



Overview of Science and Engineering Indicators 2016

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Background

- Science and Engineering Indicators (SEI)
 - High quality, quantitative data on U.S. and international science and engineering (S&E) enterprise
 - Biennial report mandated by Congress
 - Factual, policy relevant, and policy neutral
 - No policy recommendations
 - SEI is produced and published by NSF's NCSES, under the guidance of the National Science Board (NSB)
 - Extensive review: outside experts, federal agencies including NSF, NSB

SEI 2016: Digital Report



National Science Board
SCIENCE & ENGINEERING INDICATORS 2016



Report

State Indicators

Data

Figures

Topics

Digest

Science and Engineering Indicators 2016

A broad base of quantitative information on the U.S. and international science and engineering enterprise



2016 Indicators Report



State Indicators



Data



Figures



2016 Digest

Explore the Full Report

Science and Engineering Indicators is the premier source of information on the U.S. and international science and engineering enterprise. Learn more about important topics, including education; workforce; national and international R&D trends; academic R&D; industry, technology, and the global marketplace; public attitudes and understanding, and state performance.

Explore the 2016 Report



SEI Suite of Products

- Report: seven broad topics
 - K-12 science and math education and higher education in S&E (chapters 1 and 2); S&E workforce (chapter 3)
 - National and international trends in R&D; academic R&D; industry and innovation (chapters 4, 5, 6)
 - Public attitudes and understanding of science and technology (chapter 7)
- Overview and Digest
 - Draw connections among the different topics
- State Data Tool
- NSB: Companion Briefs

Conceptual Framework

- Data are “indicators”
 - Information on scope, vitality, and quality of S&E enterprise
 - Central to the functioning of the S&E enterprise
- Define indicators
 - Data tables, figures, and narrative text to describe significant findings and provide other contextual information
 - Core set updated every cycle
 - New indicators based on data availability or emerging issues or other policy interests
- Criteria for data
 - Compiled from a variety of sources: federal, nonfederal, international
 - Relevance, timeliness, representativeness
 - Statistical and methodological quality
 - Sidebars

Primary Audience, Strength, Challenge

- Wide and diverse audience
 - Policymakers
 - Researchers, journalists, educators, and students
- Strength
 - Quality of information
 - Authoritative, unbiased, objective
 - Comprehensive
 - Suite of products that meet the need of a diverse audience
- Challenge
 - Production process is resource intensive
 - How do we maintain high quality in a world that expects shorter cycles for information turnaround?

Undergraduate S&E Data in SEI

- Undergraduate enrollment data
 - National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Fall Enrollment Survey
 - Intentions to major in S&E fields
 - University of California, Los Angeles, Higher Education Research Institute, The American Freshman: National Norms survey
 - International students
 - Institute of International Education (IIE)
 - U.S. Department of Homeland Security, U.S. Immigration and Customs Enforcement, Student and Exchange Visitor Information System (SEVIS)
- Undergraduate degree data
 - National Center for Education Statistics, IPEDS, Completions Survey
- Analyses by demographic characteristics, type of institutions, field

Undergraduate S&E Data in SEI

- S&E degrees account for about one-third of all bachelor's degrees awarded in the U.S.
- Women earn about half of all S&E degrees
 - Men earn the majority of bachelor's degrees in engineering, computer sciences, mathematics and statistics, and physics, and women earn the majority in the biological, agricultural, and social sciences and in psychology
- The racial and ethnic composition of those earning S&E bachelor's degrees is changing
 - Population changes and increases in college attendance by members of minority groups
- At the bachelor's level, attrition from STEM majors was lower than in many non-STEM majors (NCES report, Chen and Soldner 2013)
 - Mathematics, physical sciences, biological and life sciences, computer and information sciences, engineering and engineering technologies, and science technologies
 - Among students starting their bachelor's degree program in the 2003-04 academic year, about half of those who declared these STEM majors had either left school altogether by spring 2009 (20%) or left STEM for another field (28%)
 - Bachelor's degree students in the humanities, education, and health sciences had higher attrition rates (56%–62%) than students in STEM fields (48%), in the social and behavioral sciences (45%), and in business (50%)

State Indicators Data Tool

- State-level data on science, engineering, technology, and education measures
- Unlike main SEI report, the tool presents indicators individually
- Indicators normalized to enable comparison among states of different sizes
- Key elements: data, text, and visual
 - Table: data back to 1990, if available, plus trend lines for each state, the District of Columbia, and Puerto Rico
 - Chart: graphical representation of each indicator over the years for all states
 - Map: Color coded map where states are presented in quartiles and histogram to show state distribution
 - The visualization helps the reader quickly grasp geographic patterns

State Indicators Data Tool

8-17 : Bachelor's Degrees Conferred per 1,000 Individuals 18–24 Years Old (Degrees)

← PREVIOUS INDICATOR | NEW INDICATOR | NEXT INDICATOR →

> Description

> Findings

🇺🇸 Map View

📊 Chart View

📄 Table View



◀ prev | next ▶

State▼	2002↕	2003↕	2004↕	2005↕	2006↕	2007↕	2008↕	2009↕	2010↕	2011↕	2012↕	2013↕	Trend
AK	21.1	20.0	19.5	19.4	21.2	20.3	19.9	22.2	21.4	22.9	22.0	22.9	
AL	45.0	44.8	46.6	47.0	47.7	47.2	49.6	50.6	53.3	56.2	56.2	61.0	
AR	37.0	38.5	39.1	40.8	41.4	41.7	41.5	42.7	43.9	46.0	49.1	49.6	
AZ	48.7	50.3	56.1	60.8	65.5	70.7	71.7	75.1	80.6	88.2	104.0	106.6	
CA	35.9	36.7	37.8	38.8	39.7	39.9	40.7	40.2	40.6	41.7	42.3	44.1	
CO	49.1	51.1	52.6	54.4	59.0	61.8	62.0	60.7	59.3	60.2	61.9	64.4	
CT	51.8	54.8	56.4	55.0	57.9	58.8	59.1	59.0	59.4	59.2	61.5	62.8	
DC	119.6	124.7	130.4	123.8	137.4	130.7	131.3	129.0	117.2	115.0	125.7	128.3	
DE	60.7	62.3	61.2	62.3	63.6	58.6	59.9	60.8	60.3	63.6	63.1	67.6	
FL	38.8	39.0	40.6	40.8	42.3	43.7	45.1	46.3	47.8	48.7	50.8	52.6	
GA	34.2	36.2	40.0	39.5	39.6	40.2	41.1	41.8	43.5	45.2	45.4	46.7	
HI	38.4	38.9	41.8	39.6	42.7	43.1	44.3	43.5	40.2	42.1	43.4	44.7	
IA	63.2	64.2	64.0	66.3	68.6	72.8	79.0	85.5	98.9	116.2	129.2	129.8	
ID	33.5	39.7	39.7	47.6	50.6	51.8	50.9	58.4	61.3	59.1	62.9	66.3	
IL	46.7	48.0	47.5	51.4	54.9	56.4	55.9	55.6	56.8	57.5	57.8	60.3	
IN	53.7	55.2	56.7	57.3	59.6	60.4	60.6	61.0	64.0	66.2	68.6	69.7	

State Indicators Data Tool

8-17 : Bachelor's Degrees Conferred per 1,000 Individuals 18–24 Years Old (Degrees)

← PREVIOUS INDICATOR | NEW INDICATOR | NEXT INDICATOR →

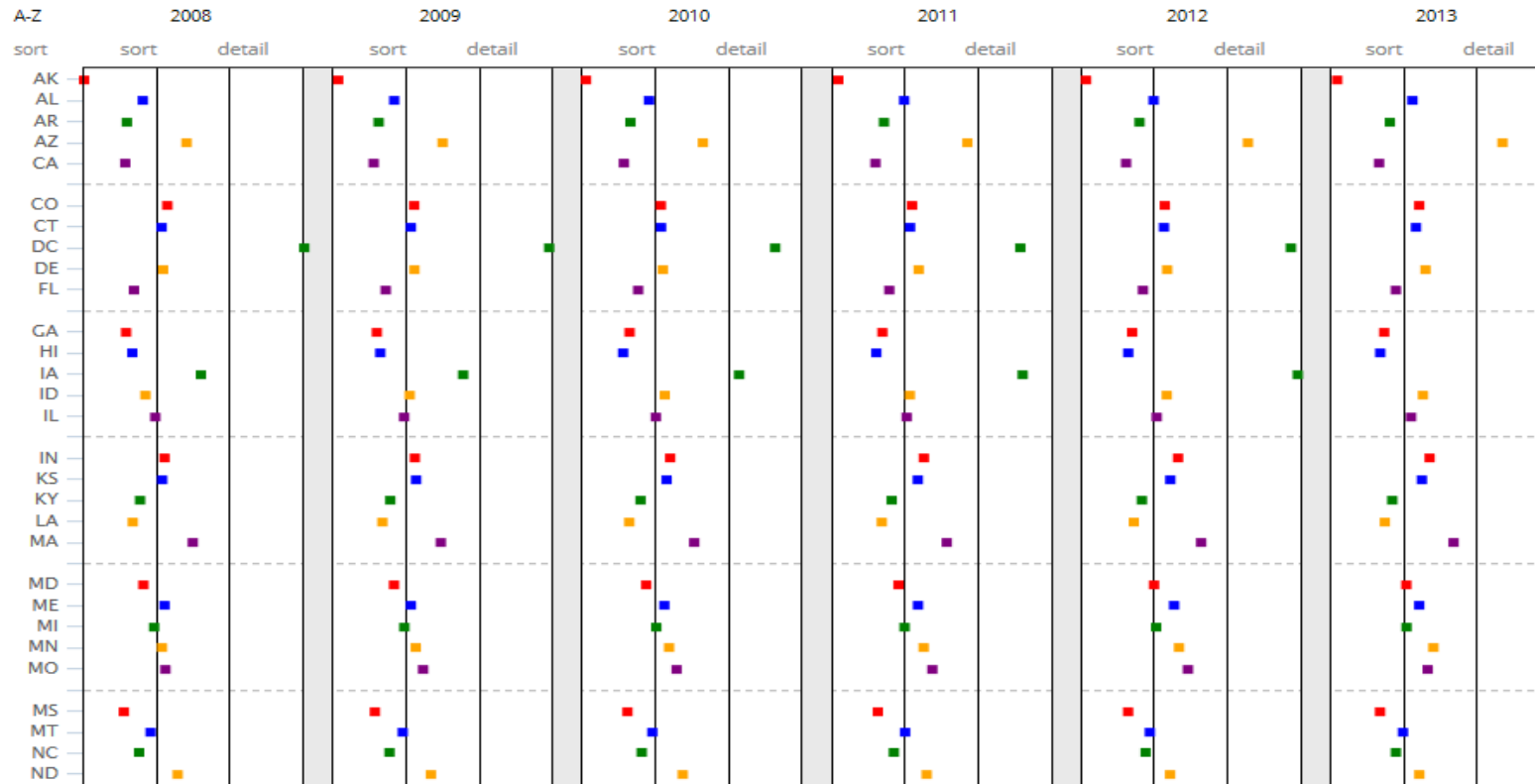
> Description

> Findings

Map View

 Chart View

Table View

[← PREVIOUS YEAR](#)

State Indicators Data Tool

8-17 : Bachelor's Degrees Conferred per 1,000 Individuals 18–24 Years Old (Degrees)

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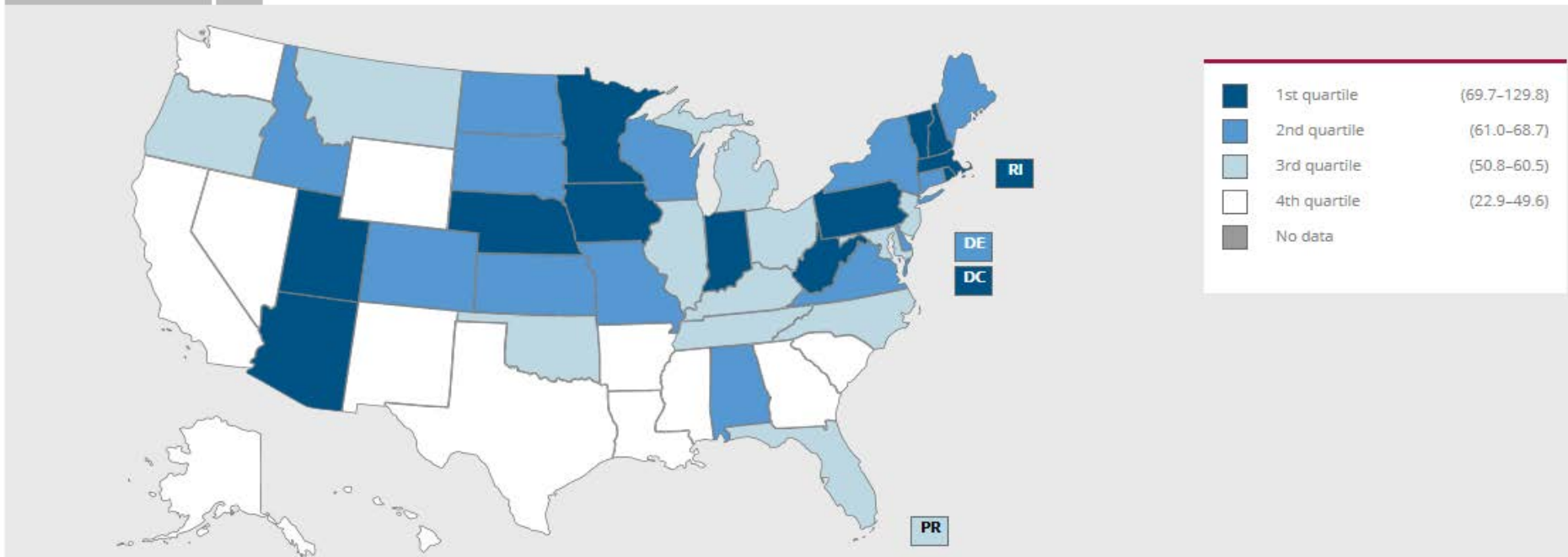
🇺🇸 Map View

📊 Chart View

📄 Table View



Choose Year : 2013



State Indicators Data Tool

8-17 : Bachelor's Degrees Conferred per 1,000 Individuals 18–24 Years Old (Degrees)

[← PREVIOUS INDICATOR](#) | [NEW INDICATOR](#) | [NEXT INDICATOR →](#)

✓ Description

Higher educational attainment gives people greater opportunities to work in better-paying jobs than are generally available to those with less education. Earning a bachelor's degree also prepares them for advanced education.

Educational attainment varies by several demographic characteristics including age. The cohort 18–24 years old was chosen to approximate the age range of most students who are pursuing an undergraduate degree. This indicator represents the extent to which the 18–24 year old population has earned a bachelor's degree.

The number of bachelor's degrees awarded is an actual count provided by the National Center for Education Statistics. Estimates of the population ages 18–24 years are provided by the U.S. Census Bureau. Small differences in the indicator value between states or across time generally are not meaningful.

A high value for this indicator may suggest the successful provision of educational opportunity at this level. Student mobility after graduation is not accounted for, which may make this indicator less meaningful in predicting the qualifications of a state's future workforce. A state's value for this indicator may also be high when its higher education system draws a large percentage of out-of-state students, a situation that sometimes occurs in states with small resident populations and in the District of Columbia.

✓ Findings

- In 2013, more than 1.8 million bachelor's degrees were conferred nationally in all fields, which is up from 1.3 million in 2003 and corresponds to an increase of 36%.
- Between 2003 and 2013, the number of bachelor's degrees conferred per 1,000 individuals 18–24 years old in the population increased by 25% nationwide (from 46.6 in 2003 to 58.4 in 2013).
- In 2013, state values varied greatly. They ranged from 22.9 to 129.8 bachelor's degrees conferred per 1,000 individuals 18–24 years old.
- The number of bachelor's degrees conferred per 1,000 individuals 18–24 years old increased in all states and the District of Columbia between 2003 and 2013.
- Iowa had the largest increase from 2003 to 2013, with more than twice the number of bachelor's degrees conferred per 1,000 individuals 18–24 years old in 2013 than in 2003.