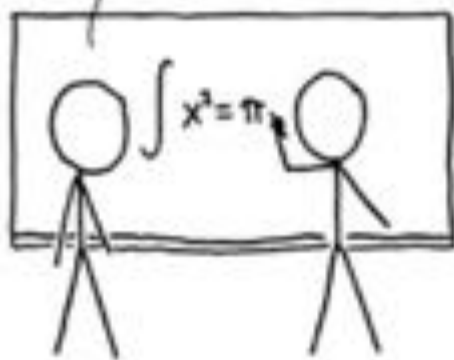


# On DiversITy in STEM, privacy and information security

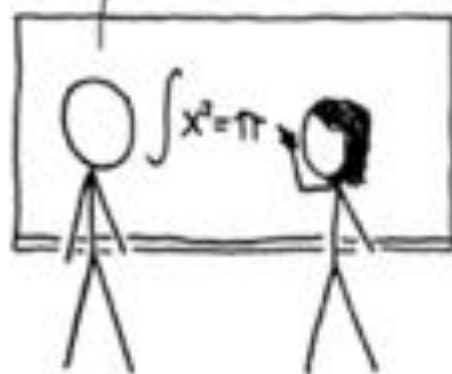
Dr. Pablo G. Molina, CIO, Southern  
Connecticut State University  
Adjunct Professor, Georgetown  
University



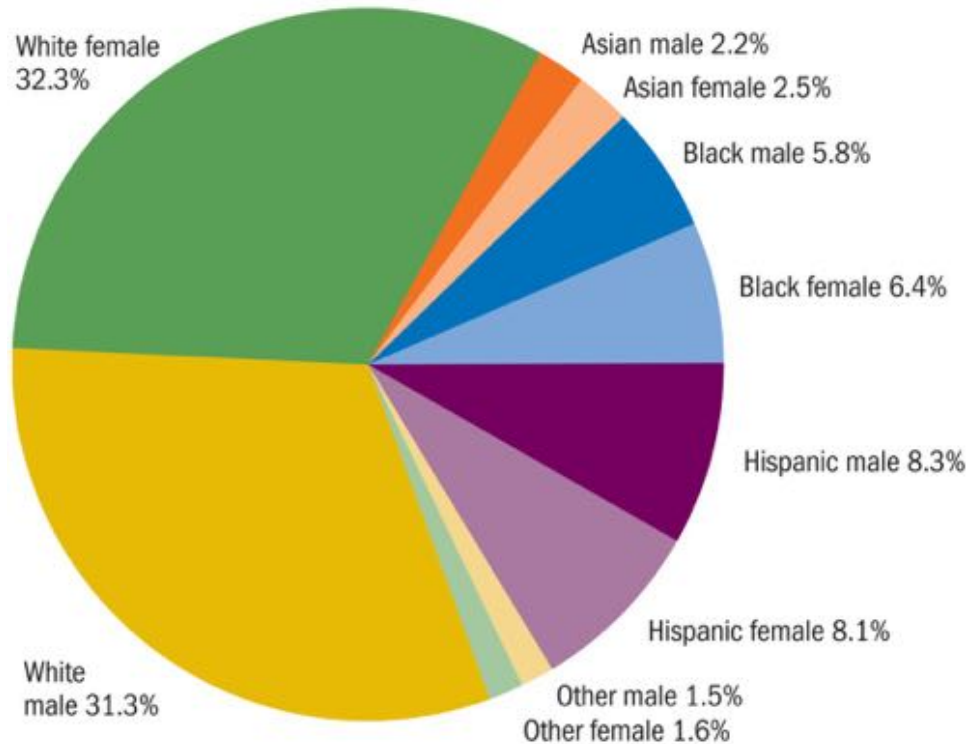
WOW, YOU  
SUCK AT MATH.



WOW, GIRLS  
SUCK AT MATH.



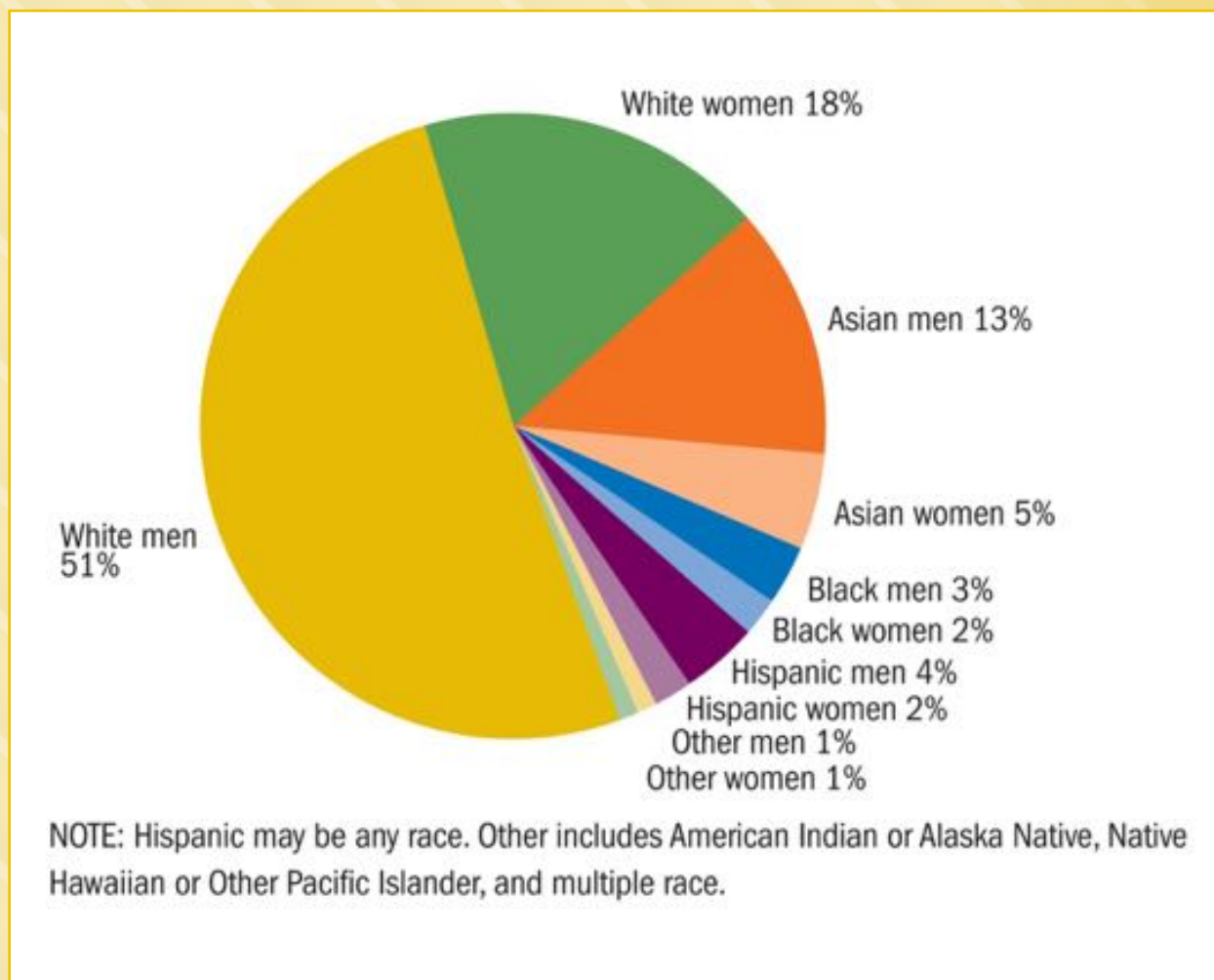
# Resident population of the United States, by sex and race/ethnicity: 2010



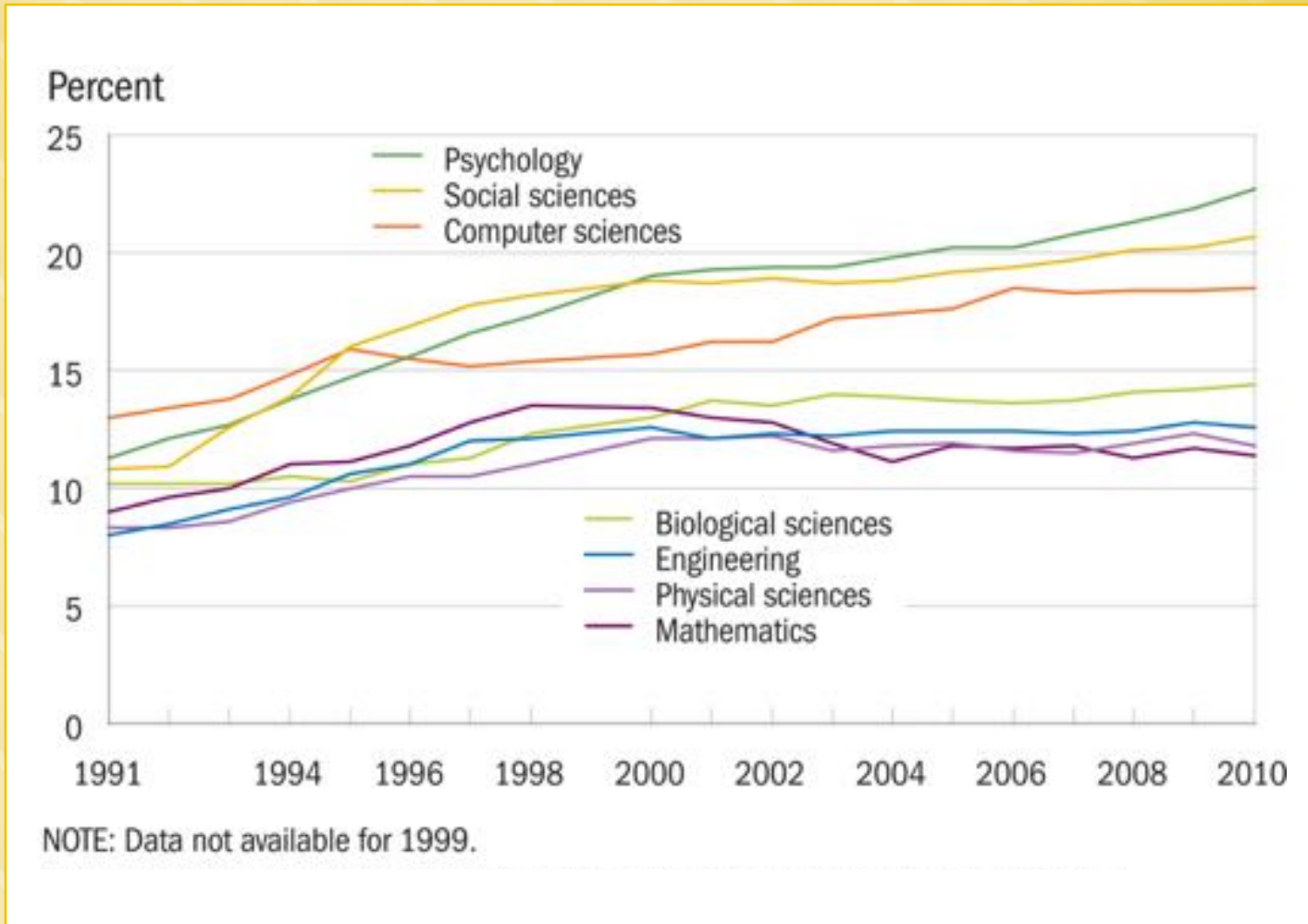
NOTE: Hispanic may be any race. Other includes American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and multiple race.



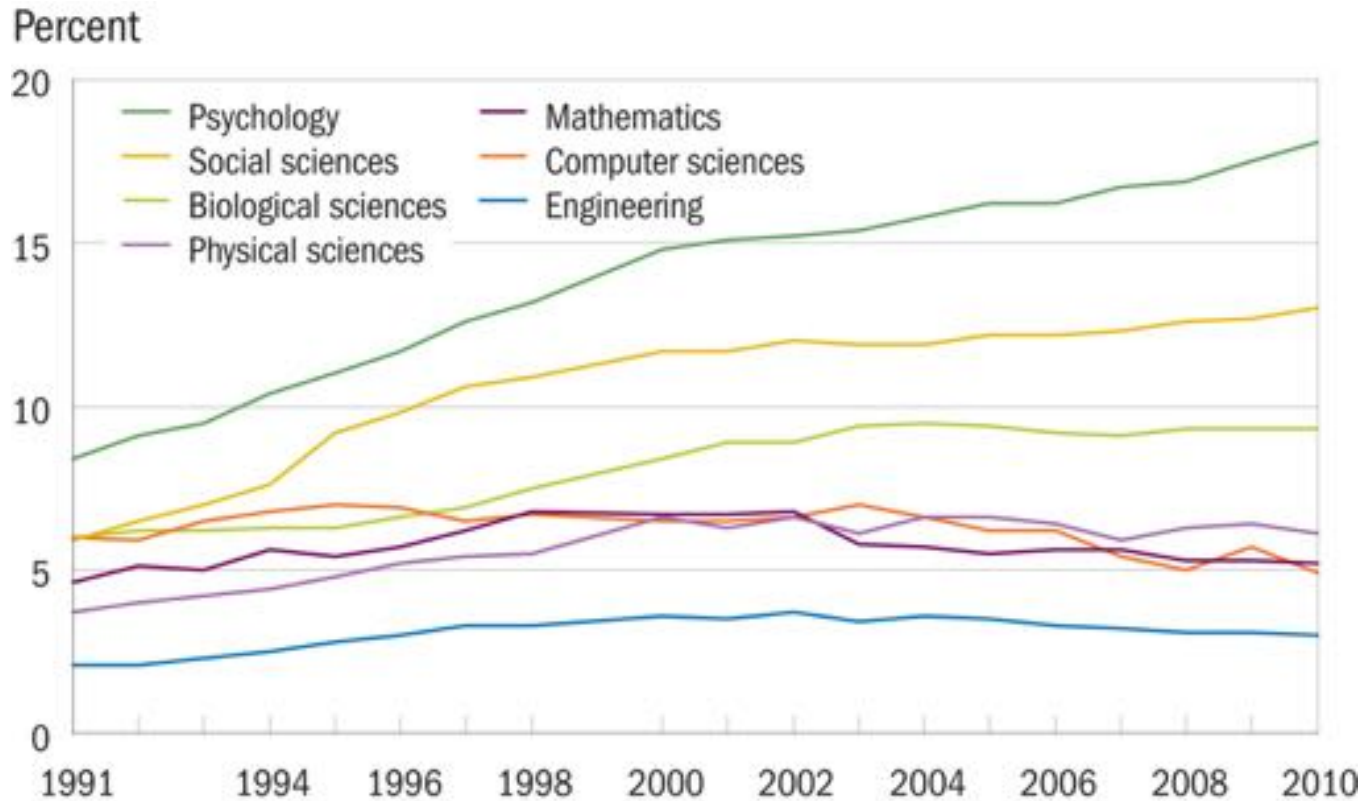
# Scientists and engineers working in science and engineering occupations: 2010



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



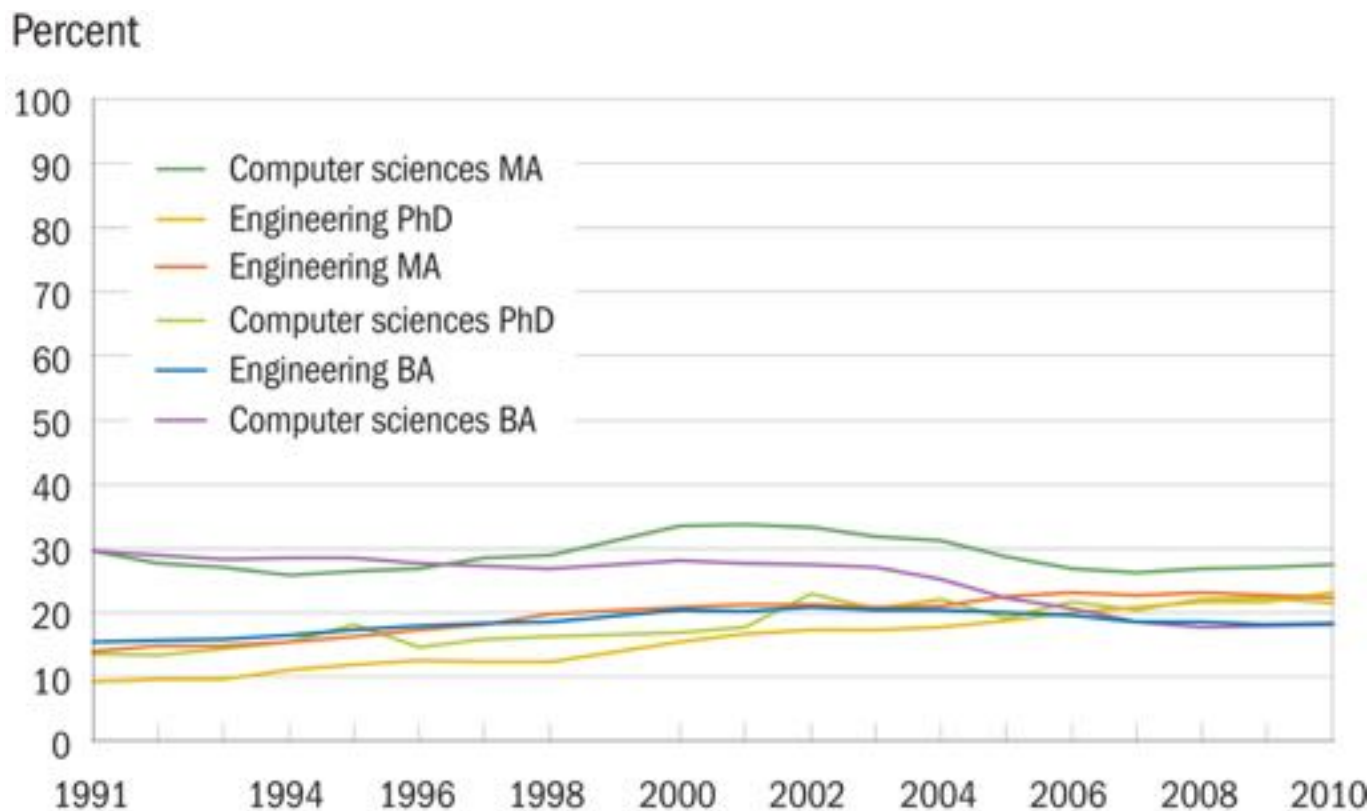
# Science and engineering bachelor's degrees earned by underrepresented minority women, by field: 1991–2010



NOTE: Data not available for 1999.



# Low participation fields for women: Computer sciences and engineering, 1991–2010

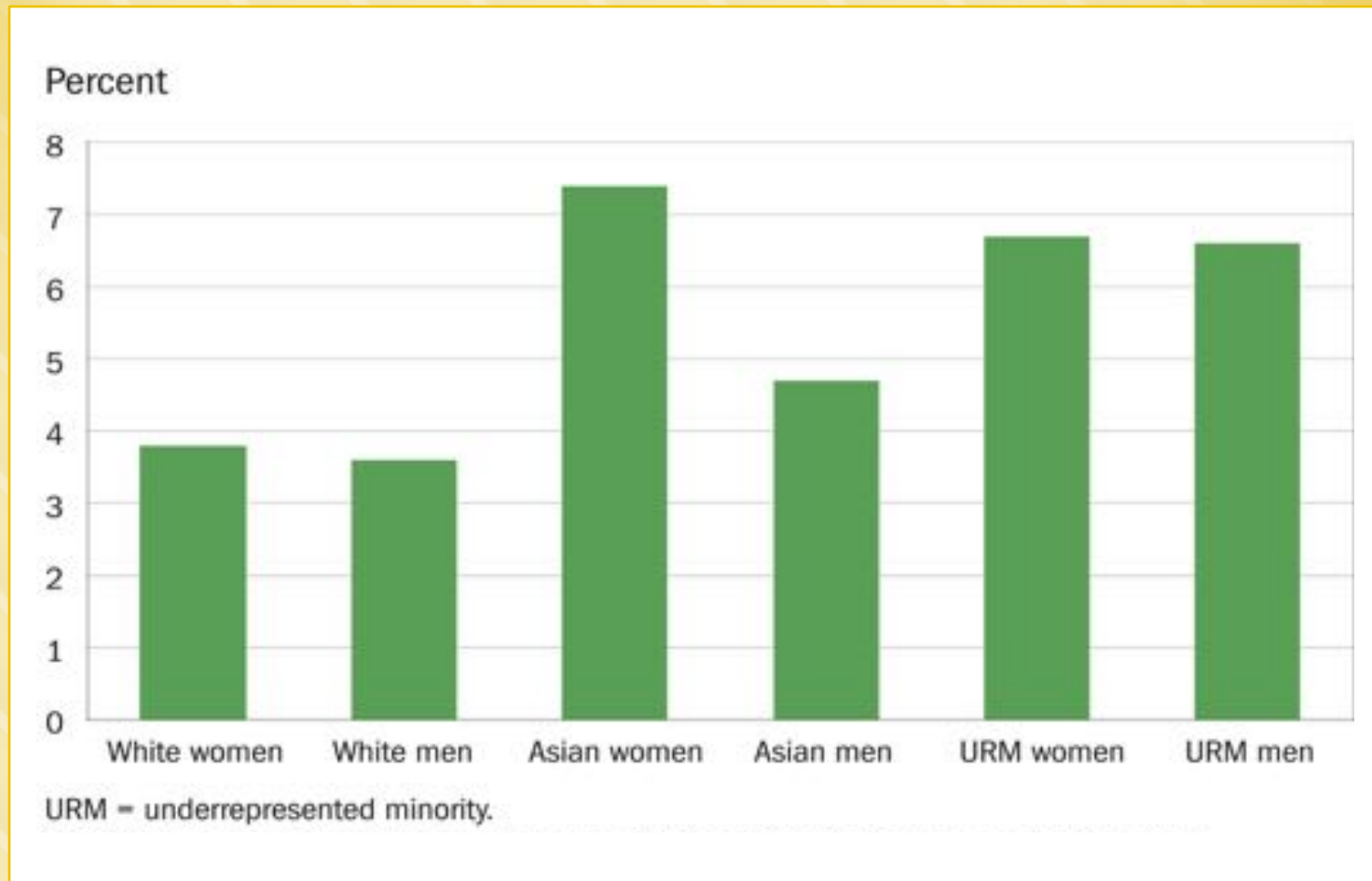


NOTE: Data not available for 1999.

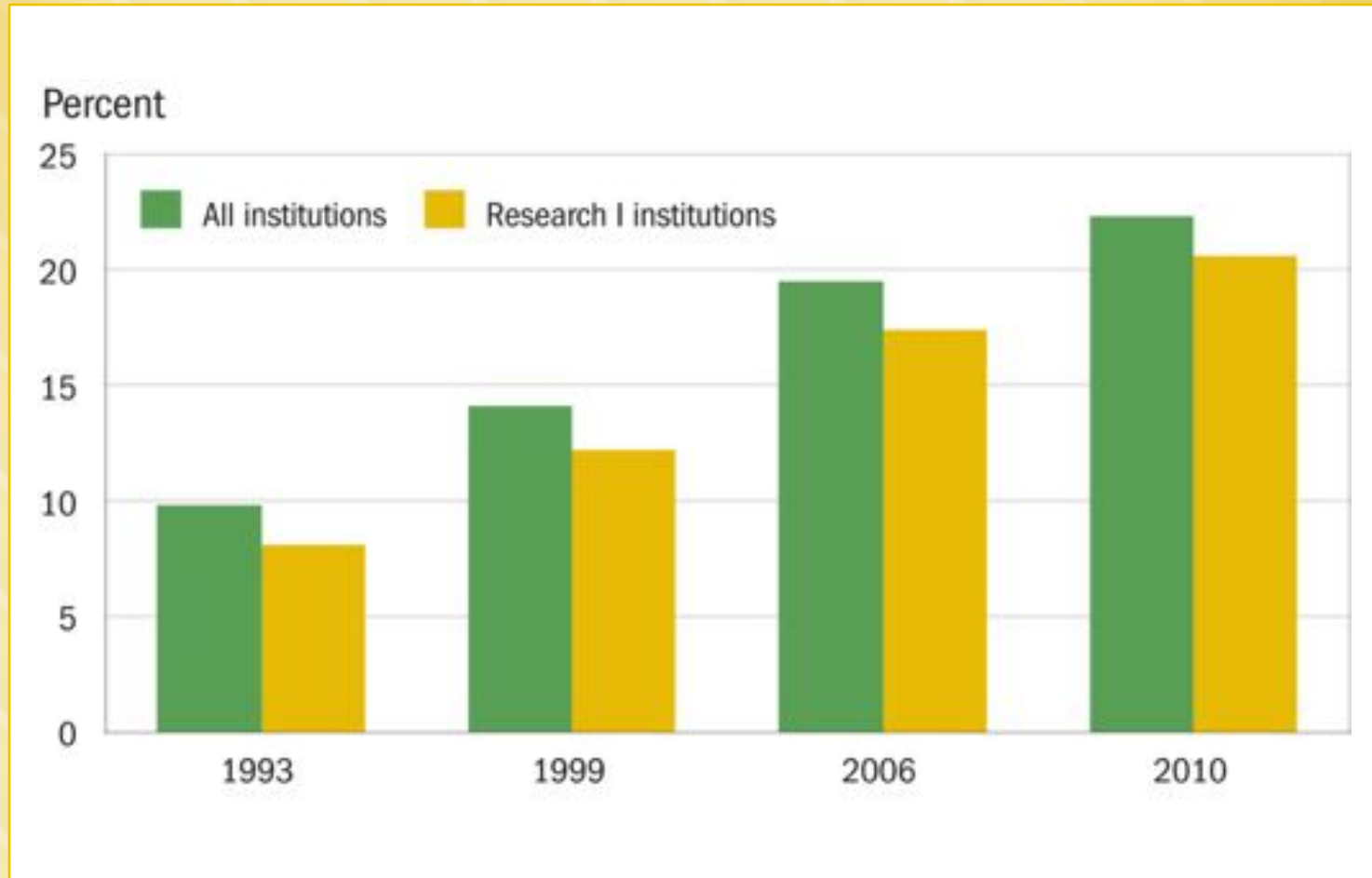




# Unemployment rates of scientists and engineers: 2010



# Women as a percentage of full-time, full professors with science, engineering, and health doctorates, by institution of employment: 1993–2010



# Underrepresented minorities as a percentage of full-time, full professors with science, engineering, and health doctorates, by institution of employment: 1993–2010

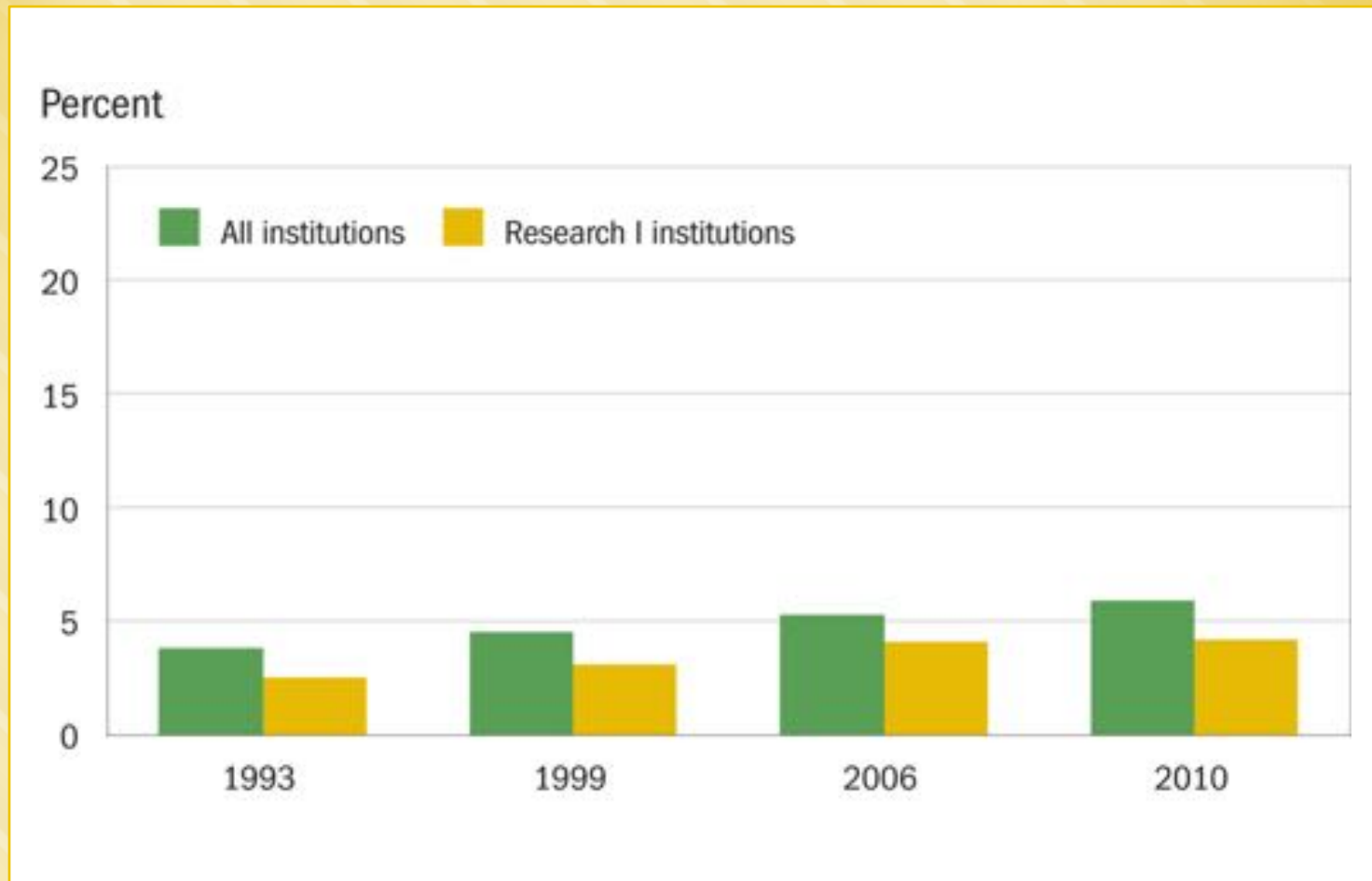
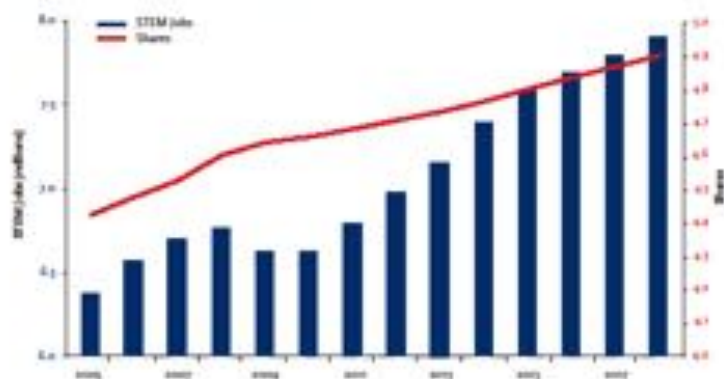


Figure 4: STEM jobs are an increasing share of all jobs in the U.S. economy.

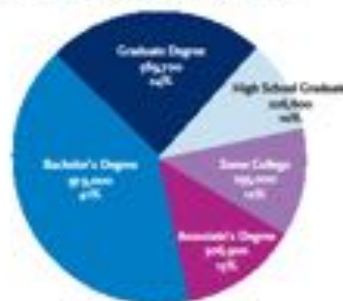


Source: Congressional Budget Office, Center on Education and the Workforce, *Forecast of occupational growth, 2008*

Figure 4 shows projected STEM occupations (bars) and their share of the total U.S. economy (line). As with many other occupations during the recession, STEM lost a substantial number of jobs in 2009 and 2010. It will regain those—and more—once the economy is fully under way. We project steady expansion for the sector through 2018, when the number of STEM jobs will have grown from 4.4 million to nearly 8 million—from 4.4 percent to 4.9 percent of all jobs in the U.S. economy.

Coupled with the rapid creation of new STEM jobs will be significant job openings due to baby-boomer retirements. Job openings arise when new jobs have been created or when replacement positions have become available due to incumbent workers retiring or moving to other sectors of the economy. We project 2.4 million job vacancies for STEM occupations between 2008 and 2018. Figure 5 shows the education levels those jobs will require. As with STEM jobs in general, a substantial portion of the projected vacancies (65%) will require Bachelor's and graduate degrees. Despite the educational intensity of the field, however, there will also be over 790,000 job openings available in STEM occupations for workers with less than a Bachelor's degree (see Table 1).

Figure 5: Distribution of STEM new and replacement occupations by level of education in 2008: The majority of new and replacement occupations in STEM will require at least some postsecondary education



Employment projections of STEM new and replacement jobs through 2018: 2.4 million

Source: Congressional Budget Office, Center on Education and the Workforce, *Forecast of occupational growth through 2018*

## Part 2: What is STEM?

### THERE IS GREAT VARIETY AMONG STEM OCCUPATIONS

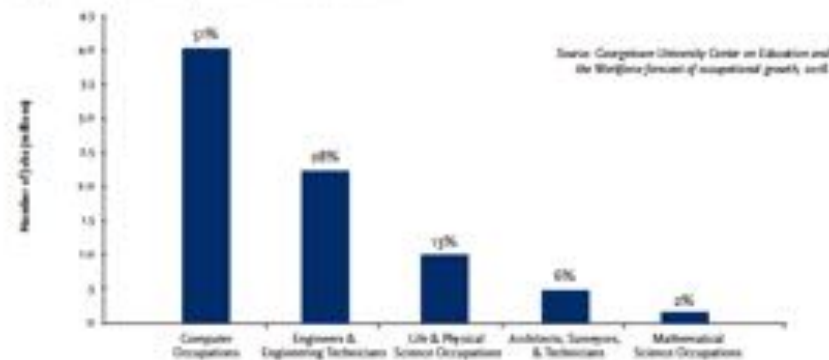
STEM occupations include five major subgroups<sup>4</sup>

- Computer occupations<sup>5</sup>
- Mathematical science occupations
- Architects, Surveyors, and Technicians
- Engineers and Engineering Technicians
- Life and Physical Science occupations<sup>6</sup>

Jobs in these occupations include computer scientists, network and computer systems administrators, database administrators, architects, architectural drafters, nuclear technicians, various kinds of engineers, hydrologists, materials scientists, geneticists, microbiologists, biochemists, and many others.

Although we discuss STEM as a unitary set of occupations, there is much diversity under the broader STEM umbrella.

Figure 1: Computer occupations dominate STEM: 2018



<sup>4</sup> Computers (SOC 13-0000, SOC 13-1099), Mathematical Science (SOC 15-0000, SOC 15-1099), Architects, Surveyors, and Technicians (SOC 17-0000, SOC 17-1000, SOC 17-2000, SOC 17-3000, SOC 17-4000), Engineers and Engineering Technicians (SOC 17-0000, SOC 17-1099, SOC 17-2000, SOC 17-3000), Life and Physical Science (SOC 19-0000, SOC 19-1099, SOC 19-2000, SOC 19-3000).

<sup>5</sup> We use "Computer occupations" and "Computer workers" throughout the report as shorthand for Computer Technicians, Computer Programmers, and Computer Scientists.

<sup>6</sup> Our definition of STEM excludes social scientists. In a separate analysis, we provide education and training information for the social sciences (see Carnevale, Smith, and Sothell 2010).

Table 1. Education distribution of job growth due to new and replacement STEM jobs 2018

LEVEL OF EDUCATION	COMPUTER OCCUPATIONS	ENGINEERS & ENGINEERING TECHNICIANS	LIFE & PHYSICAL SCIENCE OCCUPATIONS	ARCHITECTS SURVEYORS & TECHNICIANS	MATHEMATICAL SCIENCE OCCUPATIONS	TOTAL STEM
High School Dropout	10,100	1,600	-	300	-	12,000
High School Graduate	85,000	130,800	4,100	4,000	300	224,200
Some College	124,600	98,100	3,300	4,600	4,400	235,000
Associate's Degree	111,400	175,500	-	8,300	1,700	306,900
Bachelor's Degree	353,400	181,400	129,900	79,400	23,900	678,000
Master's Degree	221,900	79,600	85,000	49,100	11,600	437,200
Professional Degree	8,300	3,300	8,300	3,300	3,300	26,500
Doctorate	24,600	9,500	69,100	3,700	4,600	111,500
<b>Total</b>	<b>1,019,200</b>	<b>679,800</b>	<b>300,400</b>	<b>142,700</b>	<b>48,800</b>	<b>2,189,500*</b>

Source: Georgetown University Center on Education and the Workforce, *Forecast of Occupational Growth through 2018*.

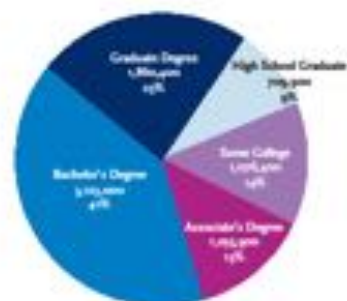
\*Numbers may differ slightly due to rounding.

Additionally, while on the whole, STEM occupations require high educational attainment, there is significant variation within different STEM occupations, as shown in Table 2. For example, Life and Physical Science occupations rely heavily on the highest levels of education, with almost half of the demand in these occupations being for workers with Master's and Doctoral degrees. Computer workers and Mathematical-Science occupations, as well as Architects, Surveyors, and Technicians, mostly demand Bachelor's degrees. In contrast, many Engineering occupations require Associate's degrees and/or some college, including postsecondary vocational certificates.

#### **MOST, BUT NOT ALL, STEM JOBS REQUIRE AT LEAST A BACHELOR'S DEGREE**

Close to two-thirds (65%) of STEM jobs will require a Bachelor's degree or better by 2018. Overall, STEM is the third-most education-intensive occupational cluster, exceeded only by Healthcare Professional occupations and Education occupations.

Figure 6. Distribution of all STEM occupations by level of education in 2018



Employment projections of STEM jobs in 2018: 8 million

Source: Georgetown University Center on Education and the Workforce, *Forecast of Occupational Growth through 2018*.

# The law of the land

- American with Disabilities Act
- Anti-discrimination labor laws

# In black and white, and 50 shades of grey

- Age
- Disability
- Equal pay/compensation
- Genetic information
- Pregnancy
- Race/color
- Religious
- Retaliation
- Sex
- Sexual harassment

Source: U.S. Equal Employment Opportunity Commission



# Everybody wants to have diversity

- Some question its fairness in implementation
- Some do not get it
- Some are not willing to pay the price

# Is there a cost to diversity?

- There is not such a thing as a free lunch
- Section 508 compliance costs money
- Close captioning multimedia materials costs money
- Thinking about diversity takes time and effort