Diversity in STEM 101:
Why Should we Care, the Role of Implicit Bias and Privilege, and What are Some of the Solutions

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Complex differences and similarities in perspectives, identities, and points of view among individuals.

Diversity includes important and interrelated dimensions of human identity.
Advantages of socially diverse groups
How Diversity Makes Us Smarter

Being around people who are different from us makes us more creative, more diligent and harder-working

By Katherine W. Phillips on October 1, 2014
Problem solving (Hong and Page *PNAS* 101: 16385–16389 2004)
Multicultural networks promote creativity (*Harvard Business School* 2011)
Innovation and business growth (*Forbes* study 2011)
Companies receive higher earnings and returns on equity (*McKinsey Quarterly* 2012)
Leads to greater contributions to science as measured by impact factors and citations (*NBER Working Paper No. 19905* 2014)
5 Numbers That Explain Why STEM Diversity Matters to All of Us

8,650,000

84
Percentage of working professionals currently in science and engineering jobs in the U.S who are white or Asian males. (Source: National Science Foundation)

-12
Percentage drop, since 1991, in the number of computer science degrees earned by women in the U.S. (Source: National Science Foundation)

$15,900
Annual salary gap, as of 2013, between male and female professionals in STEM-related jobs. (Source: U.S. Census Bureau)

+40
Percentage difference in the number of U.S. information and technology patents filed by mixed-sex teams compared to all-male teams. (Source: National Center for Women & Information Technology)
Race/Ethnic Diversity in the United States
The good news

The United States is becoming a more globalized, multiracial country

William H. Frey
Diversity Explosion
How New Racial Demographics are Remaking America
2044: The year the Census Bureau projects we’ll have more minorities than whites in the U.S.

http://www.brookings.edu/research/reports2/2014/11/
2020: The year by which everyone under age 18 will be majority-minority

http://www.brookings.edu/research/reports2/2014/11/
The face of the United States
The face of Science and Academia

U.S. 2010 Resident Population Distribution vs Science and Engineering Workforce

S&E doctoral degrees earned in U.S. universities, by field: 2000–15
S&E doctoral degrees earned by U.S. citizen and permanent resident underrepresented minorities, by race and ethnicity: 2000–15
Postdoctoral appointees in science engineering and health:
Gender distribution in appointees

Source: National Science Foundation, National Center for Science and Engineering Statistics, NSF-NIH Survey of
Postdoctoral appointees in science engineering and health: Racial/Ethnic Breakdown of Postdoctoral Appointees

Source: National Science Foundation, National Center for Science and Engineering Statistics, NSF-NIH
Are we missing out? Increasing diversity gives us access to talent currently not represented
Increasing diversity in research will allow us to tackle the difficult and complex questions of the 21st century faster and better.

In short: Diversity is essential for excellence
We've used tools of computational creation to unlock immense wealth. We now have the opportunity to unlock even greater equality if we make social change a priority and not an afterthought. And so these are the three tenets that will make up the "incoding" movement. Who codes matters, how we code matters and why we code matters.
Implicit/Unconscious Bias: An obstacle to achieving diversity
https://www.youtube.com/watch?v=dVp9Z5k0dEE&index=1&list=PLPW-YUMwYuPL9uP73xqfzDHTLBZVvOk5H
The Real Question
Am I biased?
What are my biases?

“If you have a brain, you have biases.”

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Unintended, subtle and unconscious thought that happens to most people much of the time

Attitudes and stereotypes we develop based on characteristics such as race, age, ethnicity, religion or appearance
Spans 30 years

Numerous studies across disciplines (business, health care education, etc.)

Can be measured

May be a better predictor of behavior over explicit biases
Research Findings
Gender differences in conference presentations: a consequence of self-selection?

Female students were less likely to be assigned a higher visibility long-talk slot than male students.

Abstracts allocated a ‘male author’ were deemed of greater ‘scientific quality’ than those allocated a ‘female author’.

Perhaps more interestingly, was that less than a quarter of the participants assessing the abstracts could actually recall the gender of the abstract authors. This suggests that the observed differences arose through subconscious bias.

Jones et al. (2014), PeerJ 2:e627; DOI 10.7717/peerj.627
Knobloch-Westerwick, Glynn & Huge (2013)
Other Social Categories Can Also Affect Evaluation: Sexual Identity

Pairs of matched resumes sent to 1,769 ads for 5 different occupations in 7 different states

Overall, 40% fewer call backs for gay applicants

Largest difference in Ohio, Texas, Florida (as compared to California, New York, Nevada and Pennsylvania)


Additional Resource:
Other Social Categories Can Also Affect Evaluation: Ethnicity

The Letter
Dear Professor [Surname of Professor Inserted Here],
I am writing you because I am a prospective doctoral student with considerable interest in your research. My plan is to apply to doctoral programs this coming fall, and I am eager to learn as much as I can about research opportunities in the meantime.
I will be on campus today/[next Monday], and although I know it is short notice, I was wondering if you might have 10 minutes when you would be willing to meet with me to briefly talk about your work and any possible opportunities for me to get involved in your research. Any time that would be convenient for you would be fine with me, as meeting with you is my first priority during this campus visit.
Thank you in advance for your consideration.
Sincerely, [Student’s Full Name Inserted Here]

Student names:

Brad Anderson
Meredith Roberts
Lamar Washington
LaToya Brown
Juanita Martinez
Deepak Patel
Sonali Desai
Chang Wong
Mei Chen
BIASED TEACHINGS

Instructors at 259 US institutions were, on average, more likely to respond to fake email requests for mentoring if the senders’ names sounded white and male.

*Statistically significant difference in response rate
Characteristics of Unconscious Bias

• Pervasive and Robust

• Don’t necessarily align with our declared beliefs

We typically hold to biases that favor our own ingroup

Have real-world effects on behavior

We can learn to control our responses to unconscious bias and not act on them.
Impact of implicit bias?
Consequences of Unconscious Bias

Multicultural Effectiveness

Talent Acquisition

Staff Development/Promotion

Creativity/Innovation

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Implicit Bias contributes to lack of diversity in many areas.
How to address implicit bias?
Intention
Acknowledges biases and has motivation to change

Time
Practices new strategies designed to “break” the automatic associations

Attention
Pays attention when stereotypical responses or assumptions are activated

Dr. Patricia Devine, University of Wisconsin
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Management Habits For Breaking Bias

- Take intentional steps to expose blind spots (take IAT test)
- Recognize hot buttons/micro-triggers and don’t jump to conclusions too quickly
- Use your increased knowledge about cultural differences to anticipate how someone is likely to respond
- Step into the shoes of a stereotyped person and consider their view (perspective-taking)
- Build in accountability. Solicit feedback from peers, employees, etc.
- Actively seek out situations where you are likely to be exposed to positive examples of other cultures that are subject to stereotypes
- Practice micro-affirmations
- When a stereotypical response is detected, remind yourself of examples that prove the stereotype to be inaccurate (i.e. if a person judges an African American male as lazy or incompetent, (s)he imagines Colin Powell or Eric Holder)
Habits for Breaking Biases

**Micro-Aggressions**
subtle slights and snubs that devalue people

**Micro-Affirmations**
Small intentional acts that occur whenever people want others to succeed
“Just so you know, we hire based on qualifications not race...by the way, you are very articulate.”
In the classroom...
“Today we are going to debate immigration. I expect the Latino students to argue in favor of immigration”
Micro-Affirmation Behaviors
(within context of cultural values)

• Greet employees, colleagues and customers with *sincerity*

• **Connect person-to-person**: bring a personal element to your interactions and acknowledge each employee beyond the role or position they occupy

• **Be present** to the other person: focus your complete attention on them when they are speaking. Let your body language and facial expression demonstrate that you are listening

Mary Rowe, MIT
Micro-Affirmation Behaviors
(within context of cultural values)

• Respond to what’s really being said by paraphrasing and empathizing

• Appreciate and praise strengths and contributions
Privilege: Another reason why diversity remains elusive in academic research
What is privilege?

- Enjoying rights and/or advantages associated with being part of a particular group
- These advantages are unearned
- There are privileges associated with every dimension of diversity: gender, race, religion, etc.
  - Everyone interacts with all dimensions of privilege
- Experienced most often unconsciously
• Because we are often unaware of our privileges, we make assumptions about:
  • What is possible
  • Merit
  • Accomplishments

• When evaluating individuals (for employment, college admissions, etc.) lack of or access to privilege are rarely considered.

• The unequal access to privilege is an important consideration in the retention of diverse scholars.
Privilege Walk

https://www.youtube.com/watch?v=hD5f8GuNuGQ
What to do about privilege?

• Privilege is
• Be aware of your privileges
• Use your privilege to work towards leveling the playing field
  • Work to extend your privileges to those who do not have them.
• As future leaders, postdoctoral scholars need to keep these concepts in mind
  • To make an impact on the diversity of the workforce
  • To become better leaders who can identify talent and assemble a productive team
Let’s discuss