics classes or labs"





Reflection on Experiences

"It is important to me to apply my expertise in my major to benefit the community I belong to"



**FACTOR 1:
BELONGING**

Fostering a sense of belonging is essential for African American student persistence and success.

**FACTOR 2:
PHYSICS IDENTITY**

To persist, African American students must perceive themselves, and be perceived by others, as future physicists and astronomers.

**FACTOR 3:
ACADEMIC SUPPORT**

Effective teaching and a strengths-based approach to academic support are necessary for African American student retention and success.

**FACTOR 4:
PERSONAL SUPPORT**

Many African American students need support to offset financial burdens and stress.

**FACTOR 5:
LEADERSHIP AND
STRUCTURES**

For sustainability, academic and disciplinary leaders must prioritize creating environments, policies, and structures that maximize African American student success.

**CHANGE
MANAGEMENT**

A new level of thinking is required to solve a persistent problem.



Belonging (Quotes from the TEAM-UP Report)

“The climate of the physics department is very non-inclusive of people of color . . . They would say [things] like ‘You should change your major.’”

“[T]here [were] certain times in class when the professor would pose a question and I would have the answer. Then another student in the class who was present and happened to be a White male [would be] like, ‘No, that’s not right.’ So I didn’t propose my answer to the class. I was embarrassed because I was like, ‘I’m just going to get it wrong’ but ended up being right. Just things like that where your colleagues or other students around you just make me feel more doubtful. I’m trying to work around that and still have confidence despite their opinions.”





Physics Identity

"I've had two professors ask me why I'm in physics. They see how much I'm struggling. Like, 'Why are you still a physics major? Why do you want to do this?' Multiple times. It's like, 'Well, I'm here because this is what I want to do.' They're like, 'You're making your life difficult doing all this.' It's very discouraging when you hear [this]."



Academic Support

“There was one teacher that—really, honestly, I was going to give up on physics and she changed everything. I mean, she was so passionate about teaching, she knew a lot about physics education and research . . . She just kept checking in on me, and she would make comments on my test like ‘This is not so good. Come see me.’ Then she would email me like, ‘Did you see my comment? Come see me.’”



Factor 1: Belonging

Key finding 1d. (out of 4)

Microaggressions and discrimination received from their peers diminish students' self-efficacy and persistence.

Recommendation 1b. (out of 5)

In classrooms, student clubs, and common spaces, departments should establish clear rules of engagement that assure that everyone is welcomed and valued and convey that inappropriate behavior will not be tolerated. Departments should also provide spaces and opportunities for education and ongoing discussion among faculty and students on ways to actively foster a sense of belonging and remove barriers to inclusion.



Focus on solving the problem— not on whether you, the department, or institution will be judged because the problem exists. (from Critical Race Theory)

Factor 2: Physics Identity

Key finding 2b. (out of 4)

Participation in research, attendance and presentation at conferences, and working as a Learning Assistant (LA) all foster physics identity development.

Recommendation 2a. (out of 5)

Departments should invite speakers with demonstrated research expertise on physics identity development and should work with faculty on evidence-based ways to strengthen students' sense of physics identity, including encouragement and recognition.



Factor 3: Academic Support

Key finding 3b. (out of 4)

Overall student success increases with the number of committed and caring faculty in a department. It is important for faculty who are not members of marginalized groups to be engaged in these efforts to show students that they are valued.

Recommendation 3b. (out of 5)

Departments should adopt policies and practices that encourage multiple faculty, including those who are not members of marginalized groups, to engage in formal and informal mentoring of students, and they should recognize and reward these efforts.



Factor 4: Personal Support

Key finding 4d. (out of 4)

Student retention improves when faculty recognize students as individuals with unique and intersecting social identities and experiences, such as being a first-generation college student or working to support a family.

Recommendation 2a. (out of 5)

Faculty should seek funding for undergraduate students to work in research groups or as Learning Assistants, and find other ways to help students advance academically while earning money.



Factor 5: Leadership and Structures

Key finding 5d. (out of 4)

Lone champions can make a big difference for students, but their effort is unsustainable, making this an ineffective long-term strategy. In the most successful departments, a significant fraction of the faculty consistently value and support underrepresented students.

Recommendation 5d. (out of 5)

Department chairs should provide incentives and rewards to multiple faculty members, including those who are not members of marginalized groups, who actively support underrepresented students.



CASE STUDY: Using the TEAM-UP Report

REALIZE THAT THIS
IS A TEAM
EFFORT!!!

“What can I do to help?”

- Departments should have common spaces; then regularly evaluate and enforce “rules of engagement” to assure that everyone is welcomed.
- Suggest a speaker to the seminar schedule who can talk to the department about physics identity development.
- Inform the student about LA and Research opportunities.
 - Departments should provide information about support services written in a manner accessible to and understandable by all students. (Recommend. 3d; Academic Support’)
- Learn about informal mentoring. Recognize unique and intersecting social identities and experiences of the student. Use that engagement to show the student that they are valued.
- Departments can provide incentives and rewards. Untied to tenure, faculty can feel pressured to choose the grade = 90%+ students and not the 60-70% student.
- The APS NMC could provide training on “asset-based mindset” when mentoring across cultures. Such workshops could also provide information on informal mentoring and connecting your students to or developing counterspaces

Findings & Recommendations by Theme

Belonging	Identity	Academic Support	Personal Support	Leadership and Structures	Change Management
Faculty role	Faculty role	Faculty preparation	Financial	Department chairs	Theory of change
Student role	Co-curriculum	Faculty commitment	Paid work	McNair and similar programs	Alignment with related efforts
Counterspaces	Faculty diversity	Advising	Mental health	Campus resources	Faculty preparation and training
Climate	Prosocial behaviors	Curriculum	Intersectional identity	Incentives and rewards	Rewards and incentives
Harassment response	Career options	Resource guide for students	\$50M endowment for financial aid	Professional societies support	Ongoing data collection, assessment, and accountability

Items in **blue** cells describe **both key findings and recommendations**.

Items in **purple** cells describe **recommendations only**.



The Time is Now

“The persistent underrepresentation of African Americans in physics and astronomy is due to (1) **the lack of a supportive environment** for these students in many departments, and (2) **the enormous financial challenges** facing them and the programs that have consistently demonstrated the best practices in supporting their success. Solving these problems requires addressing **systemic and cultural issues** and creating a large-scale **change management framework.**”





Questions & Discussion



Faculty Voices from a top-performing department

- *“You have to set high expectations of students, be realistic about where they are, then take them [to] where they can be.”*
- *“Building community takes a lot of sweat equity.”*
- *“These are the most talented students anyone could want.”*
- *“Our students are our strength.”*

