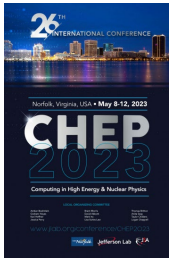
L E I D A

LEADERSHIP	EQUITY	INCLUSION	DIVERSITY	ACCESS

ACCOUNTABILITY FOR RACIAL BIAS IN AI/ML and BIG SCIENCE

Larry Gladney (he, him, his), Yale University
FAS Dean of Science
FAS Dean of Diversity and Faculty Development



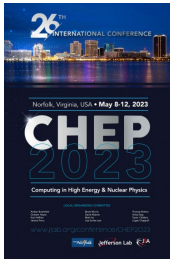
Diversity and Excellence

What do we mean when we talk about diversity?

- Differences in racial, ethnic, socioeconomic, geographic, gender, disability and religious backgrounds is typically what people refer to, but…

What we want to achieve is "excellence" in the field which generally relies on doing those things that improve the research, education and service of the field to humanity

- People with differing opinions, social experiences, political and religious beliefs, sexual orientations, heritage and life experiences

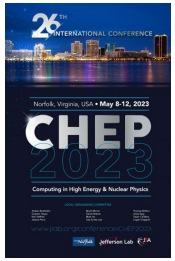


Why Link Diversity and Excellence?

- Decades of research by organizational scientists, psychologists, sociologists, economists and demographers show that socially diverse groups (that is, those with a diversity of race, ethnicity, gender and sexual orientation) are more innovative than homogeneous groups

- People with different backgrounds bring different perspectives that shape how we value what we do

- Simply interacting with individuals who are different forces group members to prepare better, to anticipate alternative viewpoints and to expect that reaching consensus will take effort.

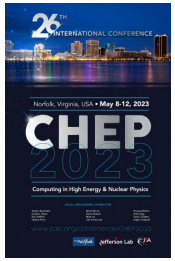


What Does Inclusion Mean?

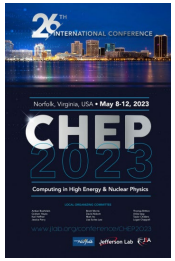
Gaining the benefits of diversity requires **inclusion**

- Diverse groups can have more internal conflicts but harnessing diverse intellectual resources brings overall benefit. This is what inclusion does.

- Inclusive organizations create an environment of involvement, connection and respect



What Does Inclusion Mean?



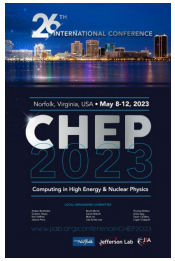
What Does Inclusion Mean?

ACCESSIBILITY

Serving a vast range of abilities while operating within an extensive range of situations.

Increasing diversity is not the goal – improving diversity is!

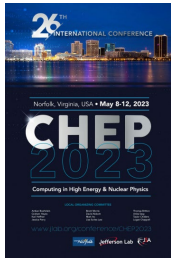
Without a culture of inclusion and belonging, increases in diversity are transitory or, at best, plodding and dependent on other societal changes.



Where is Racism Acting?

When most people think about racism, they probably think of racial slurs, hate crimes, or other overtly racist actions.

Most of the damage done is by systemic racism – often invisible to those who are not continually subjected to it



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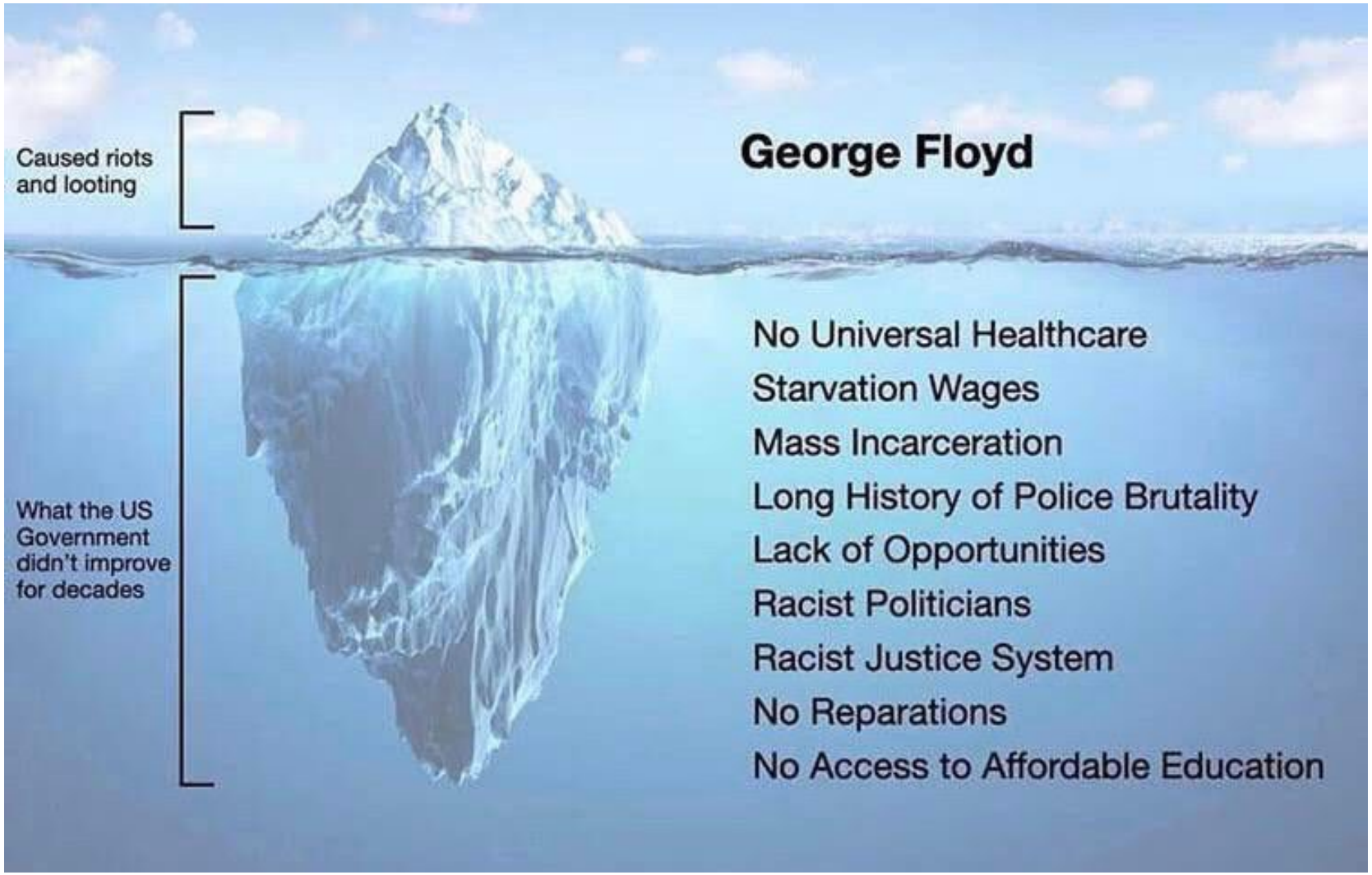
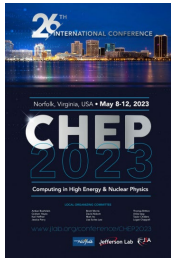
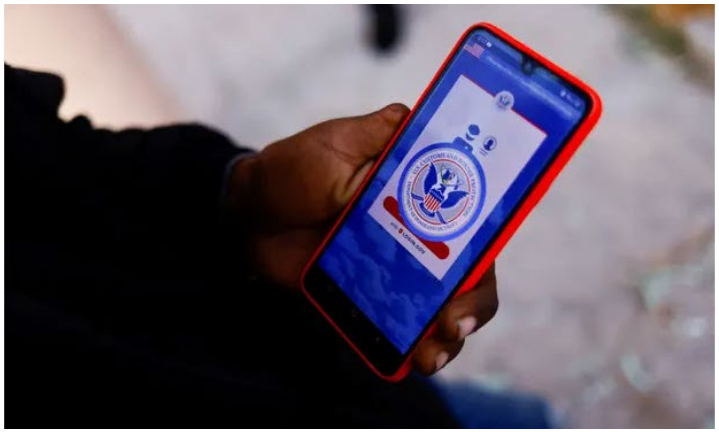




Biases Are Pervasive in and thru STEM



"Migrants from Africa and Haiti reportedly cannot utilize the US government's new mobile app to apply for asylum at the US-Mexico border". Many Black people are unable to file their claims because of facial recognition bias in the tech **app to accept their photos, which is now required to apply for asylum."**

A study by researchers at the Harvard Business School and the University of California, Berkeley found that Google was less likely to hire URM candidates for jobs in locations that were predominantly white. The study also found that Google was more likely to hire URM candidates for jobs in locations that were predominantly minority.

Unconscious Biases Pervasive in Academia

The biases that I see that most tend to affect academic decisions in order of increasing difficulty to mitigate

- **Halo effect** - our overall impression of a person influences how we feel and think about his or her character (generally a first impression)
- **Horn effect** - Unfavorable first impressions (someone is too loud, too pushy, too quiet, etc.) lead us to assume they could not be good
- **Leniency effect** - the unconscious assumption that your rating of an individual might reflect on you favorably or unfavorably
- **Contrast effect** - comparison and contrasting of candidates before or after a candidate considered especially good
- **Confirmation bias** - the tendency to search for information in an interview that confirms a pre-existing belief
- **Conformity bias** - group think or the tendency to go along with what appears to be a group response
- **Personal similarity bias** - leaders tend to reproduce themselves
- **Pedigree bias** - the tendency to look seriously only at people from a small range of institutions

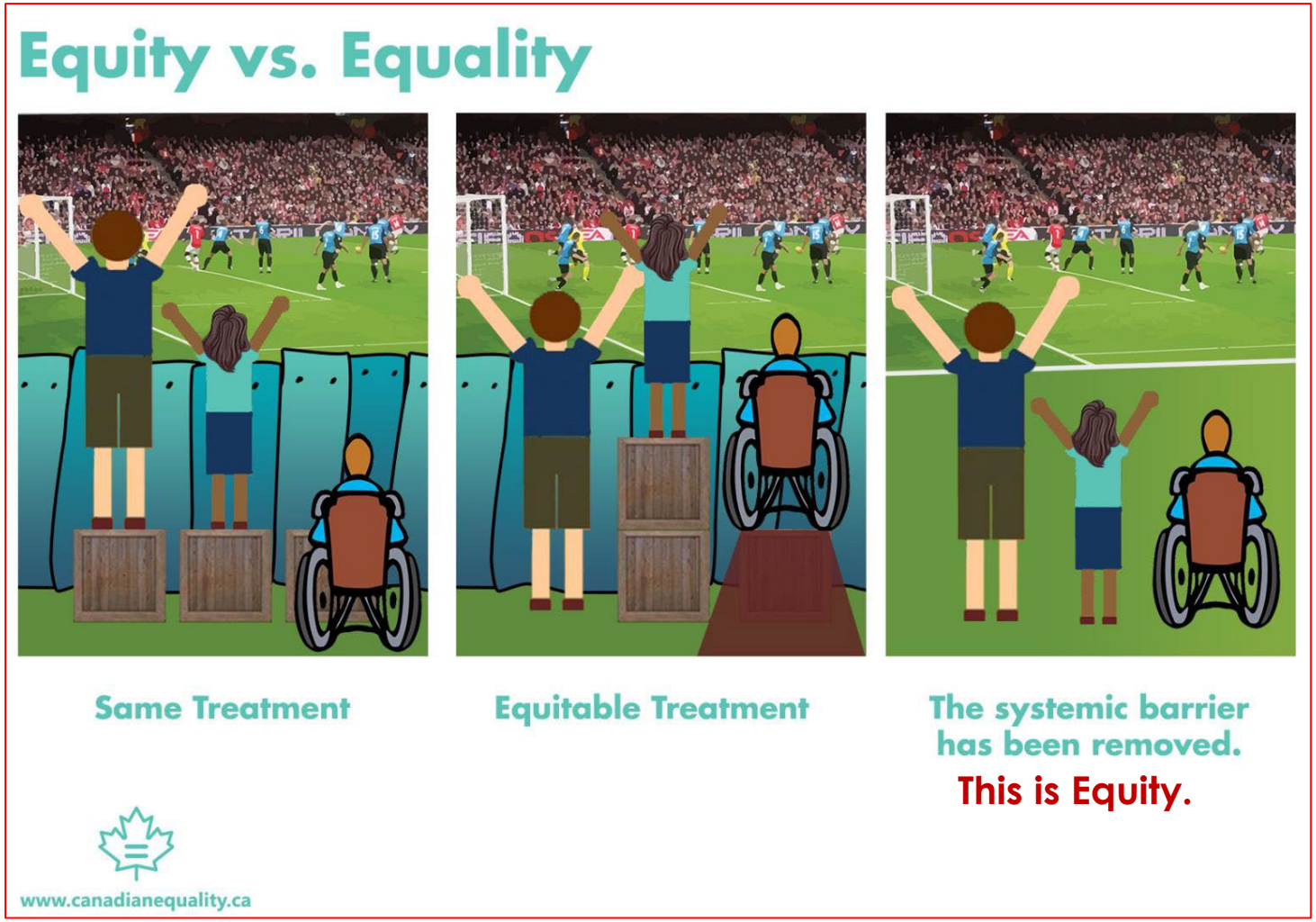
Keys to Advancing Antiracism and Improving Diversity and Inclusion

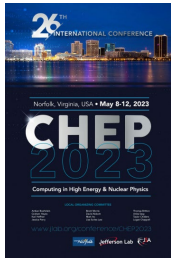
We can make use of measures of institutional racism and scientific understanding of social cognitive processes

- racialization of organizational structures through specific policies and practices
- The need for leaders to address organizational change at multiple levels to produce cultural change
- How collective responsibility across an organization upholds values of antiracism and DEI

Keys to Advancing Antiracism and Improving Diversity and Inclusion

Consistent and clear commitment to equity from leaders

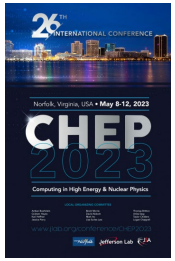




Keys to Diversity and Inclusion

- Consistent and clear commitment to equity from Senior Level Administration and throughout the org chart

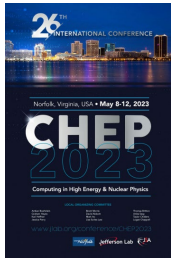
- Consistent and transparent decision procedures
  - Maintain communication of principles based on shared values
  - Provide for internal accountability initiatives that link diversity and excellence
  - Use of pipeline data and person-to-person networks to broadly disseminate information
  - In deciding on people to do tasks, know the availability pool and be sure your short lists represent it



Leading Against Implicit Bias Effects

- Know your biases
  - Essentially everyone has them!
  - Implicit biases are not the same as explicit prejudices
  - Mitigation of implicit bias requires knowledge and discussion of the bias
  - Commit to and plan for diverse outcomes

- An inclusive work environment and equitable treatment require
  - Increased attention on outreach and civic engagement
  - Identifiable goals for maintaining a diverse team
  - Engaging periodic review from “outside” observers



From Brian Nord's 2016 ICHEP Talk

- **Share the air.** If you have been dominating the discussion or participating disproportionately, let others participate. Alternatively, if you haven't said much, you are encouraged to participate more.

- **Lean into discomfort.** Discussions about racism, sexism, heterosexism, cissexism, and ableism often require us to examine issues that we do not want to talk about. However, the most progress is often made by leaning into our own discomfort so that we are able to address what needs to be addressed.

- **Use "both/and" rather than "either/or" thinking**. When confronting complex issues, the use of "either/or" thinking often oversimplifies situations and makes it more difficult to resolve conflicts. In contrast, "both/and" thinking allows us to recognize that truths are multifaceted and to come up with more options.

- **Respect the preferred pronouns of others.** Even if you do not personally care, practice announcing your preferred pronouns. We should work to see that those who do are not among the minority.

- **Recognize that intent ≠ impact.** We can (and should) assume that most people have good intentions. However, sometimes we end up saying or doing something that is hurtful even when we have good intentions.

- **Be aware of power dynamics**. A frequent occurrence in discussions is that members of historically overrepresented groups often dominate the discussion. We should ask ourselves the questions: Who is talking the most? Who is asking the most questions?

- **Speak to your own experience.** Using “I” or “we” statements often helps with avoiding generalizations and also the dynamic of explaining back to someone about their own oppressions they face.

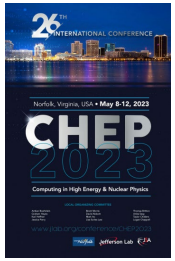
- **Be aware of intersectionality.** The most common practice in astronomy diversity efforts is to focus on a single dimension of identity. This approach leaves behind, for example, women of color who are impacted by the intersection of racism and sexism.

- **Discuss the message, not the messenger.** Focus discussion and commentary on what is being spoken, not who is speaking. For example, identifying a statement as racist, rather than the person making the statement.

- **Oops, ouch.** Part of having these conversations is messing up. If you say something that is hurtful or problematic and you realize is, you can say “oops” to acknowledge it and then try again. Alternatively, if someone else said something hurtful or problematic, then you can say “ouch” which serves as a marker that there is something that needs to be discussed further.

- **Find common cause around equity.** Understand that biases pervade which questions we ask, how we train AI/ML applications, and how we make decisions on the future of our field. What negatively impacts us around race and ethnicity is a problem for everyone in the field and potentially beyond.

- **Learn and teach, carefully.** Be cautious in broadcasting personal narratives from participants without first obtaining their permission. Share useful information with others while still respecting an individual's right to privacy and the ability to own their own narratives.



Comments and Questions

Backup Slides

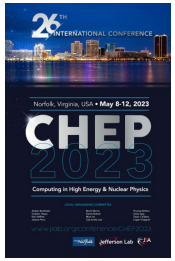
The Pervasive Power of Traditional Thinking

"A large part of our attitude toward things is conditioned by opinions and emotions which we unconsciously absorb as children from our

"I do not believe there is a way in which this deeply entrenched evil can be quickly healed. But until this goal is reached there is no greater satisfaction for a just and well-meaning person than the knowledge that he has devoted his best energies to the service of the good cause."

-- Albert Einstein, 1946

The Negro Question – written for the January 1946 issue of *Pageant* magazine



Biases Are Pervasive in and thru STEM

EXHIBIT 1 | The STEM Talent Funnel Loses Women at All Stages

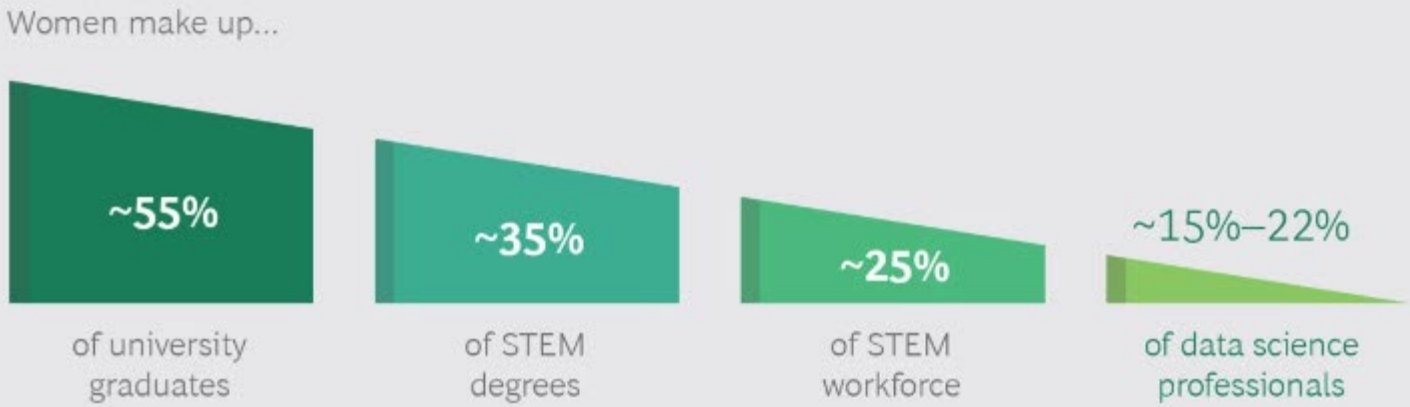
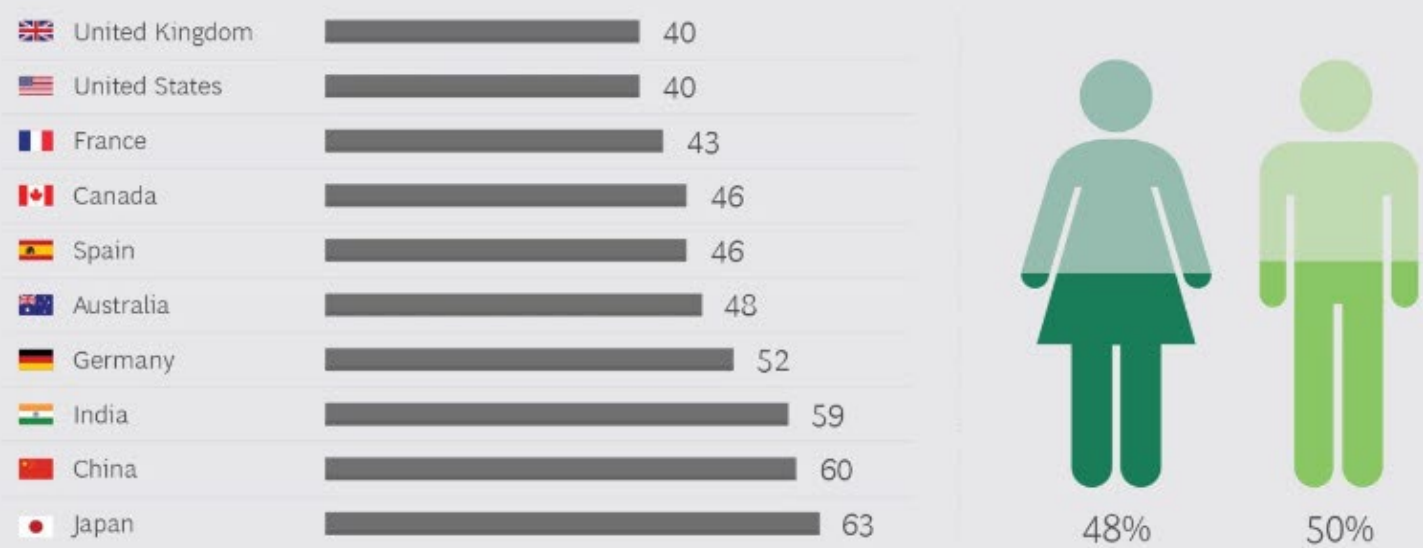
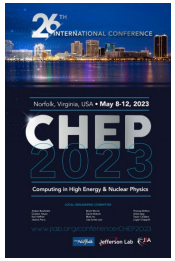


EXHIBIT 2 | Negative Perceptions of Data Science Are Widespread Among STEM Students

Share of students who view the field of data science as abstract and of low tangible impact (%)



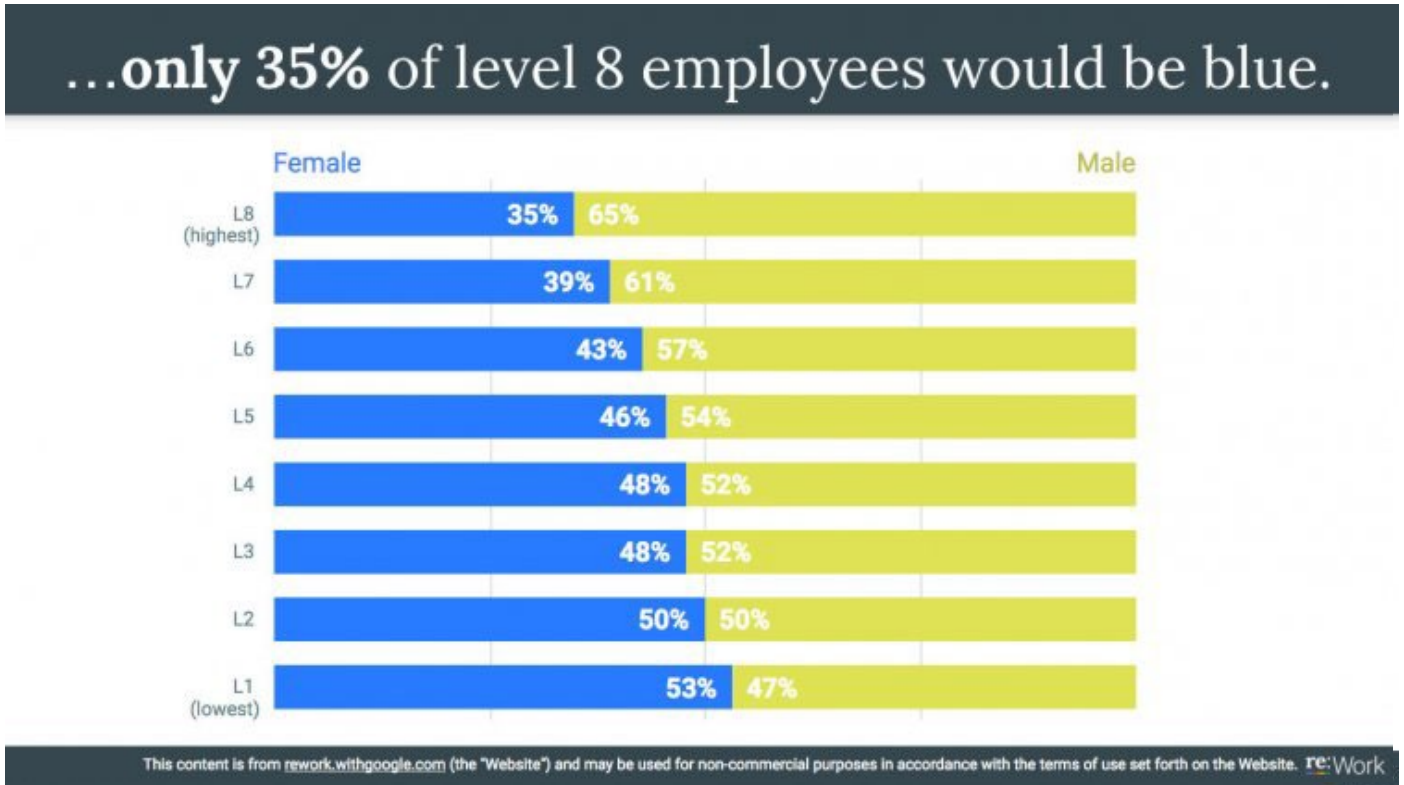
Source: BCG Women in Data survey 2020.

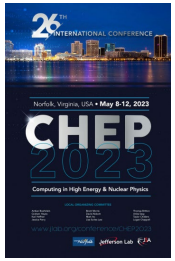


How Big an Effect is Implicit Bias?

Google also presents the numerical impact of even a small bit of bias: a 1996 computer simulation of a hierarchy that began as evenly split among men and women eligible for promotion across eight levels with a 15% attrition rate. The lowest level has 500 employees and the top only 10. Men and women were assigned a random performance score <u>but</u> men were scored on a scale of 1 – 101 whereas women were scored on a scale 1 - 100

After 20 rounds



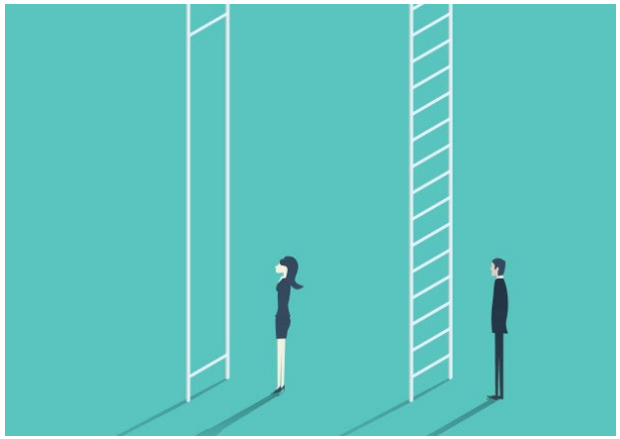


How Big an Effect is Gender Bias?

American Educational Research Association examination of career paths of recent PhD's finds there's no strong, comprehensive evidence of gendered paths to tenure during the first decade after degree completion. Scholarly publications and activities, such as research, and a postdoctoral appointment in the years following degree completion were the most important factors in getting a tenure-track job for both men and women.

At the same time, the paper suggests that women do earn lower salaries than men and take longer to complete their doctoral degrees. It also says that important gender-based differences in men's and women's career trajectories may still exist in the second decade after degree completion, and that this period merits further study.

"Although the movement out of academia by gender was not statistically significant, our data showed that more women move out of the education sector than male peers"



How Big an Effect is Implicit Bias?

In a study published earlier this year, researchers examined more than 40,000 artworks in the collections of 18 museums across the US, including the Metropolitan Museum of Art in New York, the Detroit Institute of Arts, and the Art Institute of Chicago, to analyze the gender and ethnic diversity of their holdings. They estimate that 85 percent of artists represented in these collections are white and 87 percent are men.

According to the *2010 State of Higher Education for Lesbian, Gay, Bisexual, and Transgender People*, sponsored by the Q Research Institute in Higher Education of the national organization Campus Pride, > 30% of LGBTQ students, staff, faculty, and administrators experience a "difficult or hostile campus climate" and > 20% experience some form of harassment related to their sexual identity or gender expression.

More than 25 colleges have been sued or had complaints lodged against them for not providing access or alternative formats for disabled students or closed captioning for deaf students.

How Pervasive is Unconscious Bias?

- Women and men are equally biased toward women appearing in what are considered non-traditional roles. This is particularly true in science where both sexes recommend lower wages/fewer promotions and less mentoring for women vs. men

- Women are perceived as less helpful than men. A man's offer to stay late to help a colleague is rated 14% more favorably than a woman's identical offer. Declinations to a request for such help rates women 12% lower in favorability than men

- Gender differences in scholarly productivity have remained constant since the 1960's

- The subject of hiring bias is complex and hence there are many ways it can enter and no set of compensations is guaranteed to mitigate the overall effects of bias

How Do We Mitigate Unconscious Bias?

- **Identify your biases** (again, you can test at the Harvard site)
- Be consistent in what you are looking for (more on this for interviews). If a surprising candidate appears and you realize some valuable attribute they have, reanalyze previous candidates for similar attributes
- Be wary of information which is not objectively verifiable
- Assess as much information as possible on a candidate before an interview
- Don't assume information which is not provided (including the motivation for why it may not be provided). Objectively qualified candidates should be interviewed if at all feasible despite warnings you may get from others, weird descriptors in recommendation letters, etc.

How Do We Mitigate Unconscious Bias?

- Establish criteria for discussion in committees. Be sure that group dynamics are accounted for in discussion
  - Listen for the quiet voice – be sure everyone is heard and that those who take more time to speak up in groups have the time to do so
  - Encourage the asking of tough questions. Do not avoid conflict under the impression that conflict will result. Professional conversation does not avoid this and faculty searching is as professional as discussion of a manuscript
  - If conflict does arise, stay engaged until a conclusion is reached. Ultimately everyone wants a common result that the group can be proud of. If there are those who don't, that should be explicitly addressed. Offer a path back to conversation whenever anyone violates a "norm"
  - Be aware of the data that exists (representation in the PhD pools, institutions which are strong at producing relevant students, etc.) and move to include more information whenever possible

How Do We Improve Inclusiveness?

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  - Listen for the quiet voice – be sure everyone is heard and that those who take more time to speak up in groups have the time to do so
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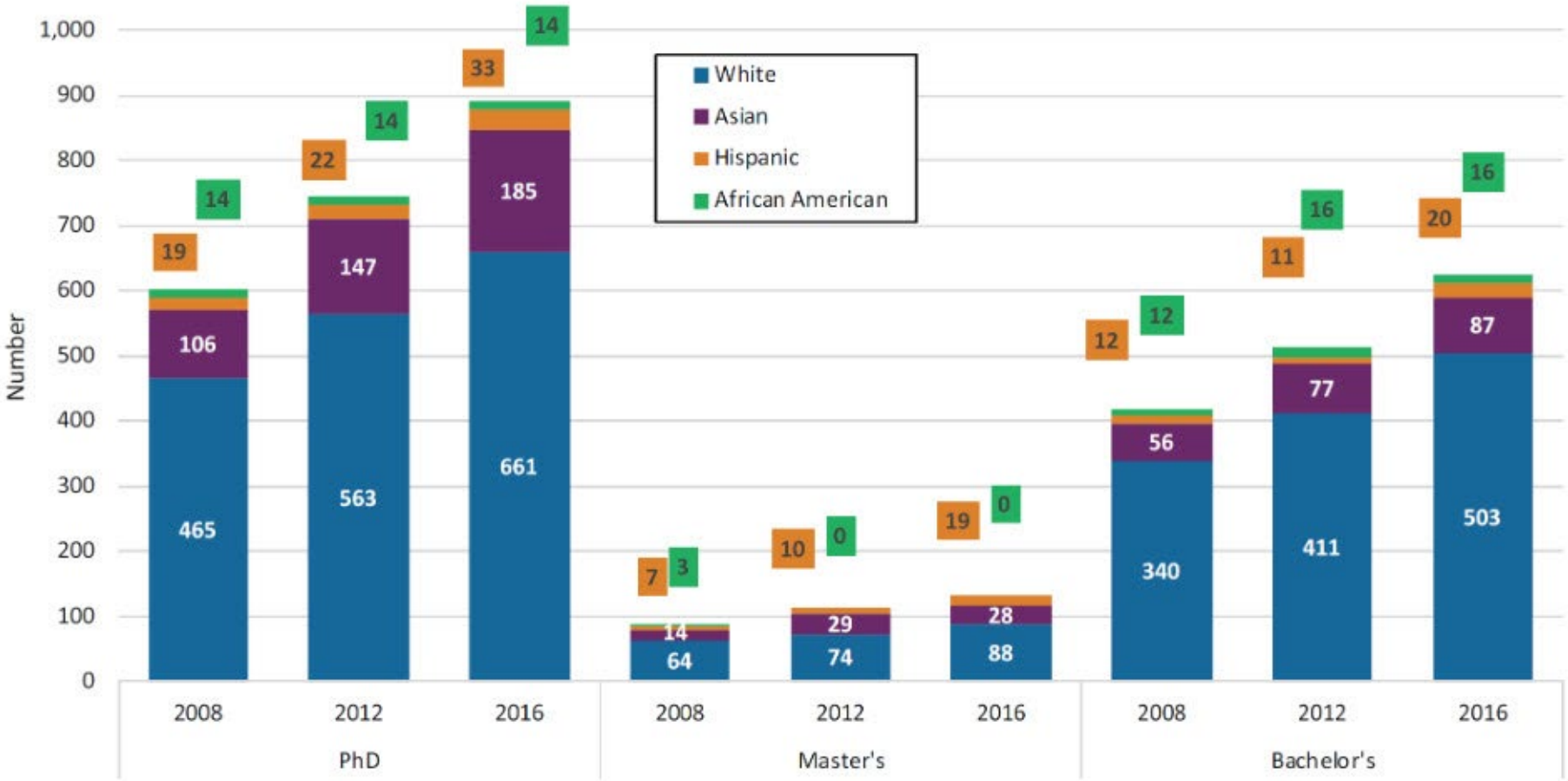
Number of Women Faculty Members in Physics and Astronomy Departments by Highest Degree Granted, 2008-2016



Source: AIP Statistical Research Center, Academic Workforce Survey.

Recognizing Unconscious Biases

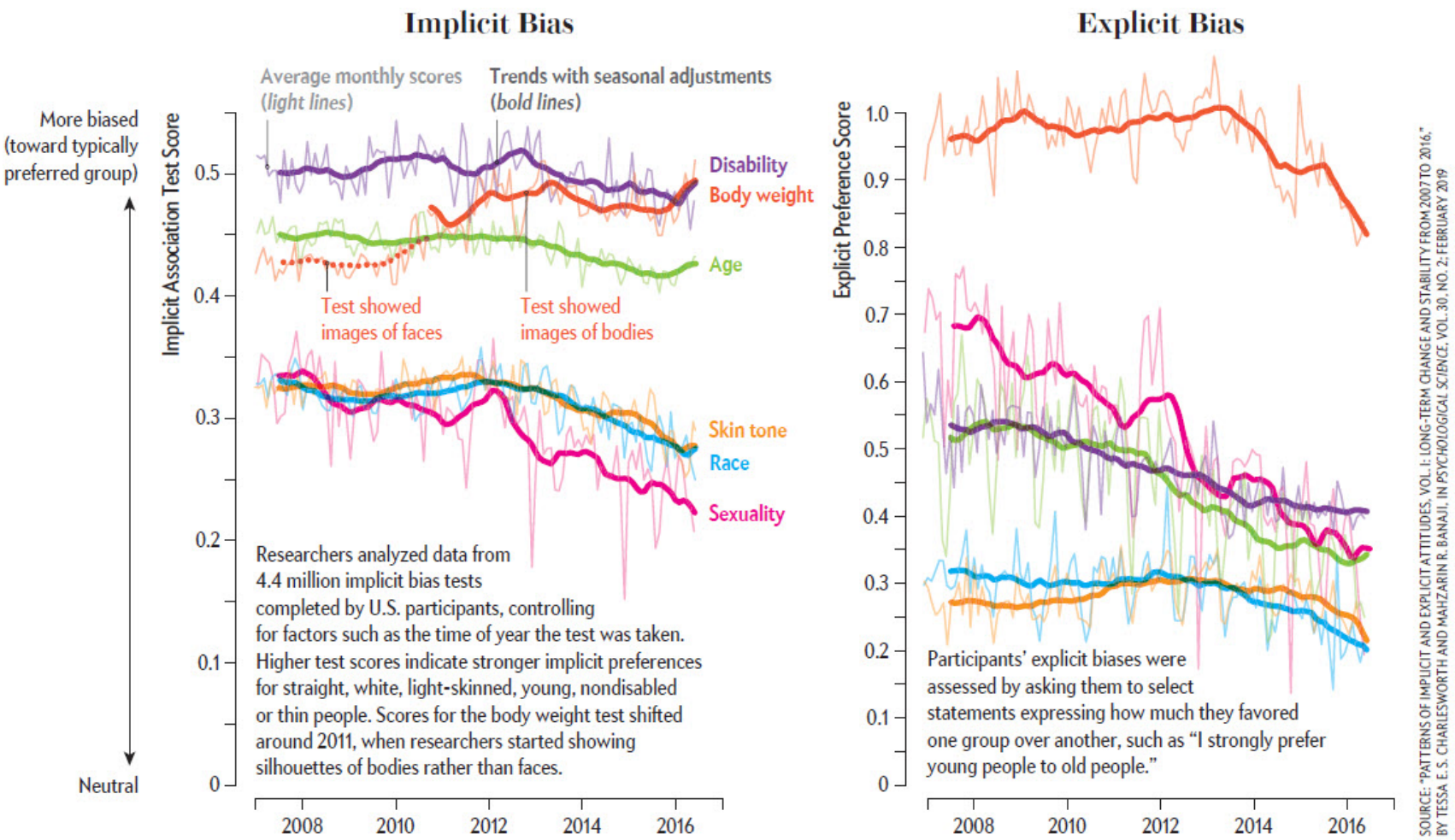
People who have experienced career success tend towards habits of “thin-slicing”.

In *Blink*, Gladwell introduces the concept and power of “thin-slicing” with the following story.

In the “Love Lab”, psychologist John Gottman can predict with 90% accuracy and in less than fifteen minutes whether a couple will still be together fifteen years later. But how? You can break a marriage down by looking at just one core element – the presence of contempt – to determine if it will be successful or not.

“He’s looking for patterns and cues. He has found that he can find out much of what he needs to know just by focusing on what he calls the Four Horsemen: defensiveness, stonewalling, criticism, and contempt. Contempt is closely related to disgust, and what disgust and contempt are about is completely rejecting and excluding someone from the community.”

Is Implicit Bias Unchangeable?



It Changes Over Time!

Why Link Diversity and Excellence?

Improving diversity for teachers is shown to impact student learning through

- Increased student retention and persistence in fields of study
- Higher student engagement (attendance and achievement) through coupling learning content to authentic real-world issues and experiences
- More emphasis on global issues that invite personal decisions to engage in social action