SCIL Works 2023:
More than a checkbox: Moving beyond DEI into justice

Highlighting BIPOC scientists and researchers: A library one-shot for STEM disciplines

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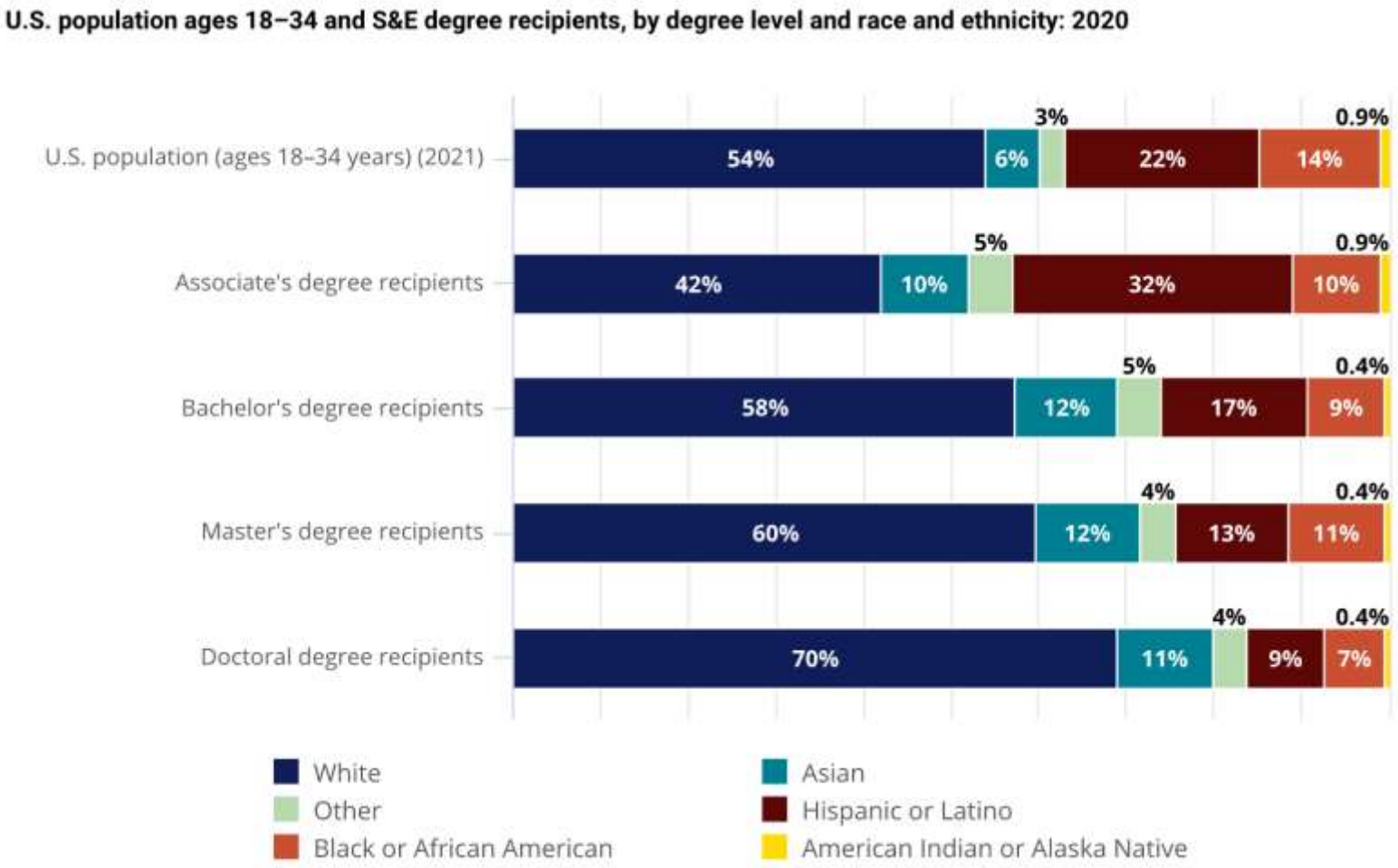
Outline

- Situating myself
- Demographics of the STEM workforce
- Science identity
- STEM teaching and learning affective domains
- Challenging a culture of white male Western science
- Example one-shot: Scientist spotlights research activity for a community college Math class
- Resources
- References

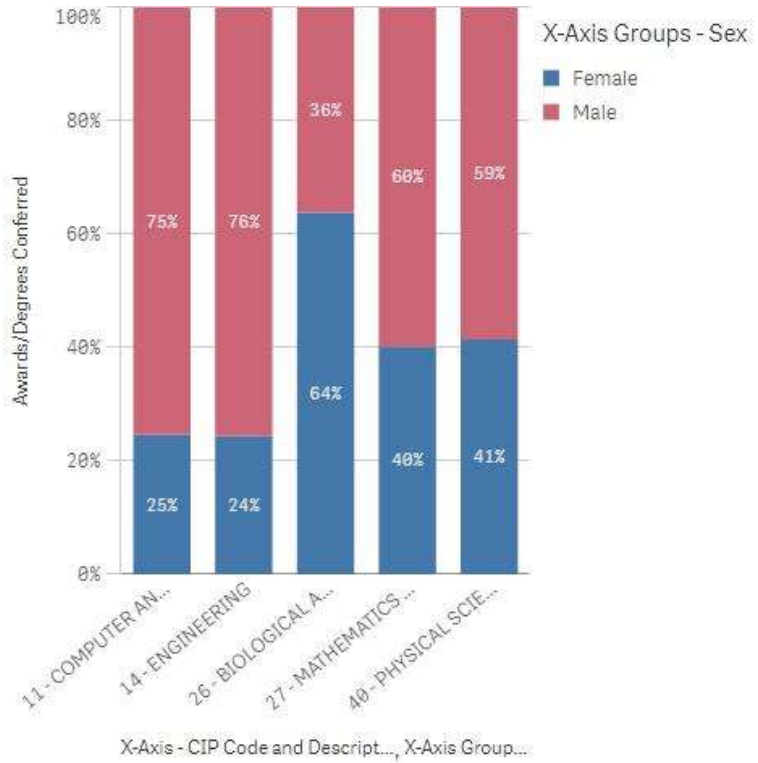
Situating myself

- White, cis-gender, able-bodied, American, male librarian
- Working in college and community college libraries for nine years, four years as a librarian serving undergraduate science students and faculty
- Interested in promoting equity and challenging systemic bias in library and educational settings

Demographics of STEM Workforce

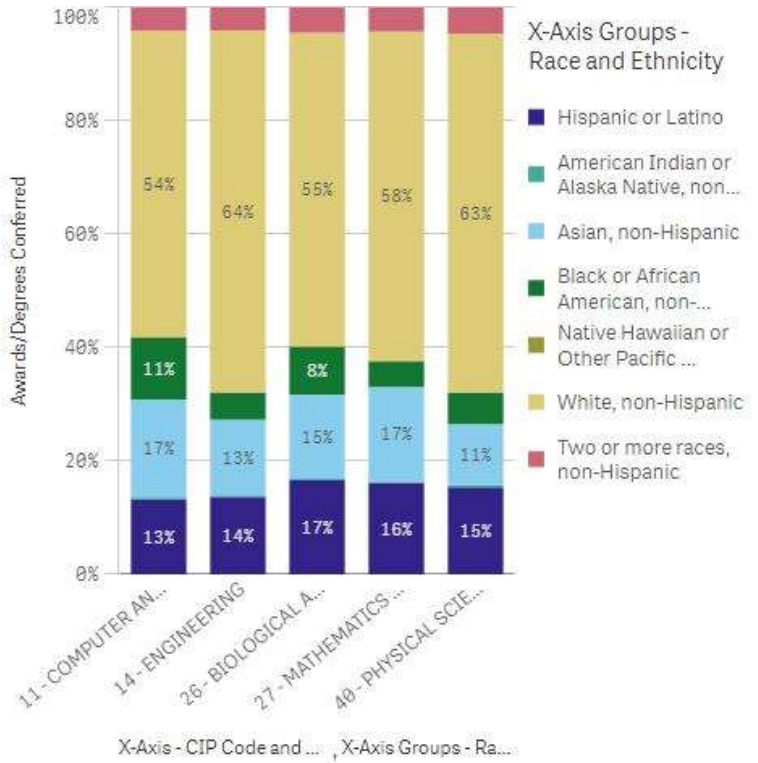


2020 STEM Degrees (US)



SOURCE: Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, unrevised

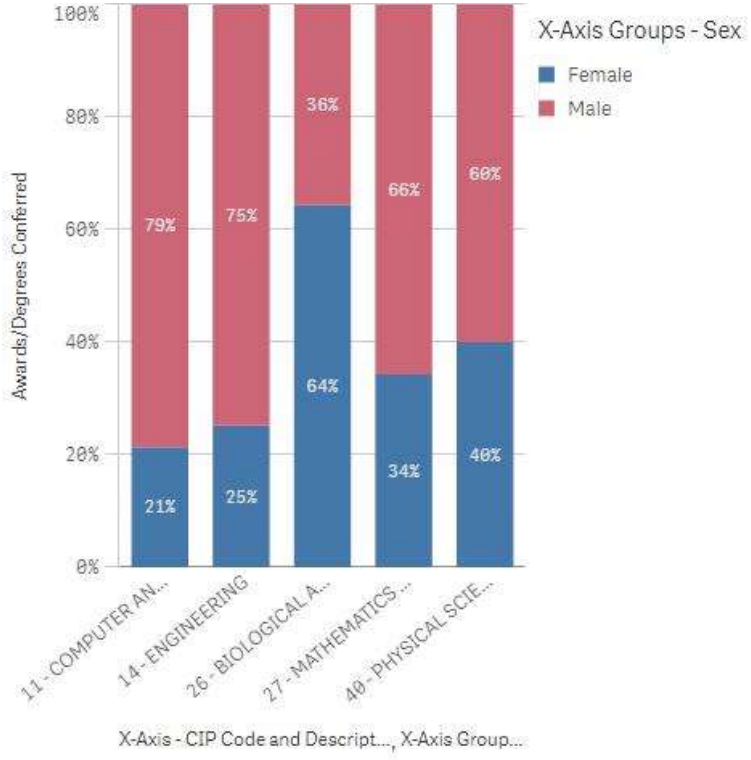
Fig. 4 Proportion of degrees awarded by gender



SOURCE: Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, unrevised

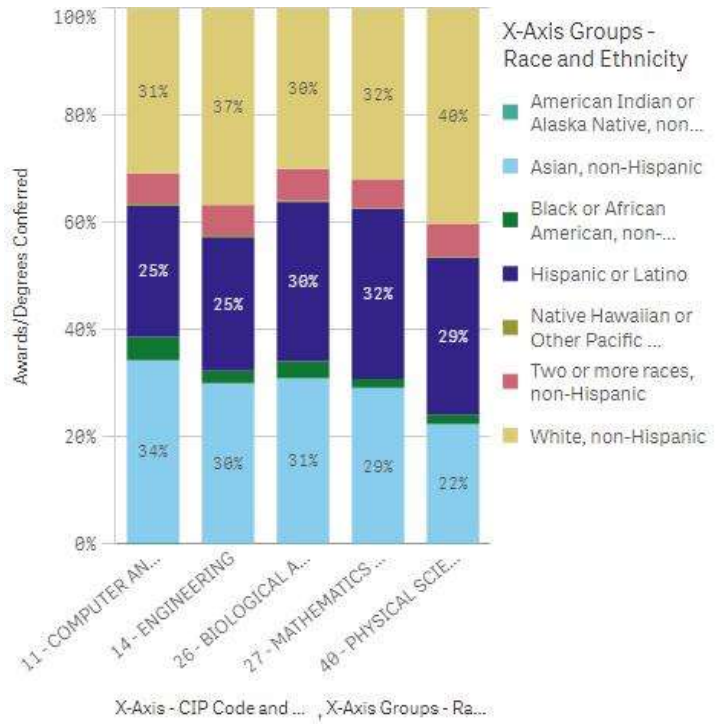
Fig. 5 Proportion of degrees awarded by race and ethnicity

2020 STEM Bachelor's Degrees (California)



SOURCE: Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, unrevised

Fig. 6 Proportion of degrees awarded by gender



SOURCE: Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, unrevised

Fig. 7 Proportion of degrees awarded by race and ethnicity

Science identity

In 2007, Carlone and Johnson developed a grounded model of science identity based on how self-identified women of color experience, negotiate, and persist in science.

Cultural practices inform the meaning of “science people”.

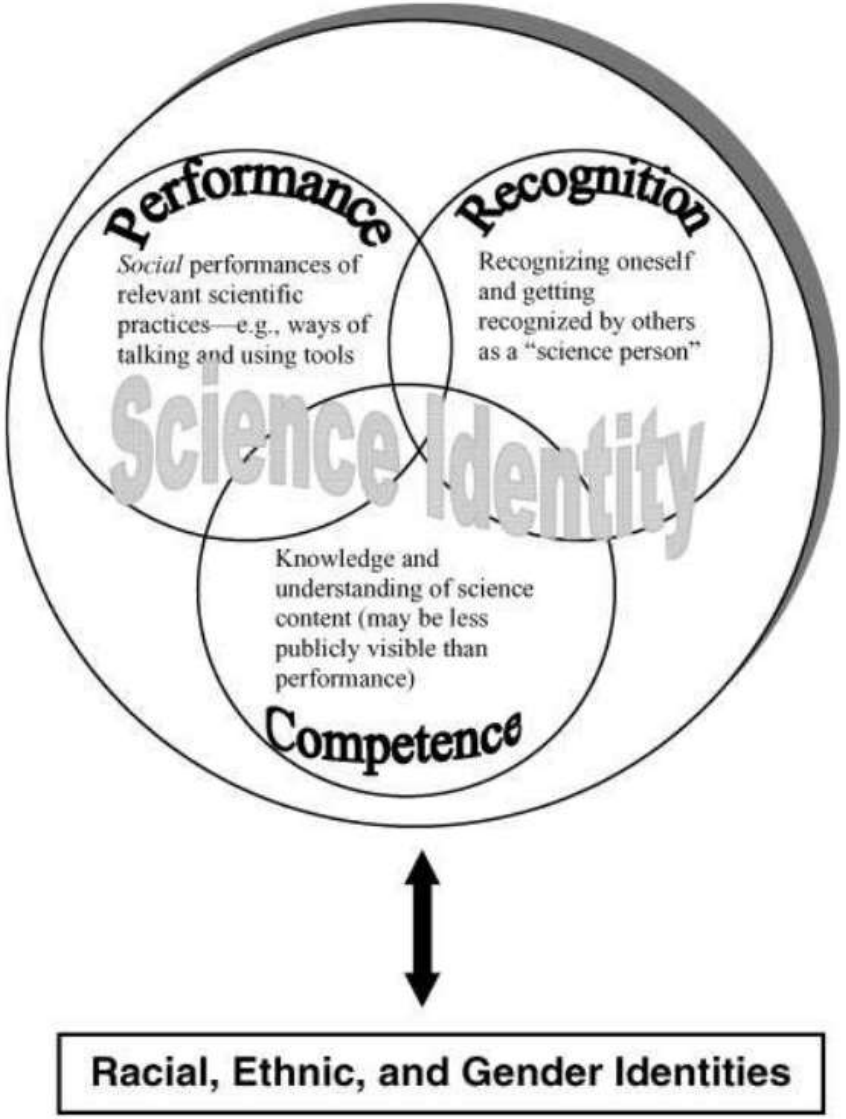


Fig. 8 Reprinted from Carlone, H. B. & Johnson, A. J. (2007). Model of science identity that guided initial analysis.

STEM teaching and learning affective domains

Self-efficacy: “the exercise of human agency through people’s beliefs in their capabilities to produce desired affects by their actions” (Bandura, 1997, vii as cited in Trujillo & Tanner, 2014, p. 7).

Impacts students’ academic achievement, perseverance, and self-regulated learning.

Sources of self-efficacy: mastery experience, emotional/physiological states, social persuasion, vicarious experience (i.e. observing models who share similar characteristics experience success) (Trujillo & Tanner, 2014).

Sense of belonging: students’ feelings that they ‘fit’ in a specific place or environment. Has implications for retention, academic motivation, academic achievement, and well-being (Hoffman, et al. 2002).

Stereotype threat: fear of confirming a negative stereotype about one’s identity, which increases stress and undermines performance (Steele, 1997; Cohen & Garcia, 2008). Interventions that eliminate this threat can improve performance.

Challenging a culture of white male Western science

- Science is a subculture of Western or Euro-American culture (Aikenhead 1996).

- Counter-stereotypical images of scientists can contribute to positive and inclusive classroom climate that validates underrepresented student identities.

Example one-shot instruction session

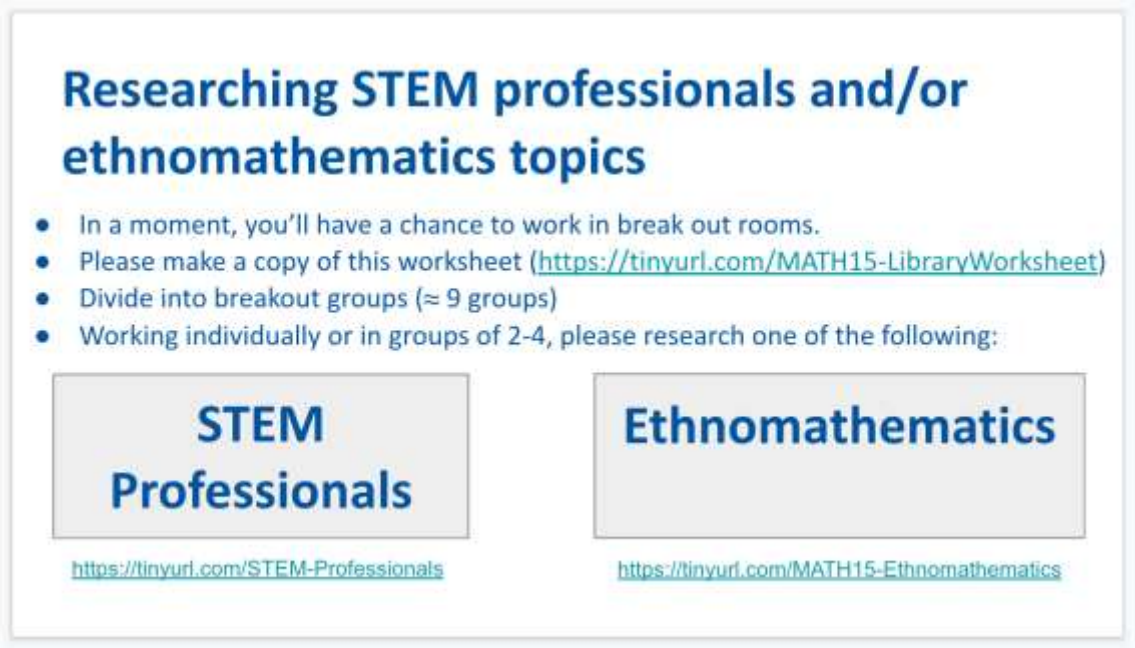


Fig. 9 Instructions for students researching a selected STEM professional or ethnomathematics research topic

Astronomy

1. Samaiyah Farid, Ph.D.
2. Arianna S. Long, Ph.D.
3. Eileen Gonzales, Ph.D.
4. Brittany E. Miles, Ph.D.
5. Dara Norman, Ph.D.
6. Angela Osterman Meyer, Ph.D.
7. Jamila Pegues, Ph.D.
8. Caprice Phillips
9. Mercedes Richards, Ph.D.
10. Meghnad Saha

Astrophysics & Astrogeology

1. Belinda Cheeseboro, Ph.D.
2. Martha Gilmore, Ph.D.
3. Eileen C. Gonzales, Ph.D.
4. Jarita C. Holbrook, Ph.D.
5. Moiya McTier, Ph.D.
6. Adriana Ocampo, Ph.D.
7. Arielle Phillips, Ph.D.
8. Anouk Aimée Shambrook, Ph.D.
9. Tonia Moira Venters, Ph.D.
10. Reva K. Williams, Ph.D.
8. Devin Swiner, Ph.D.
9. Ashley Lindalía Walker
10. Davita L. Watkins, Ph.D.

Computer Science

1. Isis Anchalee
2. Erica Joy Baker
3. Juani Bermejo-Vega, Ph.D.
4. Victor H. Chávez
5. Tracy Chou
6. Clarence "Skip" Ellis, Ph.D.
7. Duy-Loan Le
8. Amber K. Lenon, Ph.D.
9. Yao-Yuan Mao, Ph.D.
10. Kathy Pham

Ecology

1. Priyanga Amarasekare, Ph.D.
2. Shane Campbell-Staton, Ph.D.
3. Kathy DeerInWater, Ph.D.
4. Sebastian Alejandro Echeverri, Ph.D.
5. Delbert André Green II, Ph.D.
6. Alexandra Harmon-Threatt, Ph.D.
7. Zheng-Hui He, Ph.D.

Fig. 10 Compiled list of selected STEM professionals in a variety of disciplines

Example one-shot instruction session

After working in breakout groups, students were asked to share out about the following questions:

1. Please describe your STEM professional or ethnomathematics topic.
2. In what ways are you familiar with this person or topic from mainstream math or science you've been exposed to?
3. What is new to you or different from mainstream math or STEM figures you've learned about before?
4. What new perspectives do you have about math or STEM after doing this research?

References

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