



Diversity/Equity/Inclusion: why we ALL need to engage

Belle II Summer School 2021

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Worksheets (please download)

- for your benefit, not to be handed in
- write down your thoughts & reflect on them
- share those you are willing to



My DEI path

- **Being**
 - AB, AM: Harvard; PhD: UC Berkeley
 - Postdoc/Assistant/Associate Professor: Harvard
 - Professor: Virginia Tech, U Cincinnati
 - Department Head, U Cincinnati 2009-16
- **Doing**
 - 2013 – U. Cincinnati Physics Dept joins [APS Bridge Program](#)
 - Increase number of US underrepresented minorities (URM) earning physics PhD's
 - 2016 – Belle II Diversity Committee
 - 2020 – U. Cincinnati Physics joins [APS-IDEA](#) network (climate of inclusion)
 - 2021 – APS [Forum on Diversity & Inclusion](#): vice-chair

Yes, there was overt
discrimination in physics in
the past

Some historical examples that might surprise you (I)



Subrahmanyan Chandrasekhar (1910-1995)

Family wanted him to be a civil servant in India but he loved physics.

Doctoral student at Cambridge. At age 20, using QM and stat mech, showed that the maximum mass of a white dwarf star was $1.4 M_{\text{solar}}$. Heavier stars would collapse to an unknown configuration.

He was ridiculed by Sir Arthur Eddington and thus Chandrasekhar decided that there was **no hope of employment** in England. He decided to emigrate to the US with his wife to America.

Was offered a 3-month lectureship by Harvard and a faculty position at a good salary by President Hutchins of the University of Chicago. He accepted the Chicago position at age 26. However, as a **black man** he was not allowed on the University of Chicago campus and had to remain at Yerkes Observatory in rural Wisconsin. Hutchins' decision to hire him was actively opposed by the local KKK chapter on campus (Prof Gilbert Bliss) and various Deans (Gale) and administrators. Hutchins tried to arrange for a special class by Chandra at the UC extension in downtown Chicago but this was also blocked.

Chandrasekhar was eventually allowed to work on the U Chicago campus after WWII. He won a Nobel Prize in Physics in 1983 and many other honors for his extraordinary research.

Historical Examples II

Maria Goeppert-Mayer (1906-1972)



Also worked
on the
Manhattan
Project

After marrying, Maria Goeppert-Mayer migrated to the US where regulations prohibited her from accepting employment at the same university as her husband. She had **unpaid** positions at John Hopkins, Columbia and the University of Chicago. Goeppert Mayer invented the “shell model” in Nuclear Physics and received the Nobel Prize in Physics in 1963 (2nd woman).

Media coverage

San Diego Union Tribune
November 5, 1963

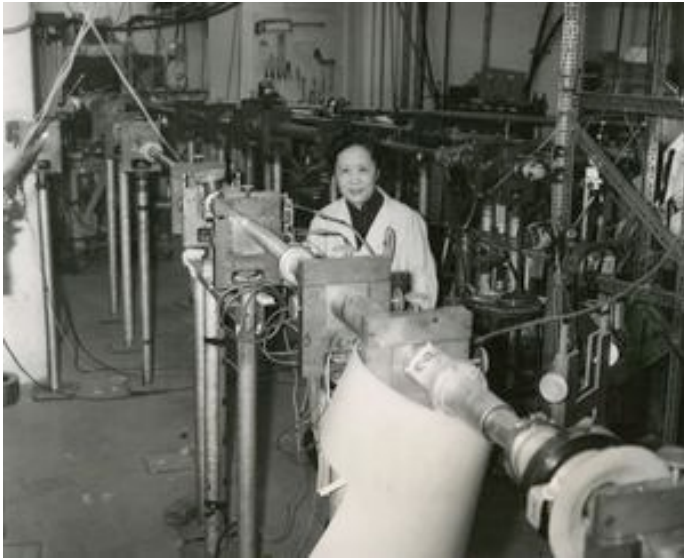
S.D. Mother Wins Nobel Physics Prize

Dr. Mayer 1st Woman in U.S.,
2nd in History So Honored

By FRANK HOGAN

III

Chieng-Shiung
Wu
(1912-
1997)



“In 1957, Wu’s male colleagues, who had come up with the theory—but not Wu, who had tested it—were awarded the Nobel Prize. “Neither Yang nor Lee is an experimental man,” reported TIME in January that year. “When two experimental proofs came through early this year, parity was dead, and the Nobel Prize was practically in the bag.” Wu’s contribution remained typically anonymous.”

“She received a personal apology from the Chinese prime minister for the destruction of her parent’s graves, and afterwards visited China regularly, becoming a vocal critic of the government’s repressions and reprisals—particularly the Tiananmen Square massacre in 1989. In the United States, she campaigned for gender equality in her profession and beyond, correcting anyone who called her by her husband’s name and insisting on being paid the same as her male colleagues at Columbia. Having overturned the theory of parity in physics, she was determined to uphold it in society.”

More recently ...

- 1960's Civil Rights Act, women's movement
- 1972 Equal Rights Amendment passed by Congress (still not ratified)
- 1972 APS establishes
 - Committee on the Status of Women in Physics (CSWP)
 - Committee on Minorities (COM)
- 1972- **MANY** efforts to support women, minorities in physics: targeted scholarships, grants
aimed at diversity in physics: representation reflecting the general public

Why (the heck) do we need to consider DEI in 2021??

- Physics is about things – no gender/class
- Discrimination is in the (distant) past!
- We are already diverse enough!
 - Physics is international!
 - A community bound by common interest!!
 - Sure, it's tough, but it's tough for everyone !!!!

therefore ...

DEI is irrelevant in Physics!!

& I don't want to spend time thinking about it

Well ...

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Did these efforts work?

Worksheet I

- I. The term *minoritized*, in current usage, refers to social groups that are devalued in society and, as a result of social constructs, have less power or representation compared to other members or groups in society. Such groups may be identified as differing from the dominant cultural group(s) due to attributes such as race, religious creed, nation of origin, sexuality, or gender. The devaluing encompasses how a group is represented, what degree of access to resources it is granted, and how the unequal access is rationalized.
 - A. Name at least two groups that you consider minoritized in physics, in the United States or in the society you are most familiar with.

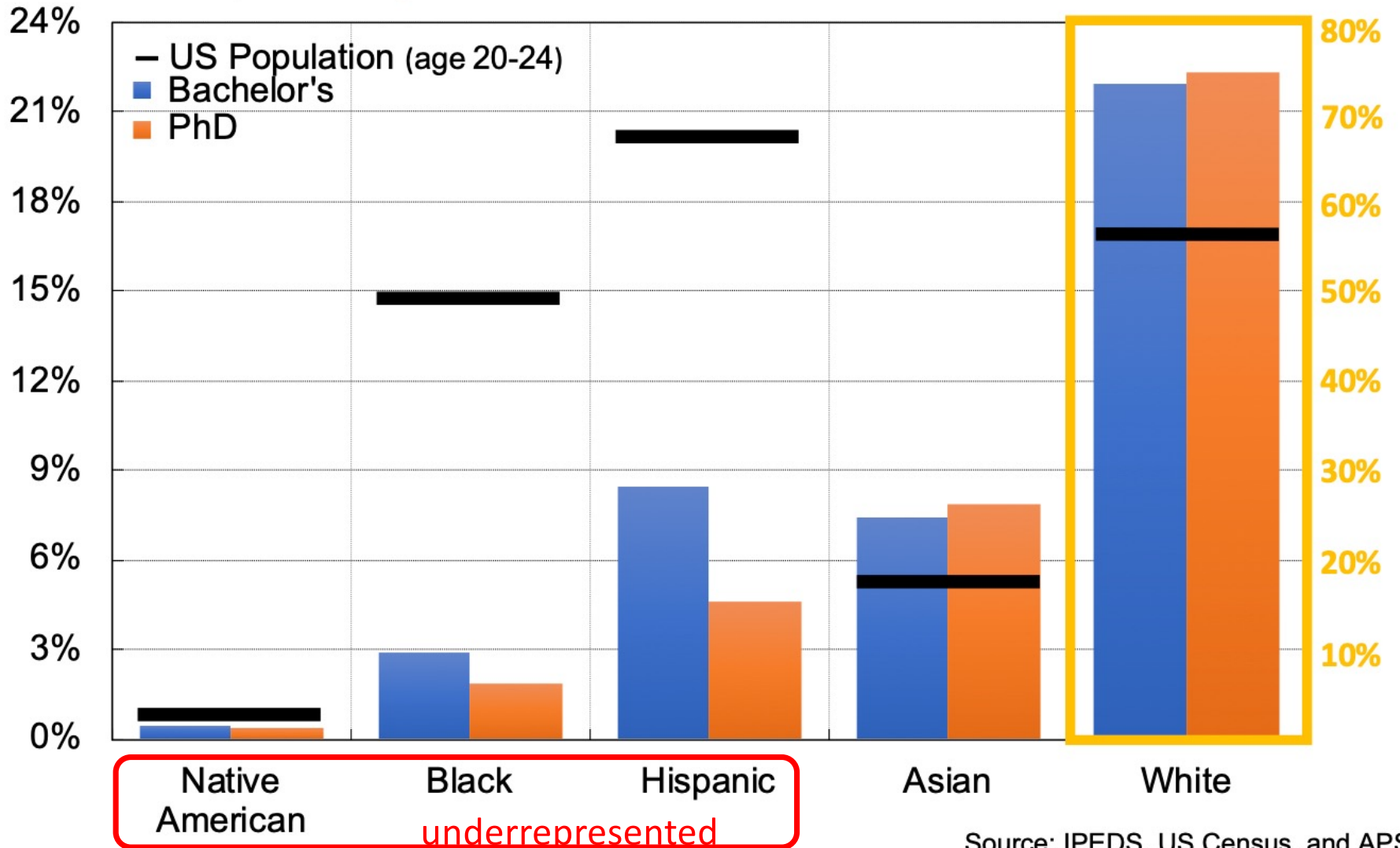
 - B. How many individuals (if any) from these groups are you aware of in your physics community (physics department(s), Belle (II))? Estimate the fraction of your physics community that these numbers of individuals represent. Then, estimate or guess the fraction that these groups comprise in the society at large.



Did these efforts work?
Let's look at some statistics from the
American Institute of Physics!

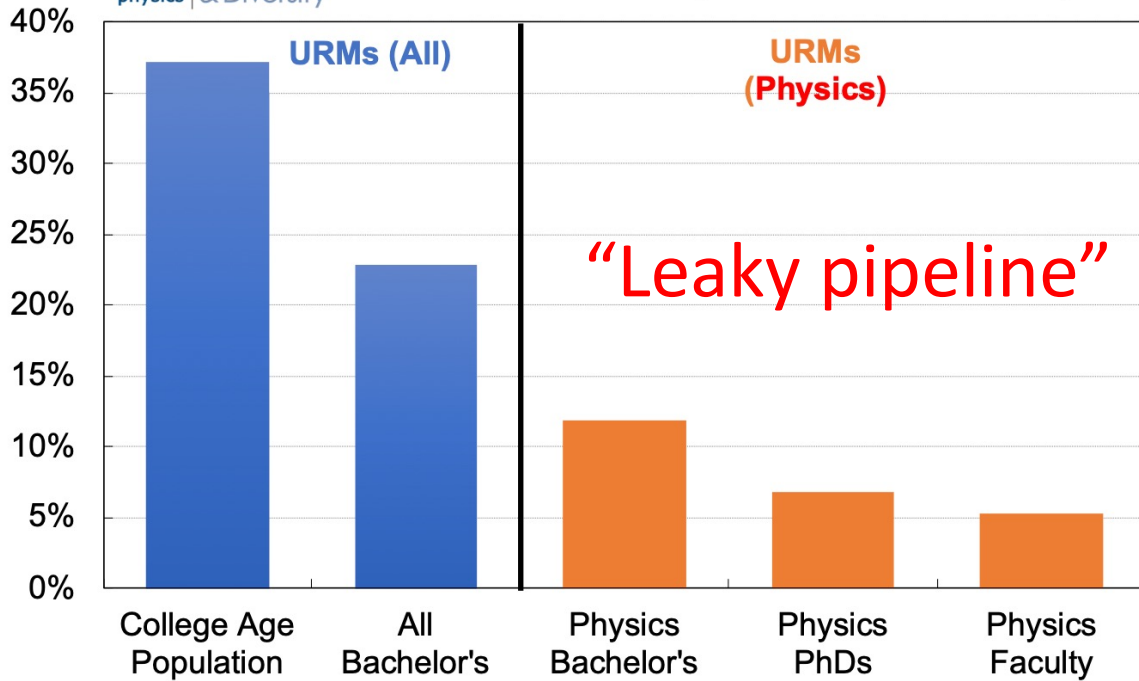
Group representation

Physics Degrees (5-yr avg 2013-2017)



Source: IPEDS, US Census, and APS

Retention of Underrepresented Minorities (URM)



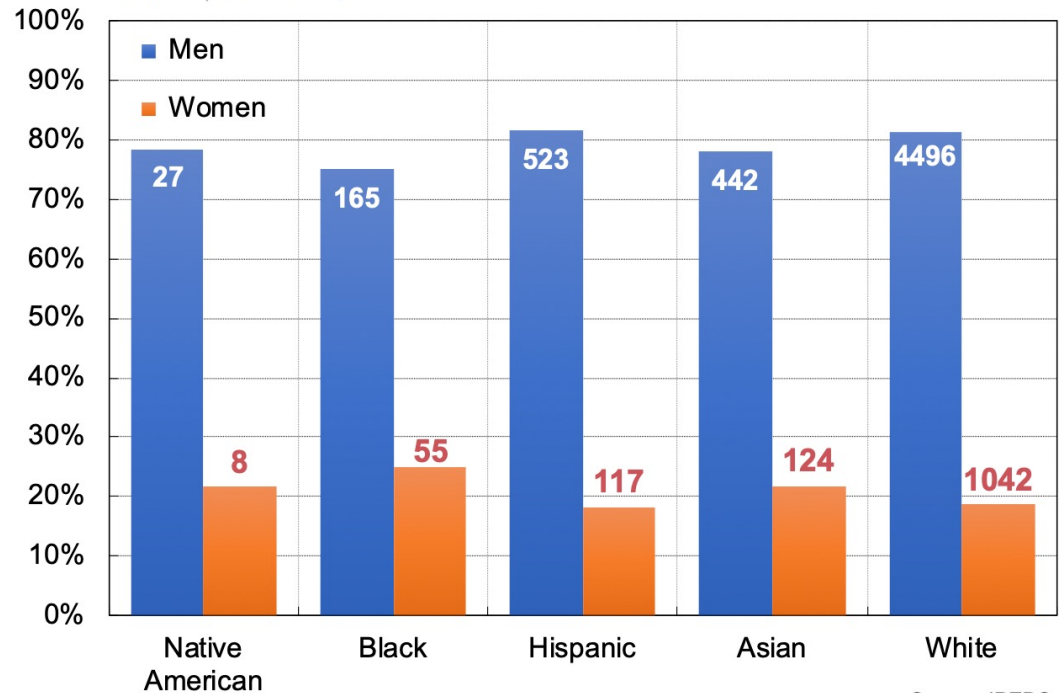
group representation, %

US underrepresented minorities (URM):
Black, Hispanic, Indigenous

Source: US Census, IPEDS, AIP, and APS physics & Diversity

Bachelor's Degrees (5-yr avg 2013-2017)

M/F



Source: IPEDS and APS

Why the persistent underrepresentation?

- Lack of “innate ability”?
- Lack of interest?
- Lack of inclusion?
- Lack of access?

Why ...?

- Lack of “innate ability”?
 - Human talent tends to be distributed similarly among different populations
 - Innate differences might develop due to evolutionary pressure favoring physicists in certain populations, not in others
 - Evolutionary time scale $\gg 10^4$ yrs
 - Higher education ≈ 1000 years
 - Physics ≈ 335 years
 - Physics PhD (US) ≈ 160 years

Why ...?

- Lack of interest?
 - Cross-cultural observations of M/F differences suggest that differences in interest are not innate
 - “interest” is strongly influenced by culture & bias

The large gaps in representation are not explained by “innate” attributes

Why ...?

- Lack of inclusion?
Let's examine
 - Cultural narratives
 - Implicit bias
 - microaggressions

- **Cultural narratives**

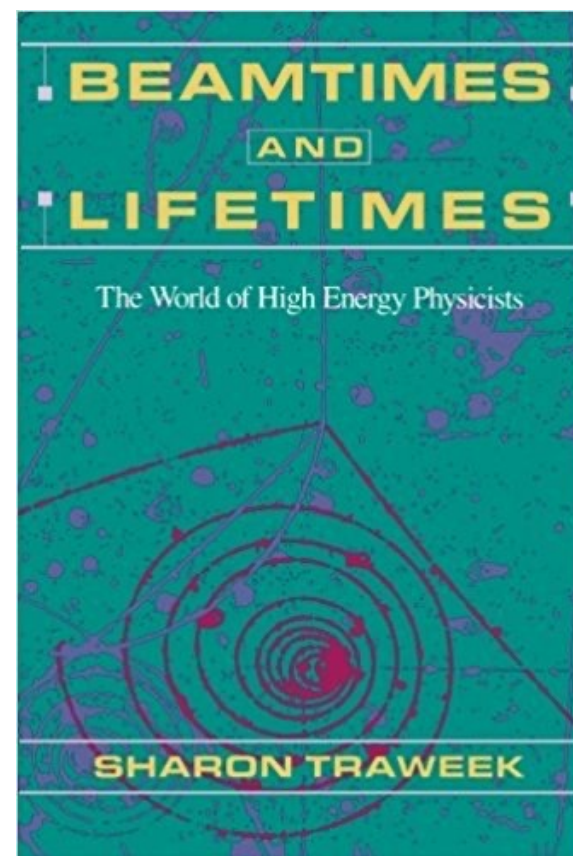
*stories told by and about a cultural community,
through which members define roles and identities*

- **Narrative: physics is a “culture of no culture”**
 - It’s the study of THINGS
 - culture plays no role
- **Narrative: Physics was developed by lone geniuses (who nearly all happen to be white men)**

a HEP cultural narrative

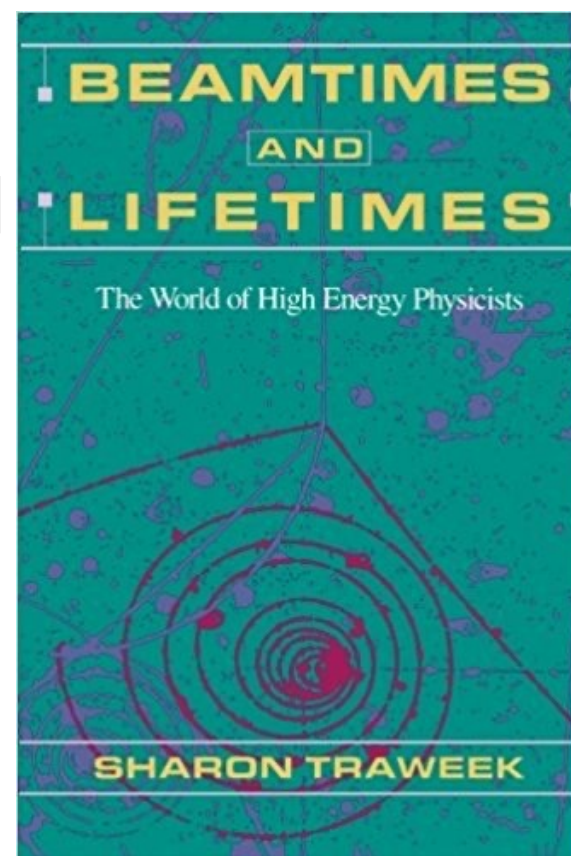
- “Beam times and Lifetimes,”
by Sharon Traweek (1988):

– comparative anthropological
examination of HEP
collaborations & community,
Japan (KEK)-US (SLAC)



“In Western culture ... stories about a life in physics define virtue as independence in defining goals, ... fierce competition with peers in the race for discoveries. Independence, experience, competition, and individual victories are strongly associated with male socialization in our culture.

By contrast, recent studies in Japan suggest that these are the qualities associated with professionally active women, not men. Women are seen as not sufficiently schooled in the masculine virtues of interdependence, in the effective organization of teamwork and camaraderie, ... the capacity to nurture the newer group members in developing these skills. We do see that the virtues of success, whatever their content, are associated with men.”



Cultural narratives in physics
may sound rational, but
they often
implicitly and explicitly
undermine inclusion

Why ...? implicit bias?

In 2021, almost nobody discriminates overtly
BUT implicit bias may be more pernicious – we all have it

- An outcome of how our brains process learning
 - new ideas/things are processed, understood, classified, stored; once stored, hard to change
 - example: students come to physics class with a preconceived notion of acceleration
- Classification of people: us vs them (tribalism), e.g.,
 - us: students/them: faculty
 - us: Northern/them: Southern
 - Attributes (stereotypes) differentiate them from us (to establish our identity)

[test your implicit bias](#)

Implicit bias can override knowledge and values

The surgeon's dilemma

A father and his son were involved in a horrific car crash and the man died at the scene. But when the child arrived at the hospital and was rushed into the operating theatre, the surgeon pulled away and said: "I can't operate on this boy, he's my son".

VOX: "Implicit bias means we're all probably at least a little bit racist"

implicit bias may lead to Microaggressions

statements, actions, or incidents of indirect, subtle, or unintentional discrimination against members of a minoritized group.

- may be well-intentioned; appear to be a compliment or a joke, but contain a hidden insult
 - “You're so lucky to be black – so easy to get into college”
 - “You don't look like a physicist!”
 - “You're so articulate”
 - “You are a credit to your race.”
 - “You don't look gay!”

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- **Seemingly small, but constant, cumulative**
 - May cause confusion, anxiety, depression, discouragement
 - Places a burden of emotional labor on the recipient
- The received message: you are not one of us

Worksheet II

II. Microaggressions

- A. List some words describing your identity, in your society of upbringing: {race, class, religion, gender, ...}. Underline those for which your group may be considered minoritized in your society.

- B. Think of an instance where, due to one of your minoritized identities, someone you know directed a microaggression at you OR, an instance where you witnessed a microaggression at someone else.

- C. What was the nature of the us/them divide? Describe briefly how this divide differentiates how people are treated in the society.

- D. Describe how it felt to receive the microaggression or, if you were the witness, imagine being the recipient.

- E. If you were the recipient, how long did it take for you to “get over it”?

Why ...?

Lack of access?

Entry to physics is (very) difficult without

- An elite secondary education
 - Calculus, physics (<10% of schools)
 - Enrichment programs, pre-K → high school
- Family, community support
 - early recognition, encouragement of interest
 - Educated parent(s): expectations of higher education, awareness of physics
- Environmental stability
- Economic stability; uninterrupted pre-college education

An unequal race

<https://www.youtube.com/watch?v=4K5fbQ1-zps>

Why the persistent underrepresentation?

- inclusion, access play a major role
 - Cultural narratives that
 - Deny that culture plays a role (burden of success is entirely on the individual)
 - Create excuses for exclusion
 - Implicit bias
 - Subject individuals to microaggressions
 - Undermine performance: [stereotype threat](#)
 - Lack of access (disproportionate for minoritized)
 - Secondary education, academic support
 - Family/community stability & support

What can I personally do?

It's easy to be "not-racist (sexist, ...)" – in theory

- In practice
 - Uncomfortable to recognize & confront your own biases
 - Embrace the discomfort
- **Consciousness of microaggressions**
 - Implicit bias is a natural result of societal upbringing; negative biases of society carry over to individuals
 - Does not excuse microaggressions
 - Reduce your contribution to a non-inclusive climate through self-awareness, active mitigation
- **Be aware of your privileged status**
 - Lack of preparation does not equate to lack of talent

Upshot

- The US talent pool is (grossly!) underutilized
- Diversity will improve physics via full utilization
- Representative Diversity will not happen without improvements to inclusion, access
 - APS projects to address these
 - Bridge Program
 - National Mentoring Community
 - APS-IDEA
 - Team-UP
- DEI is a work in progress (will be for a long time)
 - about social science, not physics
 - will require intentional efforts, culture change



**Thanks for working on being
part of the solution!**