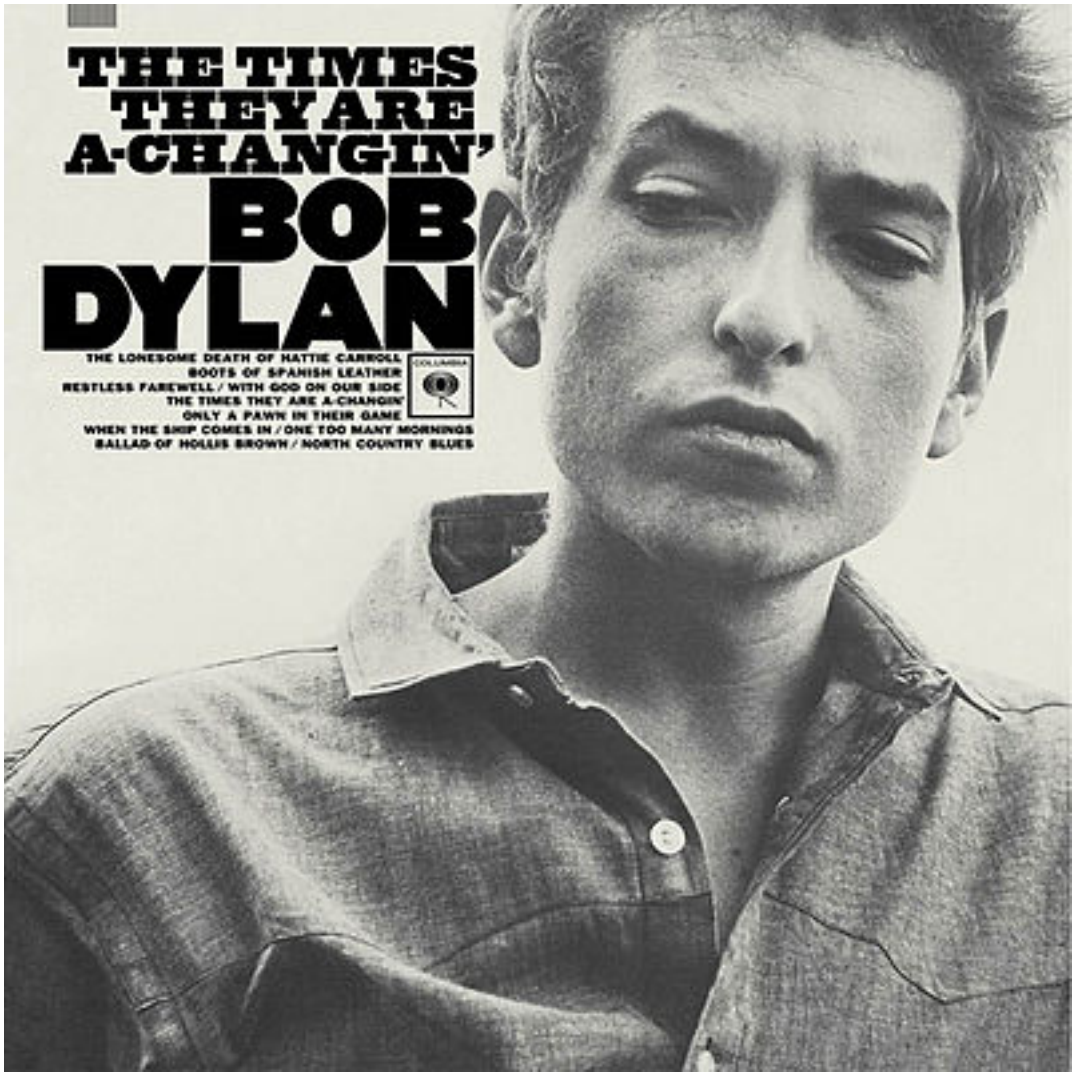
Research-based Information on Diverse 21st Century Students & Resources to Help Them Thrive in SBS

Guests:

- **Chris Cash**, IBP Director of Student Assistance Programs
- **Dr. J. Theodore Repa**, Touro College & New York University Graduate School of Education (retired)
- **David Siegfried**, IBP Director of Assessment Processes


THE TIMES THEY ARE A-CHANGIN'
BOB DYLAN
THE LONESOME DEATH OF HATTIE CARROLL
BOOTS OF SPANISH LEATHER
RESTLESS FAREWELL / WITH GOD ON OUR SIDE
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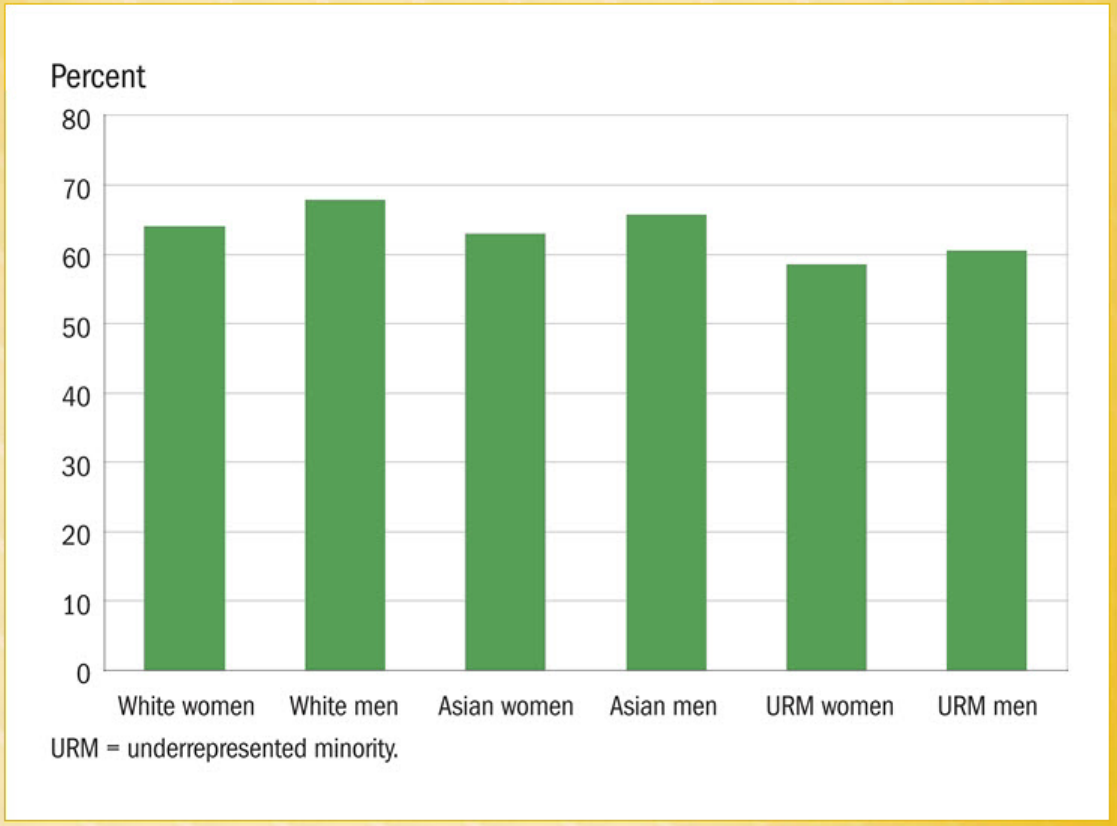
ONLY A PAWN IN THEIR GAME
WHEN THE SHIP COMES IN / ONE TOO MANY MORNINGS
BALLAD OF HOLLIS BROWN / NORTH COUNTRY BLUES
COLUMBIA

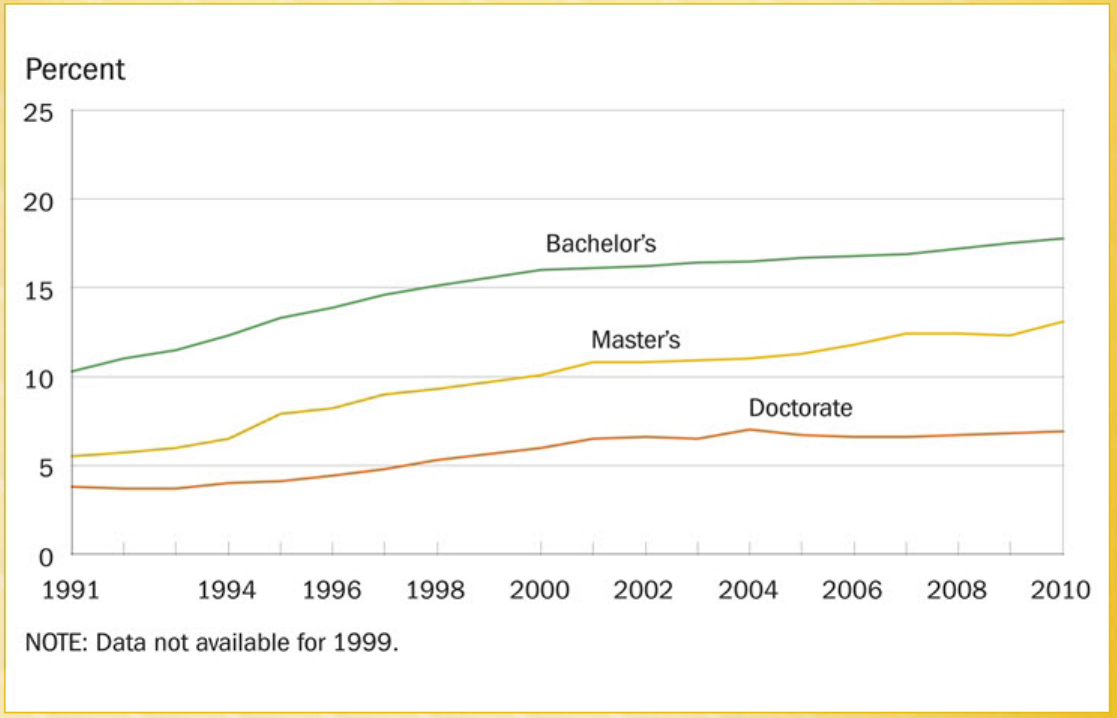
Full-time enrollment among undergraduates: 2010



Women, Minorities, and Persons with Disabilities in Science and Engineering: 2013
www.nsf.gov/statistics/wmpd/

Recent trends in undergraduate enrollment reflect the growth and changing composition of the U.S. college-age population. Most notably, ***underrepresented minorities are an increasing fraction of undergraduate students, and whites are a decreasing fraction***. Among all racial/ethnic groups, more women than men enroll in college.

Science and engineering degrees earned by underrepresented minorities: 1991–2010



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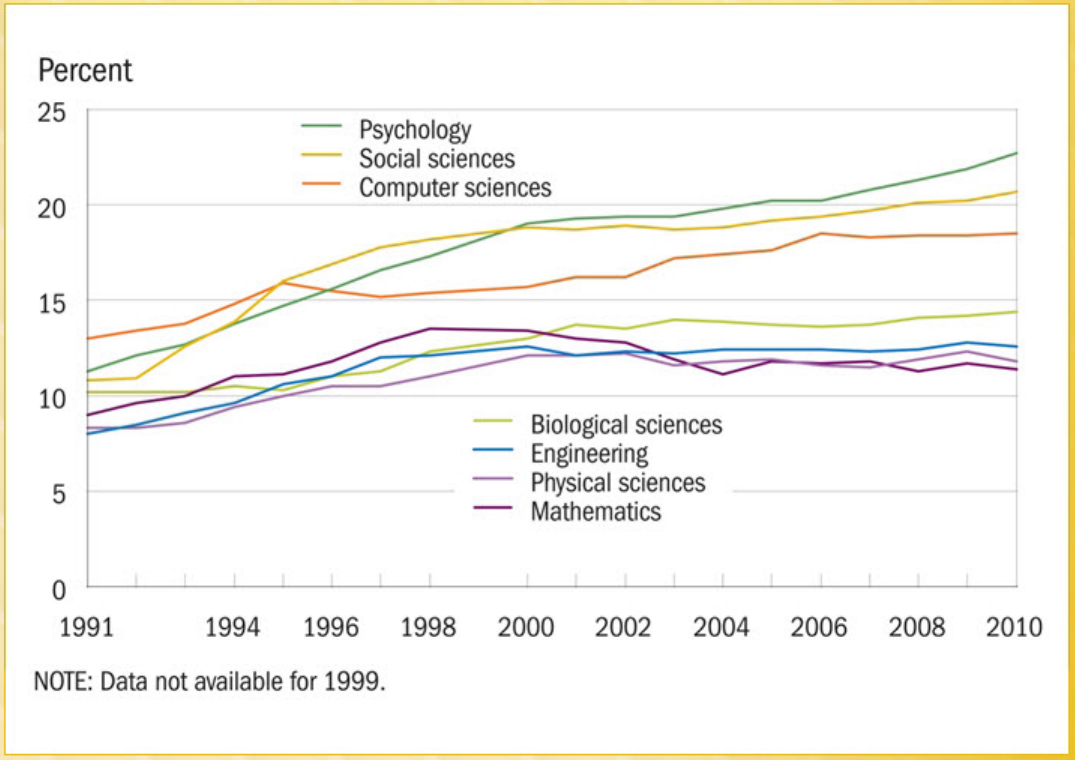
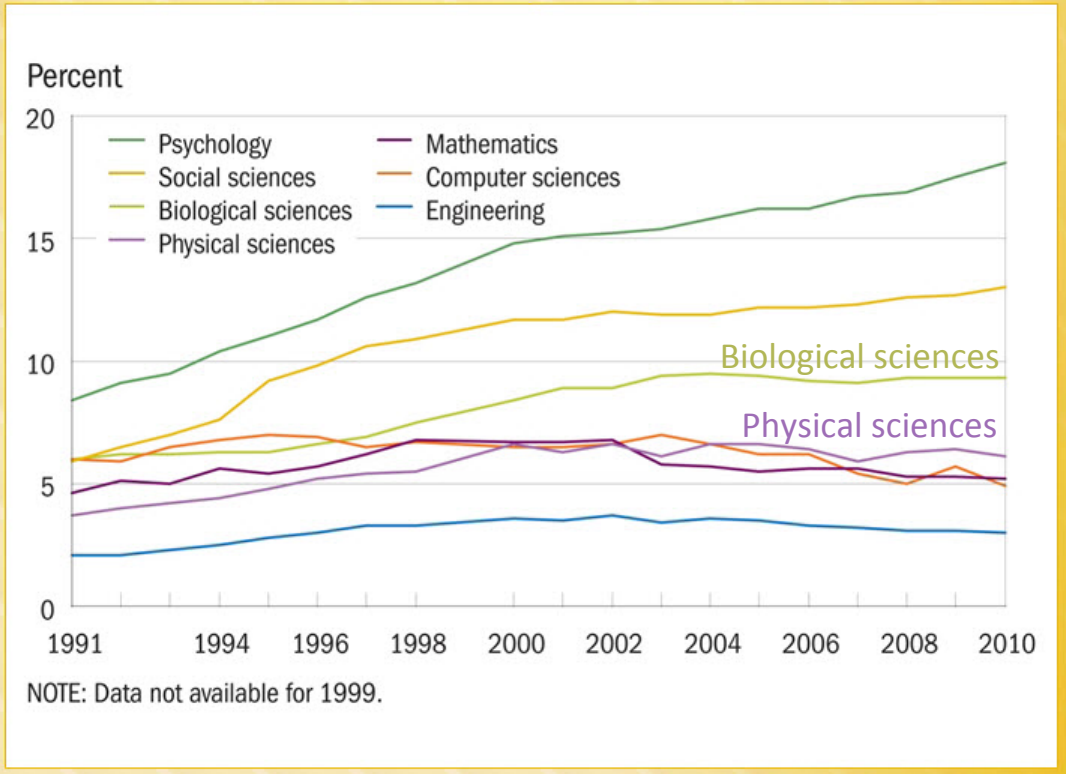
Underrepresented minorities' *—blacks, Hispanics, and American Indians—* ***shares of science and engineering bachelor's and master's degrees have been rising over the two decades*** since 1991, with shares of doctorates in these fields flattening well below 10% after 2000.

Science and engineering bachelor's degrees earned by underrepresented minorities, by field: 1991–2010



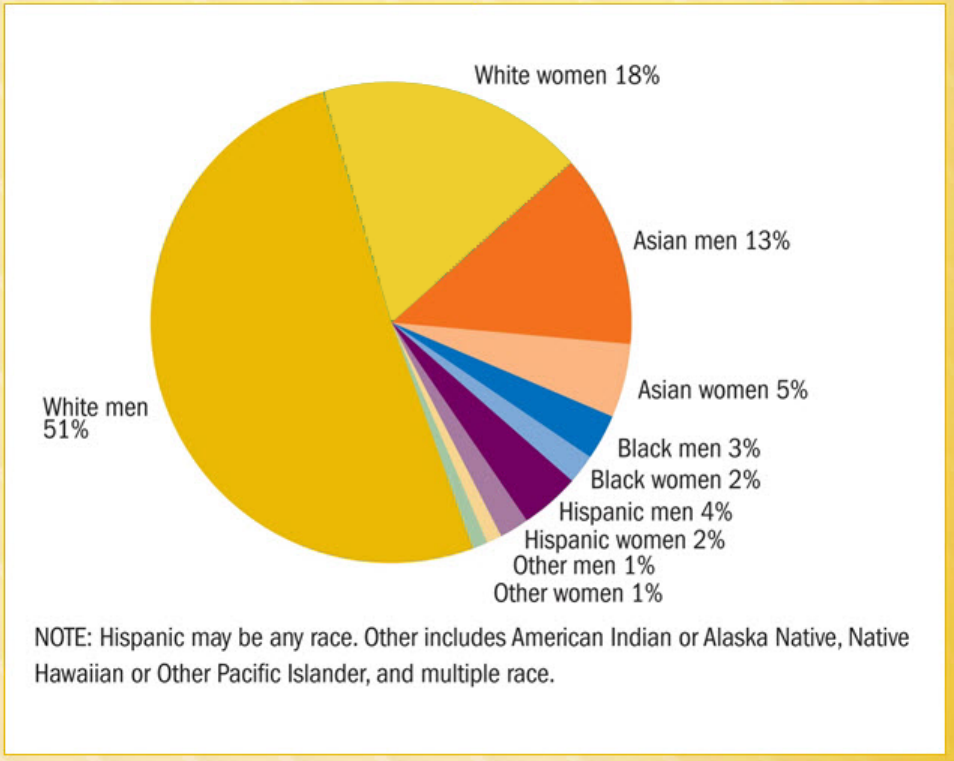
Since 1991, the greatest rise in the share of science and engineering bachelor's degrees earned by underrepresented minorities has been in psychology, the social sciences, and computer sciences. ***Since 2000, underrepresented minorities' shares in engineering and the physical sciences have been flat***, and participation in mathematics has dropped.

Science and engineering bachelor's degrees earned by underrepresented minority women, by field: 1991–2010



Underrepresented minority women, like women in general, ***earn higher proportions of bachelor's degrees in psychology and the social sciences than in engineering, computer sciences, and mathematics.***

Scientists and engineers working in science and engineering occupations: 2010



NOTE: Hispanic may be any race. Other includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and multiple race.

Women, Minorities, and Persons with Disabilities in Science and Engineering: 2013
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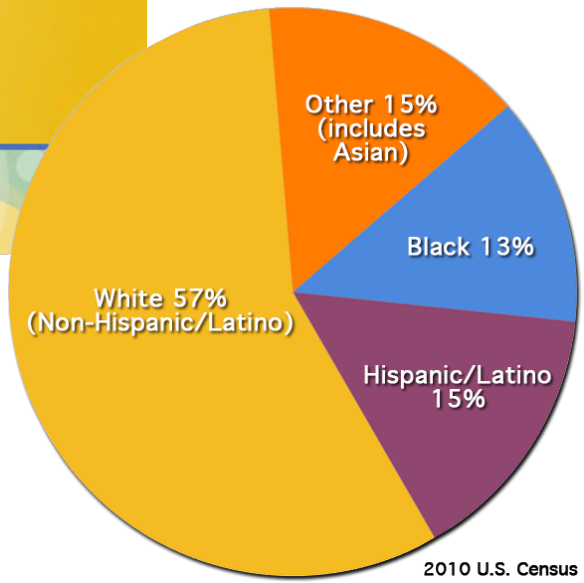
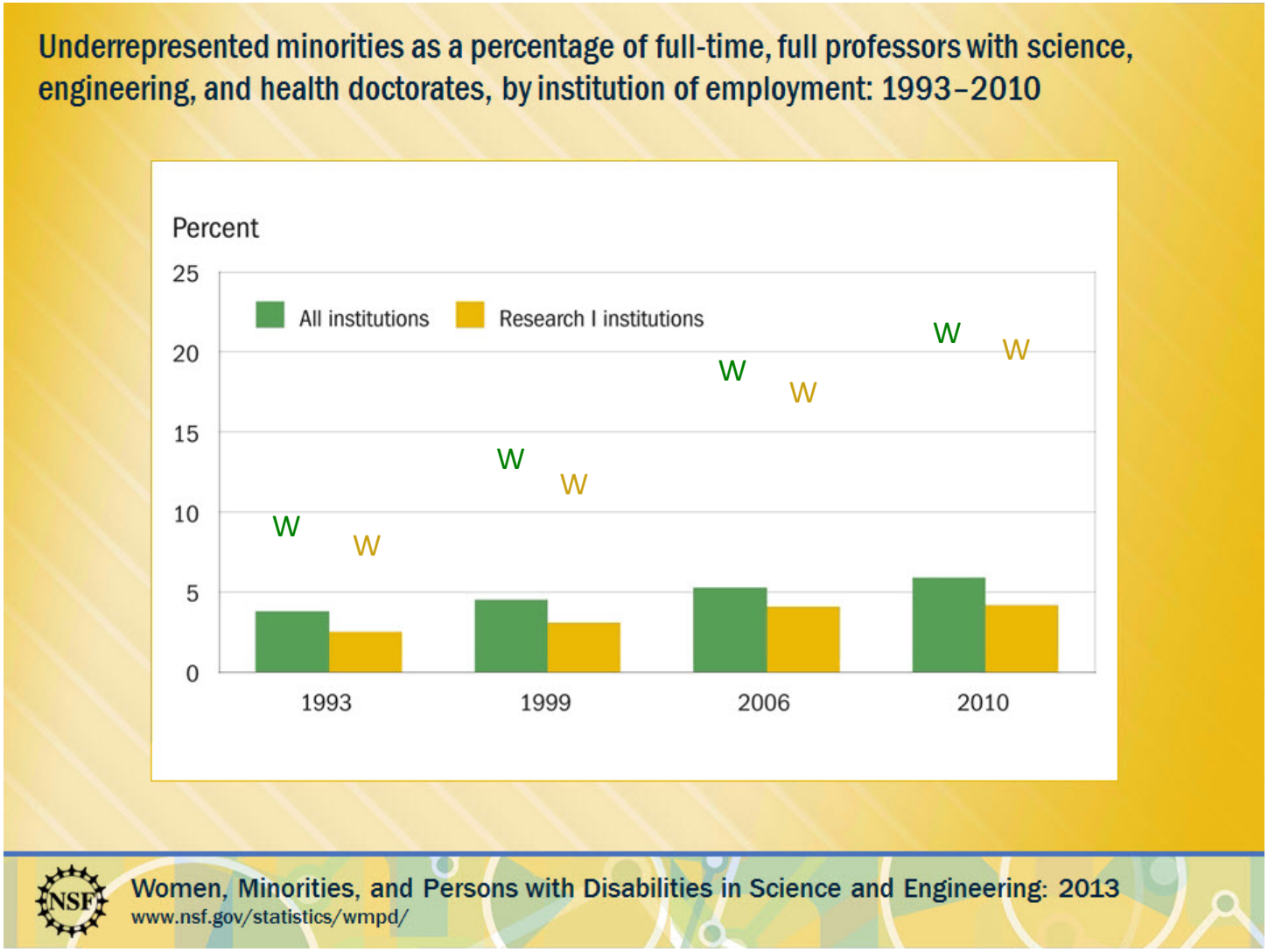
The science and engineering workforce is largely white and male. Minority women comprise about 1 in 10 employed scientists and engineers.



2010 U.S. Census



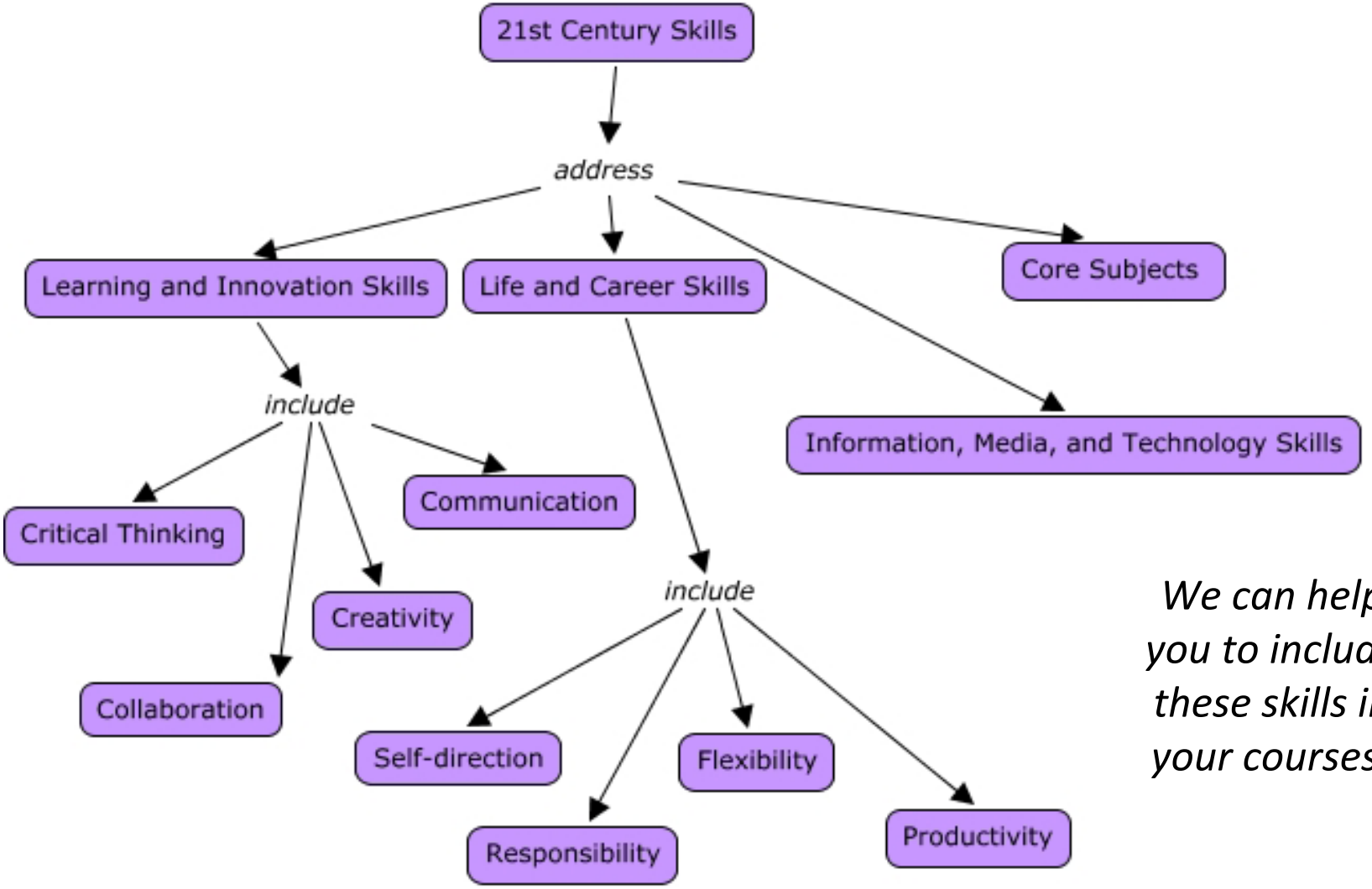
The share of ***full-time, full professorships held by underrepresented minorities is lower and has risen more slowly than the share held by women, shown here as "W"*** (<10% in 1993 and just over 20% in 2010).

Shifting Job Market

	20th Century	21st Century
Number of Jobs:	1 – 2 Jobs	10 – 15 Jobs
Job Requirement:	Mastery of One Field	Critical Thinking Across Disciplines
Teaching Model:	Subject Matter Mastery	Integration of 21st Century Skills into Subject Matter Mastery

Linda Froschauer, National Science Teachers Association (via Jay Labov, National Research Council)

21st Century Skills



We can help you to include these skills in your courses!

Larger SBS Cohort Might Benefit from Group-based "Active Learning"

Table 2. Types of active learning that have been demonstrated to enhance learning.

Types of active learning with feedback	Examples of studies that demonstrate enhanced learning
Small group discussion and peer instruction	Anderson et al. (2005); Armbruster et al. (2009); Armstrong et al. (2007); Beichner et al. (1999); Born et al. (2002); Crouch and Mazur (2001); Fagen (2002); Lasry et al. (2008); Lewis and Lewis (2005); McDaniel (2007a, 2007b); Rivard and Straw (2000); Tessier (2004 and 2007); Tien et al. (2002)
Testing	Steele (2003)
One-minute papers	Almer et al. (1998); Chizmar and Ostrosky (1998); Rivard and Straw (2000)
Clickers	Smith et al. (2009, 2011)
Problem-based learning	Capon and Kuhn (2004); Preszler et al. (2007)
Case Studies	Preszler (2009)
Analytical challenge before lecture	Schwartz and Bransford (1998)
Group tests	Cortright et al. (2003); Klappa (2009)
Problem sets in groups	Cortright et al. (2005)
Concept mapping	Foncesca et al. (2004); Prezler (2004); Yarden et al. (2004)
Writing with peer review	Pelaez (2002)
Computer simulations and games	Harris et al. (2009); McDaniel et al. (2007); Traver et al. (2001)
Combination of active learning methods	Freeman et al. (2007); O'Sullivan and Cooper (2003)

Note: All studies cited compare treatment and control groups.

With this Info in Mind, What's Next?

- Instructing Students with Diverse Backgrounds (Ted) – 20 min.
  - Clear expectations (written and oral)
  - Strategic & effective group work to break down barriers & enhance learning
- Mentoring Students from Diverse Backgrounds (Sieg) – 20 min.
  - Influencing diverse students' learning both inside & outside of the classroom (over the semester)
- Online Resources for Students & Faculty (Chris) – 15 min.
  - Walkthrough of IBP web-based resources
  - Demonstration of searching for specific resources & opportunities
- Facilitated Activity (All) – 15 min.
  - Choose one topic, Do a search, Ask a question or make a comment:
    - Partnership Directory
    - Mentorship Manuals
    - Student Searches for Resources

Resources

- NSF's "Women, Minorities, and Persons with Disabilities in Science and Engineering"
  - www.nsf.gov/statistics/wmpd/2013/
- President's Council of Advisors on Science and Technology (PCAST): Engage to Excel
  - www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-engage-to-excel-final_2-25-12.pdf
- Institute for Broadening Participation
  - www.ibparticipation.org
- 21st Century Skills: Preparing Students for Their Future
  - https://www.mheonline.com/mhmymath/pdf/21st_century_skills.pdf
- Many Learning Pathways in the Ocean Sciences – Webinar Series
  - cosee.umaine.edu/programs/webinars/mlpios/