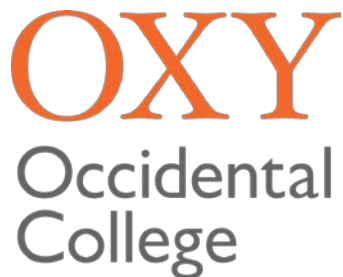


# Electronic Seminar on Mathematics Education

## **Who Are We? On the Diversity and Demographics of the Mathematics Community**

Ron Buckmire



12p ET, Feb. 18, 2020

[math.mit.edu/seminars/esme](https://math.mit.edu/seminars/esme)

# Abstract

Mathematics is a human endeavor. In other words, mathematics is done, taught, discovered and learned by people. All people have various identifying characteristics and experiences that affect how they interact with other people and how people interact with them. The identities of the people who are perceived as belonging to the mathematics community are important. Data will be presented about the diversity and demographics of the mathematics community in the United States, followed by a discussion of the significance and implications of the underrepresentation of certain groups.

# My goals for today

- Pose some questions about how “We” define the “Mathematics Community”
- Advocate for the idea that mathematics is a human endeavor
- Argue that it matters “Who does the math”
- Provide demographic details about the “(United States) Mathematics Community”
- Engage in discussion about all these topics and more!

# Outline of this presentation

- Who are “we”?
  - Some definitions of the “Mathematics Community”
- Who are we?
  - Some demographics of the United States
  - Some demographics of the mathematics community
- Why should we care?
  - Implications of underrepresentation in STEM
  - Debate over diversity/equity/inclusion is linked to the talent/grit (FKA “excellence/equity”) divide

**What Does A Mathematician  
Look Like?**



**What Is The “Mathematics  
Community”?**

# The Mathematics Community: Some Definitions

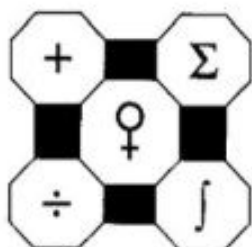
1. The set of individuals who are defined to be mathematicians.
2. The set of individuals who identify themselves as members of the mathematics community.
3. The set of individuals who belong to one or more professional mathematics organizations.
4. The set of individuals who teach, study, research, do, learn, or are interested in, mathematics.
5. Other?

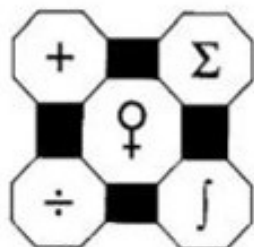
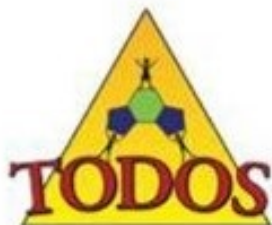
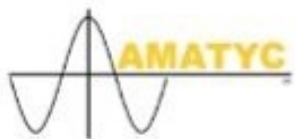


# **Def. 3: Membership in Mathematical Organizations**

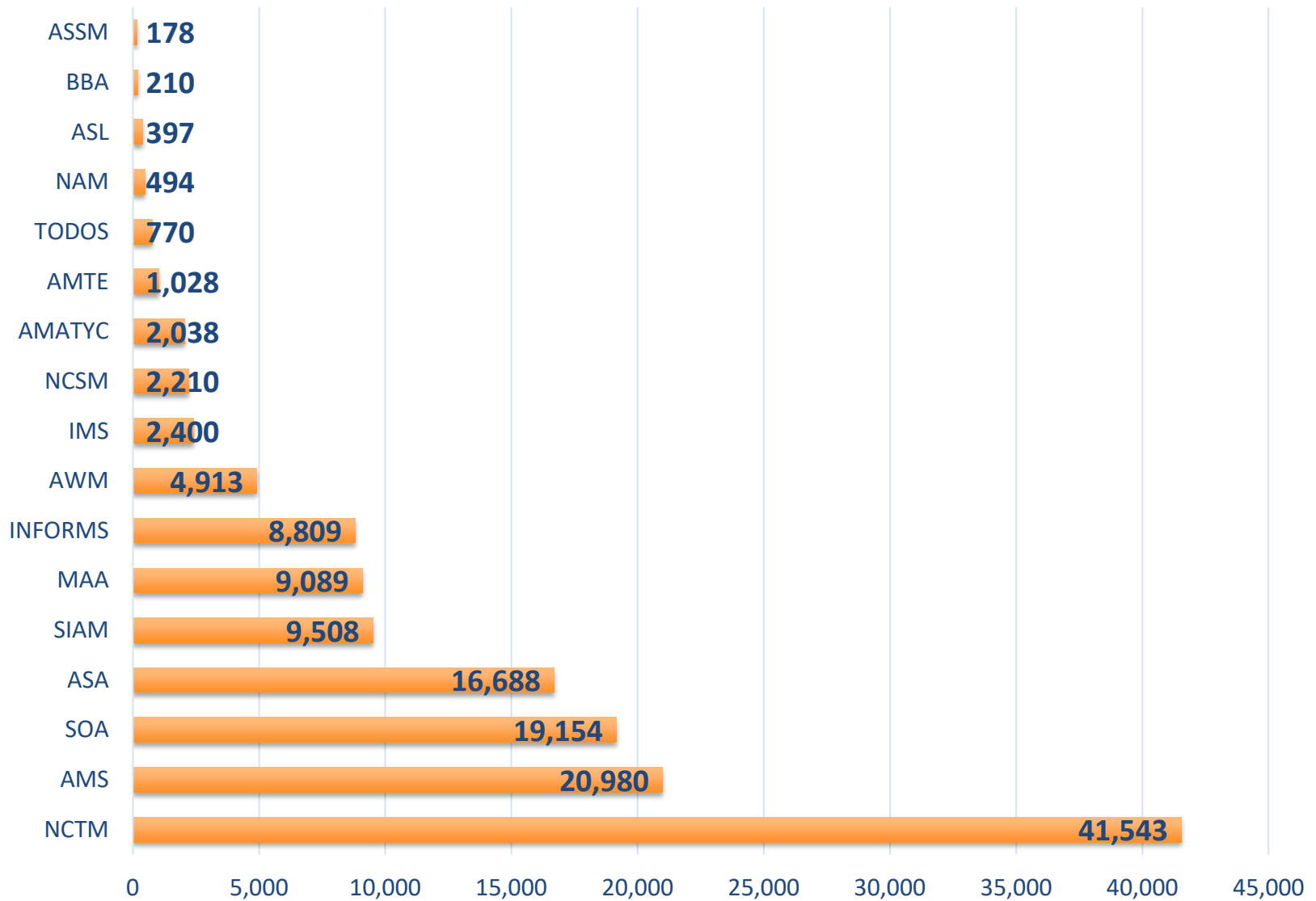
# **POP QUIZ!**

**Which mathematics organization  
has the most members?**

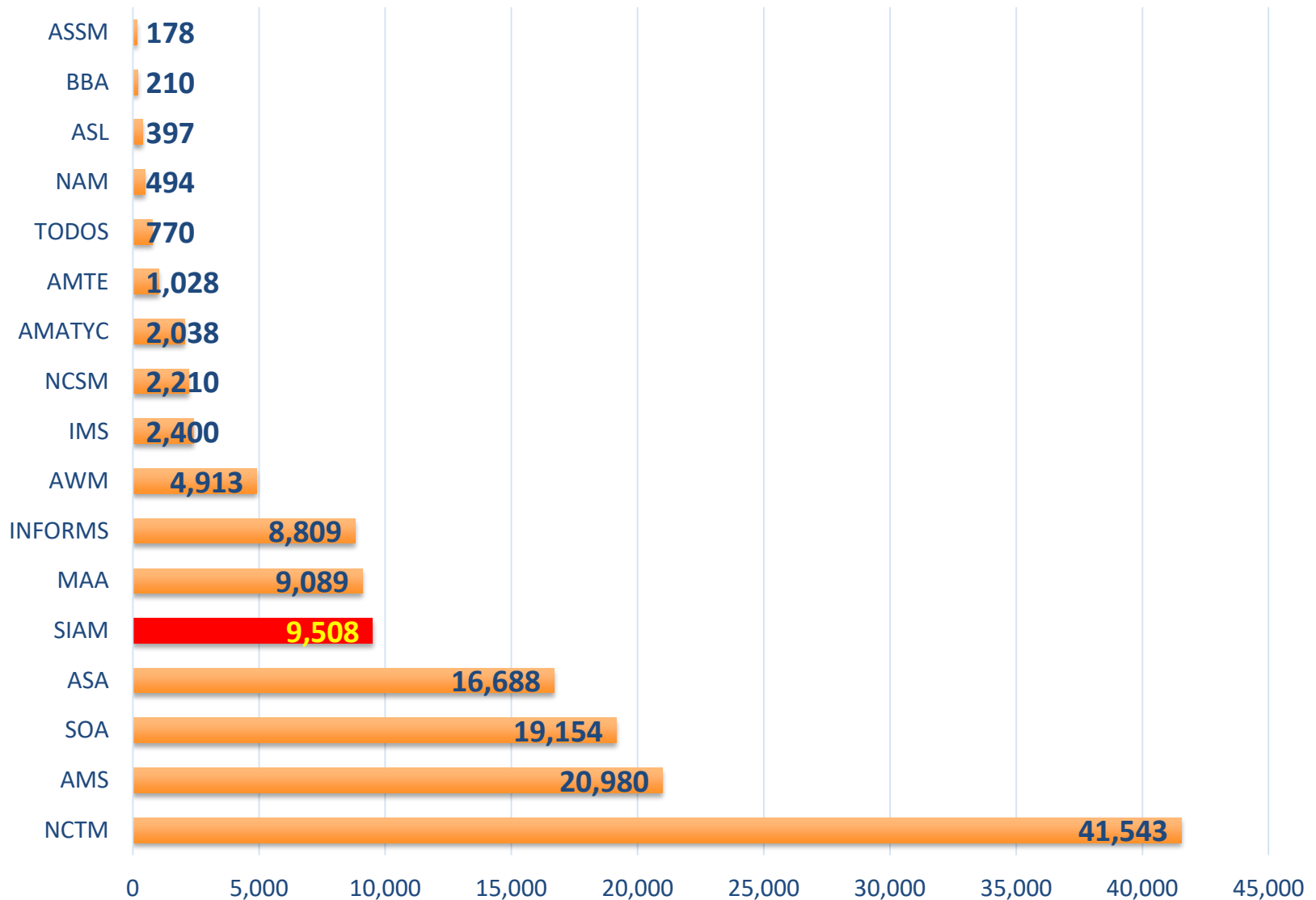




# Membership in U.S. National Mathematics Organizations



# Membership in U.S. National Mathematics Organizations



Source: Conference Board of the Mathematical Sciences (CBMS)

# Membership Demographics of SIAM

All Membership (Non-Student)	Number	Percentage
Male	6446	78.70
Female	1171	14.30
Unanswered	569	6.95

Regular Membership (U.S. Only)	Number	Percentage
Male	6432	69.95
Female	1788	19.45
Unanswered	961	10.45

Regular Membership (Non U.S.)	Number	Percentage
Male	3580	74.37
Female	685	14.23
Unanswered	544	11.30

Source: Society for Industrial and Applied Mathematics, 2019.

**(Some)**  
**Demographics of the**  
**United States**



# **POP QUIZ!**

**What is the percentage of the U.S. population that is white?**

# Race and Ethnicity in the U.S.

Categories (Race and Ethnicity)	Percentage
White	<b>75.7</b>
Black or African-American	<b>13.9</b>
American Indian and Alaska Native	<b>1.7</b>
Asian	<b>6.3</b>
Native Hawaiian and Other Pacific Islander	<b>0.4</b>
Hispanic or Latino (any race)	<b>17.6</b>
Some other race	<b>5.4</b>

# Gender in the U.S.

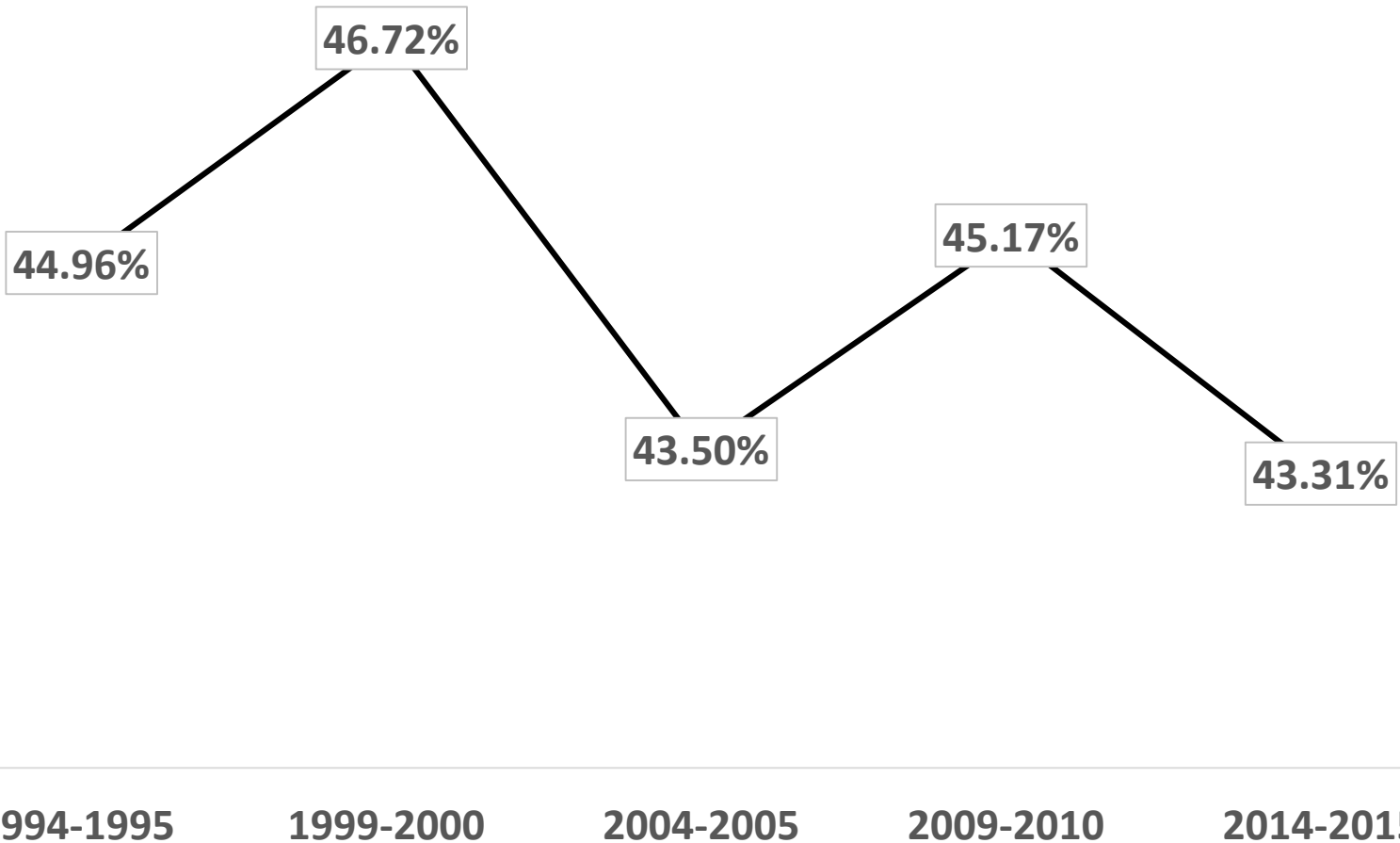
Categories (Total Population)	Percentage
Male	49.2
Female	50.8

Categories (Voting Population)	Percentage
Male	48.4
Female	51.6

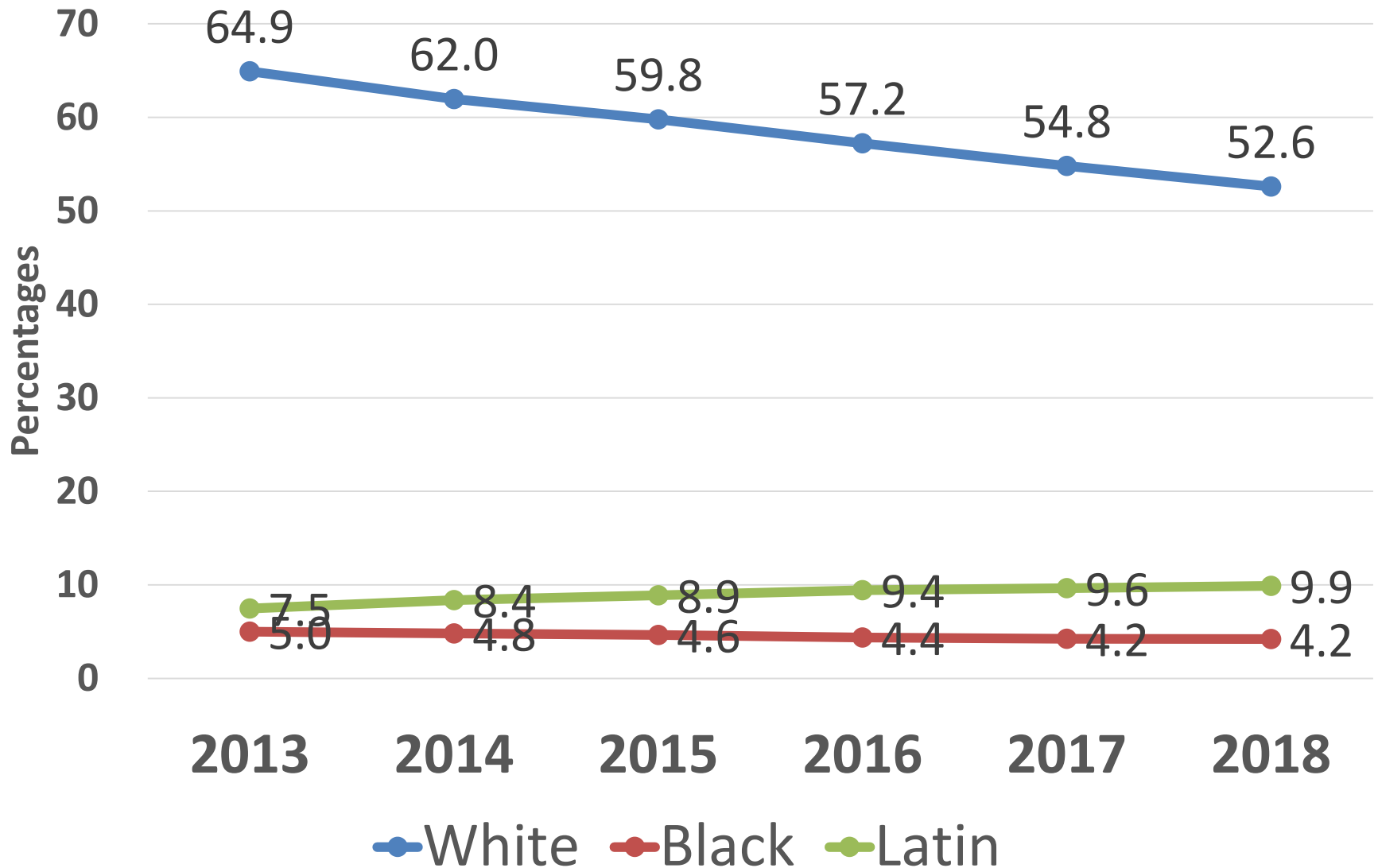
**(Some)**  
**Demographics of the**  
**Mathematics Community**

# Mathematics Majors: Gender

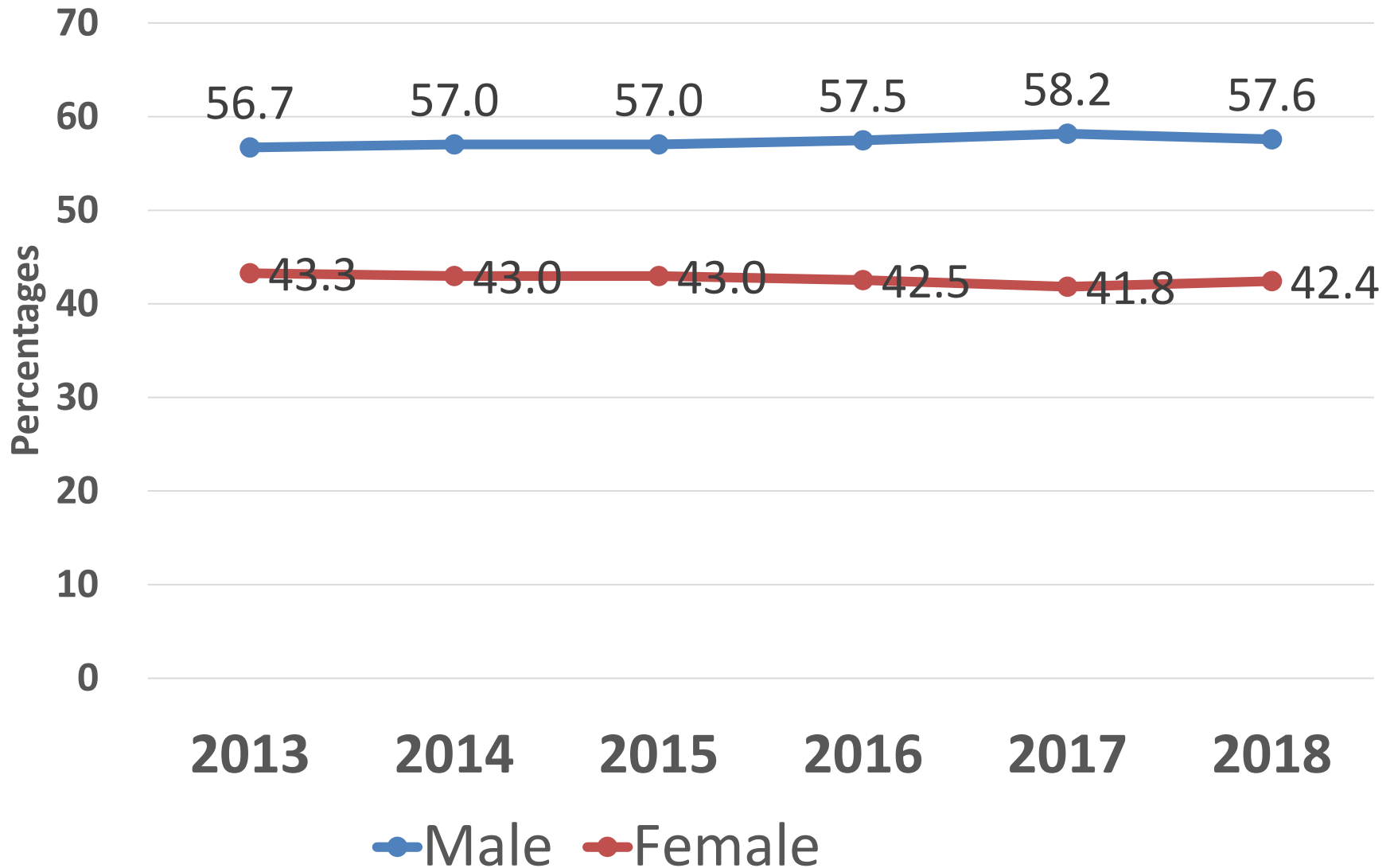
PERCENTAGE OF FEMALE UNDERGRADUATE  
MATHEMATICS MAJORS



# Mathematics Degrees: Race & Ethnicity

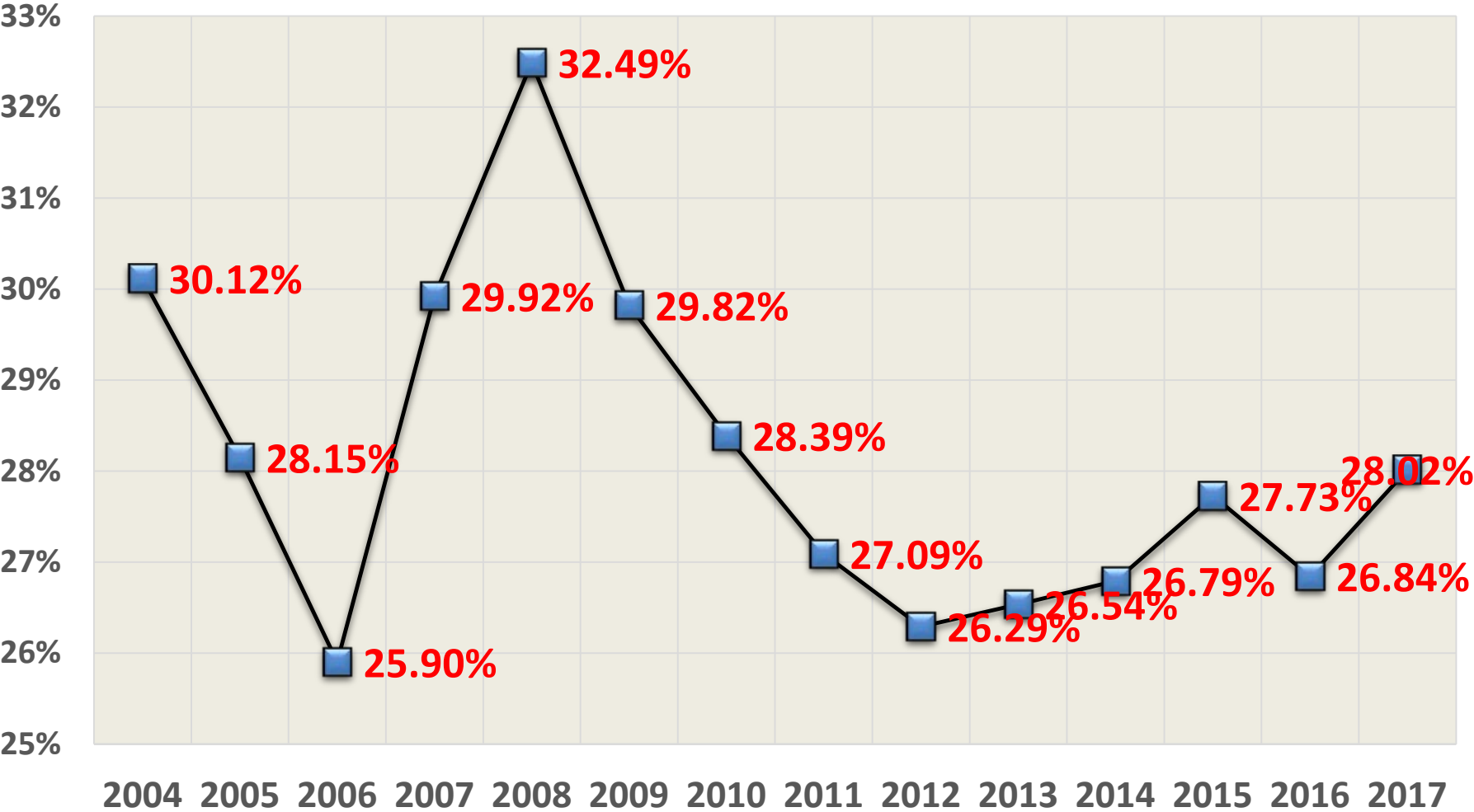


# Mathematics Degrees: Gender



# Mathematics Ph.D. Recipients: Gender

PERCENTAGE OF FEMALE U.S. MATHEMATICS PHD RECIPIENTS





# U.S. Mathematics Ph.D. Recipients: Race and Ethnicity (Women only)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Black</b>	5	11	16	9	9	10	6	9	10	11	11
<b>Hispanic or Latinx</b>	4	5	12	8	9	11	6	7	9	11	6
<b>Asian/P.I.</b>	29	24	27	39	38	22	34	32	25	25	46
<b>Native American</b>	1	0	1	0	0	0	1	1	1	0	1
<b>White</b>	132	161	154	168	155	163	170	179	195	201	189
<b>Other</b>	22	17	25	21	18	15	22	22	4	3	14
<b>TOTAL</b>	193	218	235	245	230	224	242	254	244	251	267

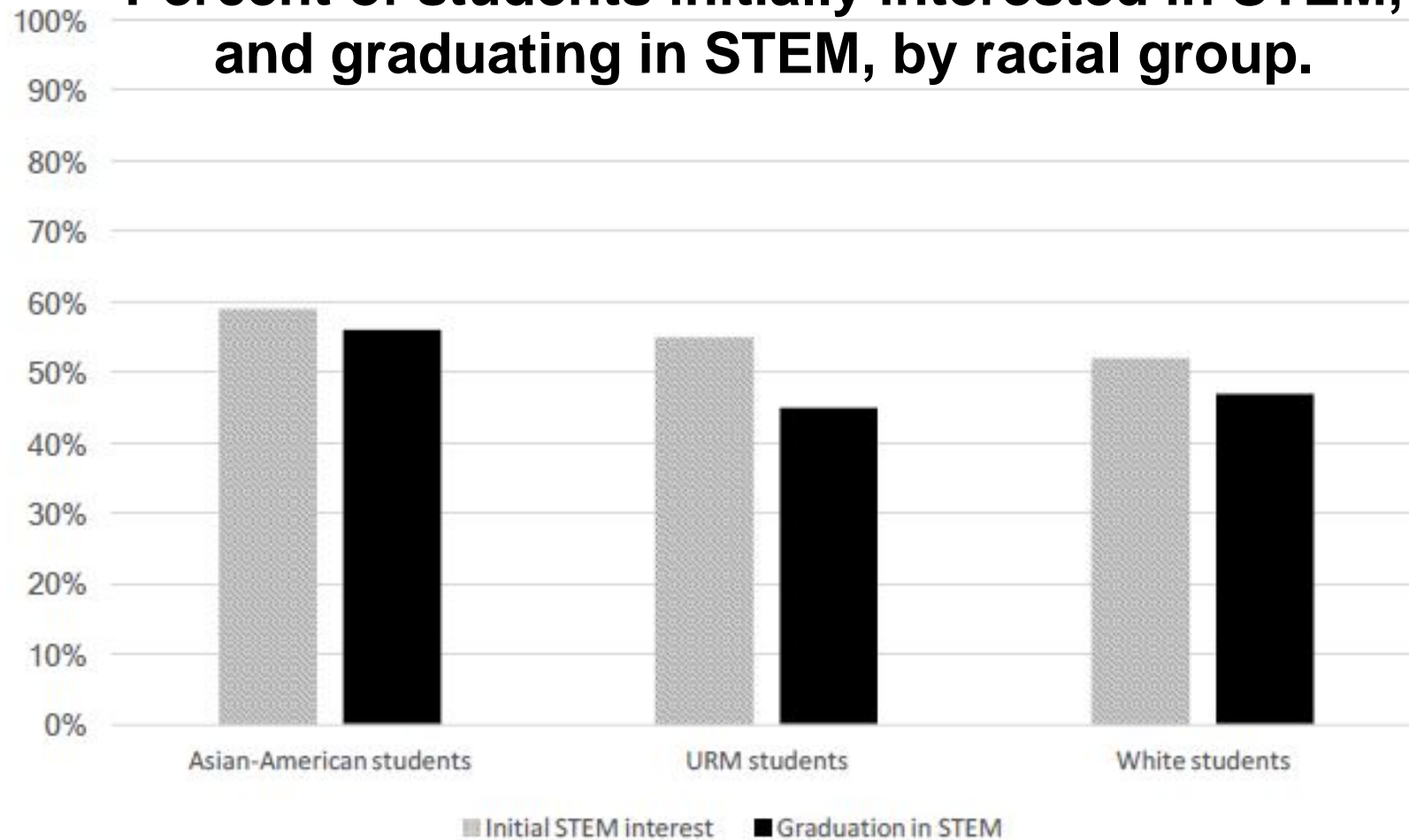
# U.S. Mathematics Ph.D. Recipients: Race and Ethnicity (Men only)

	2012	2013	2014	2015	2016	2017
Black	16	16	15	10	18	19
Hispanic or Latinx	22	22	24	17	34	27
Asian	39	50	38	40	52	68
American Ind. / Alaskan Native	5	0	5	3	2	3
Hawaiian /Pac. Isl.	3	1	2	6	5	3
White	492	522	564	545	551	527
Other/Unknown	44	13	16	15	22	39
<b>TOTAL</b>	<b>628</b>	<b>670</b>	<b>694</b>	<b>636</b>	<b>684</b>	<b>686</b>

# **(Some) Implications of Underrepresentation in STEM**

# Implications of Underrepresentation in STEM

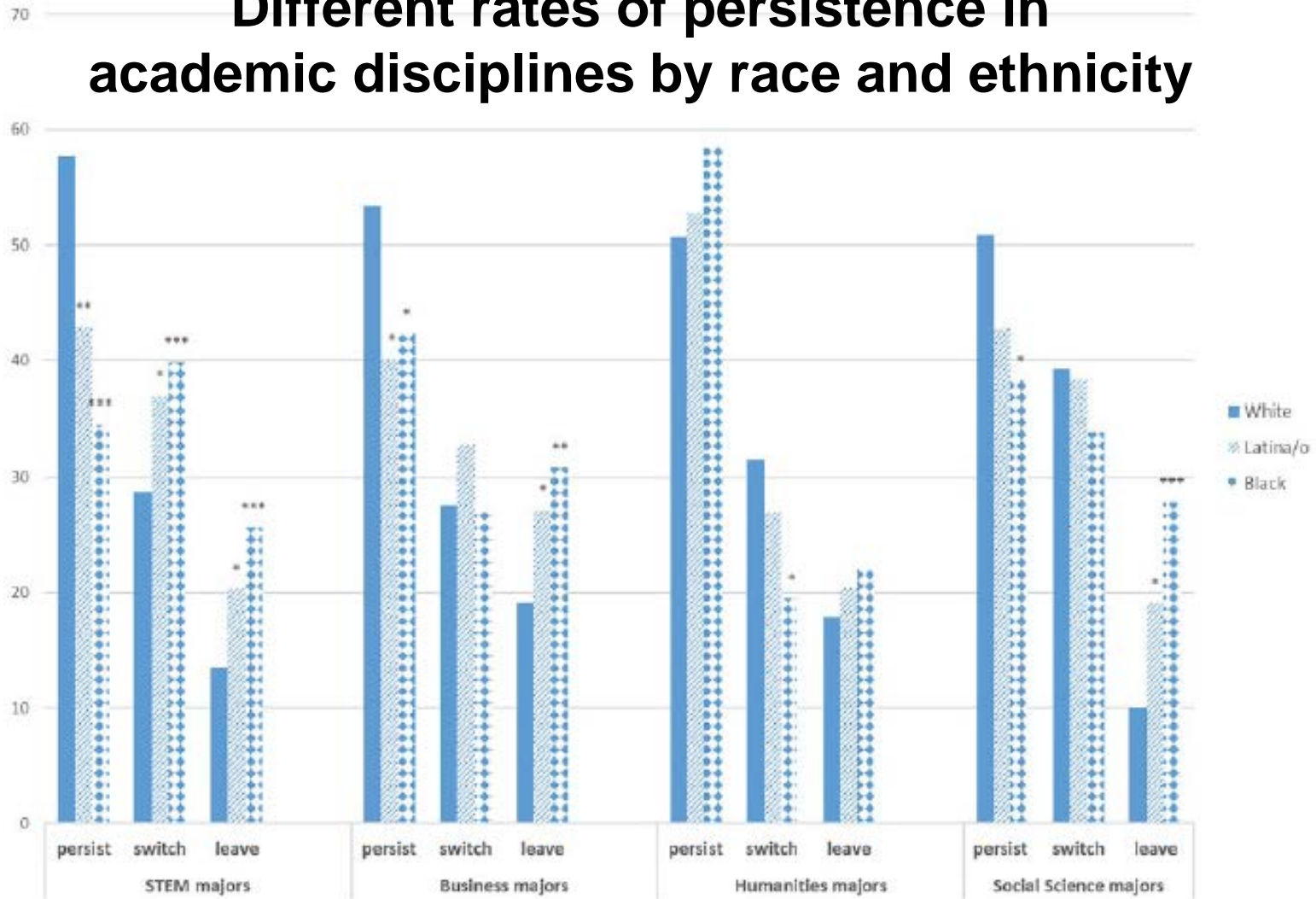
**Percent of students initially interested in STEM, and graduating in STEM, by racial group.**



Source: Williams, George-Jones & Hebl, 2018

# Implications of Underrepresentation in STEM

## Different rates of persistence in academic disciplines by race and ethnicity



# Which one is “smart”?

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Choose one:

*smart*

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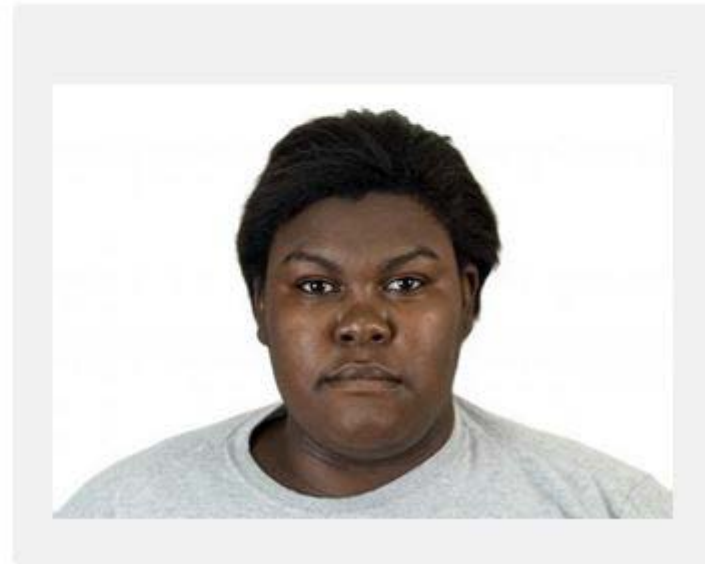
# Which one is “smart”?

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Choose one:

*smart*

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# Phenotypic Stereotypicality and STEM Persistence (Williams *et al*, 2018)

- Different Racial Groups Have Different Rates of STEM Persistence
- Racial phenotypic stereotypicality is a factor in STEM persistence.
- Racial phenotypic stereotypicality negatively relates to STEM persistence among college students from under-represented minority groups.
- Gender was a more salient factor in African-Americans than among Asian-Americans or White participants



# Broadening Participation

# (Some) Broadening Participation Efforts

## **American Mathematics Society**

- Committee On Equity, Diversity, and Inclusion
- Director of Diversity and Inclusion(TBA!)

## **Mathematical Association of America**

- Committee on Minority Participation in Mathematics
- National REU Program
- TENSOR-SUMMA grants
- Project NeXT

## **Society for Industrial and Applied Mathematics**

- Diversity Advisory Committee

## **National Science Foundation**

- Broadening Participation portfolio
- Committee on Equal Opportunities in Science and Engineering

# References

# References

1. **American FactFinder.** 2013-2017 American Community Survey 5-Year Estimates. U.S. Census Bureau. Available online at <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>
2. **David Bressoud.** Private Communication. 2018.
3. **Annual Survey of Mathematical Sciences.** Available online at <http://www.ams.org/profession/data/annual-survey/>
4. **Nicole Joseph.** “I DO (NOT) Belong: Experiences of Black Women and Girls in Mathematics Education.” Plenary Presentation. Critical Issues in Mathematics Education, Berkeley, CA (March 15, 2017).
5. **National Center for Education Statistics.** Digest of Education Statistics. 2019.

# References (continued)

6. **Richelle (Rikki) Blair; Ellen E. Kirkman; James W. Maxwell.** *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States: Fall 2015 CBMS Survey.* 2018.
7. **Society for Industrial and Applied Mathematics.** Private Communication. 2019.
8. **Melissa J. Williams; Julia George-Jones; Mikki Hebl.** “The Face of STEM: Racial Phenotypic Stereotypicality Predicts STEM Persistence by –and Ability Attributions about – Students of Color.” *Journal of Personality and Social Psychology.* October 15 2018. <https://doi.org/10.1037/pspi0000153>.
9. **David Bressoud.** *Persistence of Black and Latino/a Students in STEM.* June 1, 2019. <https://mathvalues.squarespace.com/masterblog/launchings201906>

# Discussion

# Thank You

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